

***Hybrid Spaces, Healthy Places:
Digital Placemaking
as a Place Branding Strategy***

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***Hybrid Spaces, Healthy Places:
Digital Placemaking as a Place Branding Strategy***

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Abstract

Cities are increasingly disconnecting from nature, with decreased nature spaces while populations are discovering their surroundings through technological devices. This thesis aims to understand the dynamics involved in hybrid place experiences that combine physical and digital layers of meaning in public spaces through digital placemaking as a place branding strategy in nature for wellbeing. The thesis addressed gaps in current knowledge on hybrid space effects in community dynamics.

Adopting a critical realism approach, the researcher aims to comprehend how the relationships between digital placemaking, nature and wellbeing are developed. A mixed methods study following a modified Delphi method gathered insights from 26 expert participants in digital placemaking and related fields. Data was collected through three rounds: qualitative semi-structured interviews, and two consecutive rounds of questionnaires to achieve consensus.

The findings present and test a conceptual model of digital placemaking as a place branding strategy in nature for wellbeing. Drawing on place attachment theory, place branding, Social Identity Theory and nature connectedness, the model elucidates key dynamics involved in digital placemaking. Four propositions are confirmed: i) Social Identity Theory act as a binding agent, where online place attachment and community nature connectedness are interlinked; ii) place branding in digital placemaking is expanded, where marketing and communications shape place branding and identity; iii) inclusion and accessibility are essential to ensure the multiple identities of a community are considered; iv) digital placemaking fosters feelings of belonging with the place, with others and with nature supporting wellbeing, enhanced through place attachment, social identity and nature connectedness.

The study advances understanding of digital placemaking's conceptualisation, maturity and practical applications in nature for wellbeing. It confirms the role of hybrid spaces in reconnecting communities with nature and offers actionable insights for scholars and practitioners, particularly in using digital placemaking as a strategy to promote wellbeing.

Declaration

Declaration of GenAI

I acknowledge that this assignment was completed with the assistance of GenAI as a grammar checker and paraphrasing tool in the proofing of the thesis, not in the generation of it, to ensure the quality of writing before submission.

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List of Publications

Peer Review Journal Articles (n = 4)

Fernandez-Osso Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. (2024a). Conceptualizing digital placemaking in nature for wellbeing. *Technological Forecasting and Social Change*, 204, 123440. <https://doi.org/10.1016/j.techfore.2024.123440>

- Scopus Q1 2023 = 3,18 (Applied Psychology, Business and International Management). Level 3 ABS

Fernandez-Osso Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. (2023b) Digital Placemaking, health & wellbeing and nature-based solutions: A systematic review and practice model. *Urban Forestry & Urban Greening*, 79, 127796. <https://doi.org/10.1016/j.ufug.2022.127796>

- Scopus Q1 2023 = 1,619 (Ecology). Level 3 ABS

Fernandez-Osso Fuentes, M. J., Keegan, B. J., Rowley, J., Worboys, E. (2024b) Big trouble in little places: understanding the complexities of place micro-brands. *Journal of Place Management and Development*. <https://doi.org/10.1108/JPMMD-07-2023-0077>

- Scopus Q2 2023 = 0,545 (Marketing, Strategy & Management, and Tourism, Leisure and Hospitality Management). Level 2 ABS.

Fernandez-Osso Fuentes, M. & Sánchez-Gey Valenzuela, N. (2024). Place marketing, happiness and communication structure. Review and context of consumer wellbeing. *IROCAMM- International Review of Communication And Marketing Mix*, 7 (1) 51-66. <https://dx.doi.org/10.12795/IROCAMM.2024.v07.i02.03>

Co-Author of Peer Review Journal Articles (n = 3)

Elías-Zambrano, R., Martín-García, A., & **Fernández-Osso Fuentes, M.** (2025). Consequences of the use of social networks in native consumers. Review of elements of interaction through digital advertising and educommunication as a solution. *Cuadernos Del Audiovisual | CAA*, (13). <https://doi.org/10.62269/cavcaa.44>

Jiménez-Marín, G. & Fernandez-Osso Fuentes, M. (2024). Communication, Digital Marketing and Health. The image of influencer with a social well-being purpose. *VISUAL REVIEW. International Visual Culture Review / Revista Internacional de Cultura Visual*, 16(2), 217–227. <https://doi.org/10.62161/revvisual.v16.5229>

- Scopus Q2 2022 = 0,12 (Visual Arts & Performing Arts).

Delbaere, B., Pereira Barboza, E., Van Rafelghem, E., Potter, K., McCabe, E., McBeth, Á., Utkarsh, S., Rudd, K., Fernandez-Osso Fuentes, M. J., Duarte, A., Gäckle, J., and Keune, H. (2024). The development of a Gender, Inclusion and Diversity Framework for inclusive Nature-based Solutions in cities. *Research Directions: One Health*. 2, e1, 1–7. <https://doi.org/10.1017/one.2023.14>

Submitted (n = 1)

Fernandez-Osso Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. E. (X). Branding and Identity Belonging: How Hybrid Spaces Shape Social Identity Through Digital Placemaking. *Journal of Interactive Marketing*

- Scopus Q1 2023 = 6.8 (Marketing, Business and International Management). Level 3 ABS.

Conference Proceedings (n = 3)

Fernandez-Osso Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. E. (2023). *Reaching a Modified Delphi Study Consensus on Digital Placemaking in nature for wellbeing – A working Paper*. People and Planet – from Theory to Solutions Conference 2024: Towards Transformations, University of Helsinki, Lahti, Finland. <https://www.lahdenyliopistokampus.fi/wp-content/uploads/2024/02/Abstract-book-People-and-Planet-2024.pdf>

Delbaere, B., Pereira Barboza, E., Van Rafelghem, E., Potter, K., McCabe, E., McBeth, Á., Utkarsh, S., Rudd, K., Fernandez-Osso Fuentes, M. J., Duarte, A., Gäckle, J., & Keune, H. (2024). *The development of a Gender, Inclusion and Diversity Framework: An urgent call for inclusive nature-based solutions*. People and Planet – from Theory to Solutions Conference 2024: Towards Transformations, University of Helsinki, Lahti, Finland. <https://www.lahdenyliopistokampus.fi/wp-content/uploads/2024/02/Abstract-book-People-and-Planet-2024.pdf>

Fernandez-Osso Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. E. (2023a). *Achieving Consensus on Digital Placemaking for Nature & Wellbeing through a Modified Delphi Study. An Abstract*. Academy of Marketing Science. World Conference, University of Kent, Canterbury, United Kingdom. <https://static1.squarespace.com/static/648893d9cbee3c0b58b73264/t/65099ea953ccd40981d45a1f/1695129257762/2023+WMC+Proceedings+Abstracts+Updated.pdf>

Oral presentations (n = 5)

Fernandez-Osso Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. E. (2024). *A place branding approach to digital placemaking in nature for wellbeing through a modified Delphi study*. 28TH International Conference Association People-Environment Studies. Universidad de Barcelona, Barcelona.

Fernandez-Osso Fuentes, M., Elías-Zambrano, R., & Jiménez-Marín, G. (2024). *Consumo, retail y publicidad. Creación de espacios digitales y branding de ciudades en el comercio local. Una comparativa entre España e Irlanda*. X Jornadas Internacionales Arte y Ciudad, Universidad Complutense de Madrid, España.

Jiménez-Marín, G., & Fernandez-Osso Fuentes, M. (2024). *Campañas de comunicación y marketing para la inclusión y salud mental a través de redes: El influencer con finalidad social*. V Congreso Internacional de Comunicación y Redes en la Sociedad de la Información, Facultad de Comunicación de la Universidad Pontificia de Salamanca, España.

Fernández-Ossó Fuentes, M. J. (2023). Digital Placemaking Toolkit. GoGreenRoutes Consortium Meeting. Tallin, Estonia

Fernández-Ossó Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. (2022). *Can digital placemaking improve mental health through nature?* [Microtalk video]. The Nature of Cities Festival, online. <https://airtable.com/shrAeI4H2zngGp6iz/tbl1VwQXd6kQd7SuR/viwmUpkWoWrfITOJU/recsyA4XECtl8XHUj>

Poster Presentations (n = 2)

Fernandez-Ossó Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. E. (2023). i [Poster Presentation]. People and Planet – from Theory to Solutions Conference 2024: Towards Transformations, University of Helsinki, Lahti, Finland.

Delbaere, B., Pereira Barboza, E., Van Rafelghem, E., Potter, K., McCabe, E., McBeth, Á., Utkarsh, S., Rudd, K., Fernandez-Ossó Fuentes, M. J., Duarte, A., Gäckle, J., & Keune, H. (2024). *The development of a Gender, Inclusion and Diversity Framework: An urgent call for inclusive nature-based solutions* [Poster Presentation]. People and Planet – from Theory to Solutions Conference 2024: Towards Transformations, University of Helsinki, Lahti, Finland.

Reports (n = 4)

Fernandez-Ossó Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. E. (2023). D6.3 Digital Placemaking tool-kit for all Cultivating Cities. In *GoGreenRoutes*. GoGreenRoutes. Retrieved March 11, 2024, from <https://gogreenroutes.eu/publication?t=D6.3%20Digital%20Placemaking%20tool-kit%20for%20all%20Cultivating%20Cities>

Sustainability Capabilities for Business Leaders: Guiding leaders to pioneer the transition to sustainable business outcomes. (2024). In *Skillnet Ireland*. Skillnet Ireland. Retrieved June 24, 2024, from https://www.skillnetireland.ie/insights/Sustainability_Capabilities_for_Business_Leaders

MacIntyre, T., Fernandez-Ossó Fuentes, M., Delgado-Serrano, M. M., Gulliver, Z., Mac Fadden, I., Tsekeri, E., Calleja, K., Lilli, K., Micallef, D., Kolokotsa, D., Mathioudaki, A., Randelovic, A., Domaradzka, A., Kołodziejczyk, M., Biesaga, M., Malusev, A., & Doulamis, N. (2024). SC5-14-2019 Visionary and integrated solutions to improve well-being and health in cities: Clustering Activities. Joint Manifesto. *Zenodo*. <https://doi.org/10.5281/zenodo.10478450>

Fernandez-Ossó Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. (2022). How can digital placemaking impact health and wellbeing of citizens through green and blue space connections? A systematic literature review protocol. *PROSPERO International prospective register of systematic reviews*. Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022316039

Other (n = 3)

Potter, K., Fernandez-Osso Fuentes, M. J. (2023, December 23). *GoGreenRoutes: Accessible and Sustainable Futures*. Ideas in ALL. Retrieved February 17, 2024, from <https://www.ideasinall.com/gogreenroutes-accessible-and-sustainable-futures/>

Fernandez-Osso Fuentes, M. J., Murphy, C., Scarry, A. (2023, March 7). *GoGreenRoutes: Near Nature: Green Space and Environmental Justice*. Ideas in ALL. Retrieved October 17, 2023, from <https://www.ideasinall.com/gogreenroutes-near-nature-green-space-and-environmental-justice/>

Fernandez-Osso Fuentes, M. (2021, November 26). *What is digital placemaking and how can it impact well-being through nature?* GoGreenRoutes. Retrieved March 29, 2022, from <https://gogreenroutes.eu/news?c=search&uid=aEK0Rg1q>

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List of Abbreviations

AR: Augmented reality

CV: Coefficient of Variation

ICT: Information and Communication Technology

IQR: Inter-Quartile Range

NBS: Nature Based Solutions

PPS: Project for Public Spaces

TID: Times in Dataset

SD: Standard Deviation

SIT: Social Identity Theory

List of Appendices

Appendix A: Systematic Literature Review Protocol published in PROSPERO

Appendix B: Chapter 2 Part A: Manuscript Published.

Appendix C: MMAT from Fernandez-Osso Fuentes et al. (2023b).

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Appendix G: Round 2 Questionnaire.

Appendix H: Round 3 Questionnaire.

Appendix I: Ethics Forms and Approval Confirmation.

Appendix J: Digital Placemaking Toolkit for GoGreenRoutes (H2020).

Glossary

Augmented reality (AR): A technology that superimposes computer-generated visuals or data onto the real-world environment of the users, enhancing their perception (Clarke, 2021).

Digital placemaking: The use of digital media to foster a sense of place for oneself and/or others, embracing digital tools affordances to strengthen or maintain a sense of attachment to place (Halegoua & Polson, 2021).

Gentrification: A process by which underinvested neighbourhoods are redeveloped to increase affluent newcomers, often driven by market forces that can displace long-standing communities (Bronsvoort & Uitermark, 2022).

Hybrid experience: A phenomenon where physical experiences are intertwined with digital elements. The physical experience is mediated with a digital layer such as an AR app or using Google Maps to navigate a space (Hespanhol, 2022).

Nature-based solutions: An environmental management approach inspired and supported by nature to build resilient cities and biodiversity (European Commission, 2015; 2016).

Nature connectedness: A psychological construct that assesses an individuals perceived emotional and cognitive connection to nature (Capaldi et al., 2014).

Place attachment tripartite: A three-component framework created by Scannell and Gifford (2010a) that conceptualises place attachment as a multidimensional construct, incorporating the person, psychological process and place dimensions.

Place attachment: The emotional and psychological bond between an individual and a specific location (Debenedetti et al., 2014).

Place branding: A strategic communication tool aimed at shaping the perception of a place identity and image of a location. It involves developing branding strategies to build an advantageous place-brand architecture (Zenker & Braun, 2010).

Placemaker: A professional specialised in the process of placemaking.

Place management: A strategic practice aimed at enhancing the quality, functionality and experience of a location (Keegan, 2021).

Place manager: A professional responsible of the management of a place.

Place marketer: An expert on place marketing.

Place marketing: A branch of traditional marketing that refers to a location as both the product and the place (Kavaratzis et al., 2017).

Placemaking: A participatory approach to shaping public spaces to meet the needs and aspirations of the communities that use them (PPS, 2004).

Social identity: A sense of group identification and belonging that an individual experiences due to group membership.

Social Identity Theory: A group process and intergroup relations theory that refers to the sense of belonging and identification to a social group (Tajfel & Turner, 1986).

Urban nature: The presence of nature within the urban environment, such as urban parks, green corridors or water bodies integrated in the city.

Virtual Reality (VR): A three-dimensional computer-generated simulation of the environment creating a sense of realism for the user (Litleskare et al., 2022).

Wellbeing: A multidimensional concept encompassing both hedonic wellbeing (Kahneman et al., 1999) and eudaimonic wellbeing (Ryff & Singer, 2008). Hedonic wellbeing focuses on pleasure attainment and pain avoidance, also known as subjective

wellbeing (Kahneman et al., 1999). The eudaimonic wellbeing emphasises personal growth, self-realization and holistic functioning (Ryan & Deci, 2001).

Chapter 1. Introduction

'Making peace with nature is the defining task of the 21st century (...). Now is the time to transform humankind's relationship with the natural world – and with each other.

And we must do so together.'

António Guterres, UN Secretary General (United Nations, 2020)

This quote by UN Secretary-General António Guterres represents the crucial need to transform our relationship with nature and how international organisations and institutions are combining their efforts to ensure nature is the central focus of our strategies. Following this call, this chapter provides an overview of the rationale for the study. The chapter outlines the major themes underpinning digital placemaking in nature for wellbeing. It outlines the aims and objectives of the study as well as an overview of the chapters in the thesis.

1.1. Research Overview

This mixed method study adopts a critical realism perspective to investigate the phenomenon of the use of digital placemaking to address the human-nature disconnection in cities. Three major themes guide this study: digital placemaking, nature and wellbeing and place branding. In this thesis, a novel combination of the three themes helps understanding the implications of hybrid environments as a branding strategy that uses digital technology and physical experiences in reducing the human-nature disconnection. Through a modified Delphi study, semi-structured interviews and questionnaires with both experts in digital placemaking and expanded experts in related fields were conducted, providing insights in relation to digital placemaking and its use in nature for wellbeing. Alongside the prior research in this domain, a proposed conceptual model was

created and tested through the modified Delphi method, resulting in a number of contributions which develop the initial model into a revised and confirmed final model presented. The modified Delphi method combined an initial qualitative round of semi-structured interviews with two rounds of questionnaires with a panel of experts and expanded experts in the field of the topic investigated. This is the first model that specifically explores the dynamics and processes involved in digital placemaking in nature for wellbeing as a place branding strategy. In doing so, connections between place attachment, place branding, nature connectedness and Social Identity Theory are identified. Specifically, social identity is found to act as a binding agent among all processes to specifically foster nature connectedness, place attachment and wellbeing outcomes ([Figure 6.13](#)). The study affirms the current emergent state of digital placemaking as a concept and its implications in nature for wellbeing, as well as confirming the conceptual model presented and revisited throughout the investigation. This PhD thesis offers new perspectives and insights that emerged from the analysis of the different modified Delphi rounds with contributions to theory and practice.

1.2. Rationale for Study

Urban environments are constantly growing, with the prospect of 68% of the world's population living in cities by 2050 (United Nations, 2018) and the human population predictably peaking at about 10.4 billion by 2100 (Clark & Gille, 2024). However, the deterioration of public spaces in cities has been evident since the industrialisation process (Paquin, 2019). Many studies are describing the loss of public life and valuable public spaces (Imara et al., 2024). This can be connected with the decrease in opportunities to engage with natural environments and its negative health impact, where up to 43,000 premature deaths could be prevented if cities followed the WHO recommendations regarding residential proximity to green space (Pereira-Barboza et al., 2021). Despite the

well-known benefits for communities of engaging with nature for health and wellbeing (Heckert & Bristowe, 2021; Tomasso et al., 2021) and their essential role in sustainability and climate resilience (Gulsrud et al., 2018; Kotus et al., 2022), the decrease of urban nature spaces is related to a number of negative impacts in people's health (Bashan et al., 2021; Pereira-Barboza et al., 2021). The disconnection from nature happens beyond ecosystem potentials and is also due to the interlinkages between social, cultural, and political processes (Beery et al., 2023).

The cultural shift away from nature is found as a result of the urbanisation process and the increased use of technology (Kesebir & Kesebir, 2017). Technology is described as an element of disconnection in the human-nature relationship (e.g., Shih et al., 2021; Vanderburg, 2000). Urban communities explore and discover their surroundings through digital devices that are embedded in their daily routines (Naji & Rzeszewski, 2022; Toland et al., 2020), such as electronic transport tickets, mobile apps, smart cards, checking the weather online or digitally connecting and communicating with others. Therefore, technology is changing how people experience spaces and places (Dai & Liu, 2024). However, despite the numerous studies describing the negative effect of technology on the disconnection of people from their place and their reality (e.g., Richardson et al., 2018; Shih et al., 2021), technology has been demonstrated to benefit wellbeing when involving indirect nature experiences (e.g., Cox et al., 2017) and can benefit communities by developing places that incite social interactions and improve the overall physical experience (Najafi et al., 2022; Nikšič et al., 2023).

Scholars have called to rethink the human-nature disconnection and the role of nature in human wellbeing (Riechers et al., 2021) and to embrace the increased use of technology in people's lives to help them engage with nature (Richardson et al., 2018). In the current augmented interest in implementing nature-based solutions in cities to help mitigate the

climate challenges (e.g., WHO Regional Office for Europe, 2021), the incorporation of technology can help augment and expand these solutions (Mahmoud et al., 2024).

In this context, digital placemaking has the potential to act as an interdisciplinary practice that helps communities create place experiences in the urban environment to reconnect with nature using digital media. Despite increasing interest in the role of digital technologies in urban spaces, there is limited research on how digital placemaking strategies can be used to promote nature-based experiences to support wellbeing within place branding. Existing studies primarily focus on the aesthetic or economic aspects of place branding (Farhat, 2019; Razi & Ziminski, 2022), with scant attention to the integration of environmental wellbeing or the use of digital tools to enhance public engagement in natural spaces. In light of the growing global concerns about urbanization, mental and physical wellbeing, and climate change (Intergovernmental Panel on Climate Change, 2022; Ochnik et al., 2024; United Nations Development Programme, 2024), while cities and regions seek to promote sustainability and improve the quality of life for their communities (e.g., Bansard, 2022; United Nations Human Settlements Programme (UN-Habitat), 2020; World Bank Group, 2023), there is a pressing need for innovative approaches that integrate nature and wellbeing into urban experiences to effectively engage communities. Digital placemaking offers a unique opportunity to enhance public interaction with natural spaces while fostering a stronger sense of community to support wellbeing. The rationale behind the concept of digital placemaking, its implementation in nature for wellbeing, and the place branding strategy perspective will be discussed in turn.

Why digital placemaking?

Digital placemaking is an interdisciplinary concept that appeared in 2011 (Latorre, 2011), related to placemaking. Placemaking is an urbanism concept that has been practised since the 1960s in urbanism and architecture (Paquin, 2019). It is based on the works of Jane

Jacobs, Kevin Lynch and William Whyte and it refers to the process through which communities transform public locations into places for socialisation (Project for Public Spaces & MacKenzie 2015). Placemaking has been applied beyond urbanism, to tourism (Lew, 2017) or arts (Markusen & Gadwa, 2010). With the constant increase of technology usage, the concept has evolved into digital placemaking, a process that uses “digital media to create a sense of place for oneself and/or others – to embrace digital affordances in order to cultivate or maintain a sense of attachment to place” (Halegoua & Polson, 2021, pp. 574).

Digital placemaking can foster meaningful place experiences for communities through a number of innovative digital technologies, from social media (Breek et al., 2018; Sugangga et al., 2021), to mobile games (Qabshoqa, 2018), pop-up furniture (Fredericks et al., 2018) or virtual guides (Her, 2021). The emergent concept of digital placemaking has increased interest in literature (Basaraba, 2021), with recent studies describing different frameworks and perspectives on its use (e.g., Chen et al., 2022; te Lintelo et al., 2024). While the body of research on digital placemaking is growing, there are many areas that are currently under-researched. The concept is fragmented, and scholars have described its definitional dilemmas (Basaraba, 2021; Chen et al., 2022; Głównyński, 2022). The lack of agreement on an operational definition and the broad spectrum of technologies implemented generates a general confusion on what digital placemaking is and how it can be applied.

In related types of placemaking such as creative placemaking, scholars have collected industry practitioner knowledge to investigate its processes (Salzman & Yerace, 2018; Vaughan et al., 2021; Zitcer, 2020). This programme of research will extend this method to digital placemaking through a mixed method approach that combines interviews and questionnaires with expert participants. Therefore, the research seeks to understand the

concept of digital placemaking by combining industry practitioner knowledge with academic knowledge, which is a unique perspective in the body of literature that would benefit the conceptualisation of digital placemaking involving its processes and outcomes and its application in nature for wellbeing.

International organisations, place managers and urban experts are increasing their interest in the implementation of technology for climate resilience and community benefits (UNFCCC, 2024), describing the use of technology in this context as ‘the new normal’ (World Economic Forum, 2024). Many organisations and municipalities are applying digital placemaking to engage with communities and foster belonging feelings with urban spaces. In particular, digital placemaking offers new ways to engage with these communities by implementing innovative technologies (Hespanhol, 2022). It is specifically used to promote sense of place or place attachment, which means individuals create belonging feelings with the place (Chen et al., 2022; Rutha & Abbas, 2021). Moreover, it offers unique ways to engage with communities, fostering engagement and social belonging (Paraschivoiu & Layer-Wagner, 2021; Sanaeipoor & Emami, 2020b). Finally, its digital dimension opens new opportunities for inclusion and accessibility (Clarke, 2021; Foth, 2017b).

Digital placemaking has been approached from a number of disciplines, from urban studies (Moodley & Marks, 2023), to education and pedagogy (Frith & Richter, 2021; Petrovski et al., 2024), creative arts (Razi & Ziminski, 2022), or heritage projects (Devine, 2017). It can also allude to different purposes, from promoting social change (Foth, 2017a), to empowering refugee communities (Sacramento et al., 2022), or to increasing economic gain in the area (Morrison, 2021). However, different challenges and risks from its implementation need to be accounted for, such as privacy concerns (Y. Li & Alencar, 2022), or gentrification (Bottero et al., 2022).

Thus, the novelty of this programme of research resides in the investigation of digital placemaking as a place branding strategy to create experiences in nature spaces to support community wellbeing, which is an area that has not been thoroughly explored. This novel approach that combines interviews and questionnaires with experts and practitioners in digital placemaking provides potential implications for place managers and urban planners, place branding professionals, policymakers, and placemaking practitioners. This research is significant for several reasons. Academically, it fills a gap in the literature by linking digital placemaking with place branding, nature, and wellbeing. Practically, it offers insights for urban planners and place branding professionals seeking to create sustainable and health-enhancing spaces. The findings could inform policy decisions related to urban development, particularly in cities looking to integrate nature into their digital placemaking strategies to improve the quality of life for place consumers.

Why nature and wellbeing?

There is an increased interest in enhancing nature spaces in cities, referring to blue and green spaces, due to their positive effect on communities' health and wellbeing (WHO Regional Office for Europe, 2021). As the WHO Regional Office for Europe (2021) defines, green spaces are formed by urban forests, parks or urban farming locations, among others, whereas blue spaces refer to lakes, ponds and rivers. Nature spaces in urban environments are essential for the improvement of quality of life (Hassan et al., 2023), physical health (Cornax-Martín et al., 2024), and fostering biodiversity (Bonthoux & Chollet, 2024). Therefore, nature spaces in urban environments contribute to benefit the community wellbeing and overall sustainability.

Urban nature spaces are essential for the creation of liveable, sustainable and resilient environments (Hassan et al., 2023). Nature-based solutions are inspired and supported by nature to help build resilient cities and benefit biodiversity and ecosystem services

(European Commission, 2015; 2016). They challenge and re-frame conventional environmental management methods by focusing on socio-ecological principles as the main strategies (Gulsrud et al., 2018). Nature-based solutions employ existing natural solutions or mimic nature through a variety of implementations, from planting trees to revegetate spaces or planting green roofs (European Commission, 2015; Giachino et al., 2021). More recently, nature-based solutions have explored technological tools to support its efficiency. Technology can enhance ecosystems (Galle et al., 2019), monitor their management (Li & Nassauer, 2021) and augment its results in nature-based solutions and for nature-based solutions (Mahmoud et al., 2024). Therefore, digital placemaking can be implemented as an augmented nature-based solution to help enhance its results using digital media.

Especially in the current climate crisis, nature spaces in urban environments can have positive environmental impacts, promoting biodiversity through the support of diverse ecosystems (Bonthoux & Chollet, 2024) and reducing air and noise pollution (Bloemsmä et al., 2022). Biodiverse and rich urban nature areas provide spaces beyond mere ornamental tools in urban planning, but an oasis for rich ecosystems specifically developing relational benefits for human-non-human cohabitation (Bonthoux & Chollet, 2024). However, as described earlier, nature spaces in cities are deteriorating and urban communities are decreasing their opportunities to engage with these places. Thus, digital media can provide answers that not only augment the potential results of nature-based solutions but also help the community engage with the public space.

When exploring wellbeing, comprehensive wellbeing is a common approach in public policy that involves both objective and subjective wellbeing indicators (White, 2016). This approach to wellbeing comprises three elements: the breadth and promotion of a broad range of wellbeing indicators beyond economic growth when measuring societal

progress, the relevance of statistics that reflect what is important to people, and the increased addition of subjective elements along objective metrics (White, 2016). In this programme of research, wellbeing is understood as a broad concept that combines health, positive affective states, social engagement and other wellness indicators (Shankardass et al., 2019). This broad approach is commonly used in digital placemaking studies that specifically mention wellbeing (e.g., Marshall, 2021; Shankardass et al., 2019).

Nature spaces in cities help promote physical activity and mental wellbeing, encouraging outdoor activities that are linked to healthier lifestyles (Cornax-Martín et al., 2024), as well as aiding in reducing stress and improving emotional health (Hassan et al., 2023). Moreover, nature spaces can foster social cohesion through community interactions, which promotes community ties and inclusion (Hassan et al., 2023). Studies have demonstrated the positive impact of nature spaces on general wellbeing (e.g., Kirby & Scott, 2023). In their assessment, Kirby and Scott (2023) assess the current knowledge on green and blue infrastructure on people's health in the UK, finding evidence of increased physical activity, improved wellbeing, positive mental health impact of direct pathways, and limited knowledge on indirect pathways. Similarly, international organisations are increasing interest and calling for implementing plans for integrating wellbeing and including innovative ways to foster health through nature (e.g., World Health Organisation (WHO), 2024), specifically discussed in the 28th UN Climate Change Conference (COP28) or the 77th World Health Assembly. In one of their latest frameworks, the World Health Organisation (WHO) (2023) describes the need to implement wellbeing in public health and how supporting a harmonious human-nature relationship is essential as a strategic direction.

Therefore, the intrinsic connection between wellbeing and nature, broadly demonstrated in the literature, is currently an essential strategy to help mitigate and adapt to the current

climate crisis. The growing demand for this integration calls for frameworks and practical insights that will facilitate its implementation in urban environment which can benefit from the implementation of digital technology through digital placemaking. There is potential exploration and understanding of how digitally mediated experiences could enhance the effects of nature experiences for wellbeing.

Why a place branding perspective?

Placemaking and place branding have been interrelated as they both refer to place experiences and what they mean and leave in the community. Place branding derives from place marketing and refers to the application of branding principles to places (Reitsamer & Brunner-Sperdin, 2021). Despite differences in many levels, place branding and placemaking are interconnected and complement each other as place branding can amplify the placemaking narrative and enhance the revitalisation of an area (Ebaid, 2023). Specifically, Richards (2017) explores the role of events in the evolution of place branding to placemaking, where the holistic approach to placemaking resides in three elements: the physical aspects of the city, the lived experience shared among place consumers, and the symbolic image and brand of the city created. Placemaking and place branding are described as “the public face of the city and its projection to its residents and other dwellers” (Evans, 2015, pp. 142). The endurance of a place brand that is shared and differentiated in the communities creates a collective identity of the city and pride (Evans, 2015).

However, these intrinsic elements that tie place branding and placemaking together have been overlooked in the literature. Place branding usually illustrates a shift to a consumption-oriented economic development (Farhat, 2019), where the place branding perspective of placemaking tends to focus on economic growth from tourism (Lew, 2017; Nursanty et al., 2024). Farhat (2019) refers to reframing the role of place branding as a

meaning-making, placemaking and economic development endeavour. Despite the importance of the economic effect of any place experience being important, the potential of the place branding perspective in placemaking and its digital evolution can help create place experiences that shift the brand image and perception towards societal positive outcomes. In Ebaid's (2023) study, the interconnections between place branding and placemaking suggest the potential to improve the quality of life of a city while focusing on distinctive attributes to determine the city's identity, which should be aligned with the social interest. Scholars have described placemaking as a new aspect of city branding that creates organic and authentic experiences (Evans, 2015). Moreover, brands can be understood as culture source materials with civic responsibilities (Holt, 2002). Therefore, brands can contribute beyond the economic growth and attractiveness of a place but forming places that are meaningful and positive on many levels to a community.

When exploring the connections between digital placemaking and place branding, digital placemaking has been identified as part of the place branding trifecta (Keegan, 2021). The tourism-focus trend is also found in this interconnection (e.g., Sugangga et al., 2021; Törnberg, 2022). Similarly, a place branding perspective of digital placemaking can support goals to empower community voices that contribute to creating links between the place and the people, fostering the place identity while promoting the specific place experience (Razi & Ziminski, 2022).

In this context, and following the described climate challenges faced, place branding could be implemented as a strategy to help create experiences that are unique, attractive and meaningful for city communities. Policies can benefit from implementing a communication and branding perspective to ensure community engagement. Place branding, specifically its participatory approach (Zenker & Erfgen, 2014), can enhance digital placemaking as a potential strategy for creating place experiences that could

promote pro-environmental behaviours (Paraschivoiu & Layer-Wagner, 2021). Specifically addressing the human-nature disconnection, nature could be fostered as part of the community's identity in urban environments, generating a stronger and closer relationship. Scholars have explored the effects of natural environments on people's identity, which leads to incorporating nature into people's self-concept (Clayton & Opatow, 2003). Therefore, nature could be fostered in a community identity and place brand, and it would also benefit from incorporating digital mediums through digital placemaking. Digital placemaking can create urban nature experiences for and with the community, where nature is a key actor. While there is substantial research on place branding and traditional placemaking (Balsas, 2021; Ni & Say, 2022), little attention has been given to the role of digital placemaking in fostering connections to nature and promoting wellbeing. This gap is particularly significant given the increasing interest in sustainable urban development and the need for innovative approaches to improve community health and engagement through place branding strategies.

1.3. Aims and Objectives

The research aims for this thesis are as follows:

Aim 1: To incorporate digital placemaking as a place branding strategy to help reframe the human-nature relationship enhancing urban nature experiences, supporting wellbeing.

Aim 2: To understand how digital placemaking can be implemented from a place branding perspective to promote hybrid place attachment in urban nature spaces, fostering community nature connectedness, and supporting consumer wellbeing.

The research aims are supported by the following research objectives:

1. To review the various literatures for knowledge, theory and practice in digital placemaking, nature and wellbeing.
2. To investigate how digital placemaking as a place branding strategy can promote place attachment processes, foster community nature connectedness, and support consumer wellbeing.
3. To understand the interconnected dynamics of digital placemaking in nature for wellbeing, generating the core components for the development and test of a conceptual model.
4. To provide strategies and solutions to reframe the human-nature disconnection and enhance urban nature experiences.
5. To advance assessment methods on digital placemaking in nature for wellbeing

Research Aim	Research Objectives
1: To incorporate digital placemaking as a place branding strategy to help reframe the human-nature relationship enhancing urban nature experiences, supporting wellbeing.	<p>1: To review the various literatures for knowledge, theory and practice in digital placemaking, nature and wellbeing.</p> <p>2: To investigate how digital placemaking as a place branding strategy can promote place attachment processes, foster community nature connectedness, and support consumer wellbeing.</p> <p>4: To provide strategies and solutions to reframe the human-nature disconnection and enhance urban nature experiences.</p> <p>5: To advance assessment methods on digital placemaking in nature for wellbeing</p>
2: To understand how digital placemaking can be implemented from a place branding perspective to promote hybrid place attachment in urban nature spaces, fostering community	<p>1: To review the various literatures for knowledge, theory and practice in digital placemaking, nature and wellbeing.</p> <p>2: To investigate how digital placemaking as a place branding strategy can promote place attachment processes, foster community nature connectedness, and support consumer wellbeing.</p>

nature connectedness, and supporting consumer wellbeing.	<p>3: To understand the interconnected dynamics of digital placemaking in nature for wellbeing, generating the core components for the development and test of a conceptual model.</p> <p>5: To advance assessment methods on digital placemaking in nature for wellbeing</p>
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Table 1.1. Interconnection between research aims and objectives.

Considering the described research aims and objectives, the rapid contemporary urban environment and technological integration, and the increased disconnection from nature posing significant challenges to individual and collective wellbeing, the primary research question of this thesis is:

How does digital placemaking as a place branding strategy promote place attachment processes to foster community nature connectedness to support consumer wellbeing?

The research philosophy that guides this thesis is critical realism, emphasising the understanding of the interplay of structures and mechanisms of the phenomena, influencing the frame of the research questions. This programme of research focuses on uncovering and explaining the dynamics involved in digital placemaking as a place branding strategy in nature for wellbeing. In order to analyse the primary question and identify its underlying components, such as theoretical frameworks, methodological considerations, or contextual specifics, secondary questions are also presented. Three secondary questions are defined to examine the reframing of the human-nature disconnection, understanding the interconnections in the process and assessing the wellbeing impacts:

1. How can digital placemaking reframe the human-nature disconnection affecting urban consumers?

2. How the dynamics involved in digital placemaking in nature for wellbeing are interconnected?
3. How can the wellbeing impact of digital placemaking practices in nature be assessed?

To conclude, this programme of research seeks to confirm that digital placemaking as a place branding strategy could promote place attachment and nature connectedness in communities by creating hybrid place experiences to support consumer wellbeing.

1.4. Structure of the Thesis

This PhD thesis explores the concept of digital placemaking in nature for wellbeing from a place branding perspective to help reframe the human-nature relationship in cities and to understand the dynamics involved in digital placemaking in nature for wellbeing. It explores existing evidence from digital placemaking in nature for wellbeing to then arrive at a consensual state on its implementation for future practice and research. The involvement of place attachment, place branding, Social Identity Theory and nature connectedness is tested through the conceptual model presented. This PhD thesis aims to address the above questions through a modified Delphi study (Figure 1.1).

Chapter 1 – Introduction

Chapter 1 introduces the research topic, rationale, aims and objectives. The three major themes of this thesis are described and its structure is outlined.

Chapter 2 – Literature Review

Chapter 2 presents a systematic literature review that investigates the use of digital placemaking in nature for wellbeing. The chapter is divided in two parts. Part A presents a systematic literature review which was published in Urban Forestry and Urban Greening

Special Issue “Augmented Nature Based Solutions (NBS) for Cities: Embedding technologies for improving NBS performance and fostering social inclusion in urban greening strategies” in 2023. The published protocol for this study is registered and presented in Appendix A (Fernandez-Osso Fuentes et al., 2022). Part B describes an update of the systematic literature review article to consider the key literature published from the article publication to the thesis submission, among other criteria.

Chapter 3 – Conceptual Model

Chapter 3 reports the theoretical perspectives of digital placemaking in nature for wellbeing, describing the processes and dynamics involved. Specifically, place attachment theory, place branding, nature connectedness and Social Identity Theory informs the process through which digital placemaking can support wellbeing in nature spaces in the city. The chapter is also divided in two parts. In Part A, these dynamics are considered in the proposed modified place attachment tripartite as the conceptual model that guides this PhD thesis. This conceptual model was published in *Technological Forecasting and Social Change* in July 2024. Part B presents an update of the conceptual model to consider key literature from the publication date of article to the thesis submission, among other criteria.

Chapter 4 – Methods

Chapter 4 describes and discusses the chosen methodological approach. The nature of mixed methods and the research philosophy of this study are outlined. This PhD thesis adopts a critical realism philosophy which is discussed in terms of ontology and epistemology. Research sample, method and analysis are also outlined, as well as the reliability and validity of the data collection. Three rounds of the modified Delphi method were performed to explore digital placemaking in nature for wellbeing. The initial

qualitative round of semi-structured interviews informs the consequent two questionnaire rounds with the panel of experts in digital placemaking and expanded experts in related fields. Limitations and ethical considerations are also described in this chapter.

Chapter 5 – Findings

Chapter 5 presents the findings from the modified Delphi study in terms of the processes and outcomes of digital placemaking in nature for wellbeing. This chapter is divided in two parts: a manuscript submitted for publication with the main contribution of this thesis in Part A, and other complementary findings from the modified Delphi method that are a valuable addition advancing the concept of digital placemaking, the dynamics involved and forecasting its use in nature for wellbeing in Part B. The findings comprise the outcomes from the analysis of the first qualitative round of semi-structured interviews, resulting in five thematic results, and the outcomes from the two rounds of quantitative questionnaires, resulting in the final consensual items.

Chapter 6 – Discussion

Chapter 6 is an in-depth discussion of the research findings described in this programme of research. The primary contributions to knowledge are organised into four major contributions and two additional sub-thematic contributions. The chapter highlights key theoretical and practical contributions and implications for implementing digital placemaking in nature for wellbeing. A final version of the conceptual model of this thesis is also presented.

Chapter 7 – Conclusion

Chapter 7 provides the conclusion of this PhD thesis through an overview of the accomplishment of the research objectives of the thesis detailing the contributions to

theory and practice. Limitations, future research directions and conclusions are also provided.

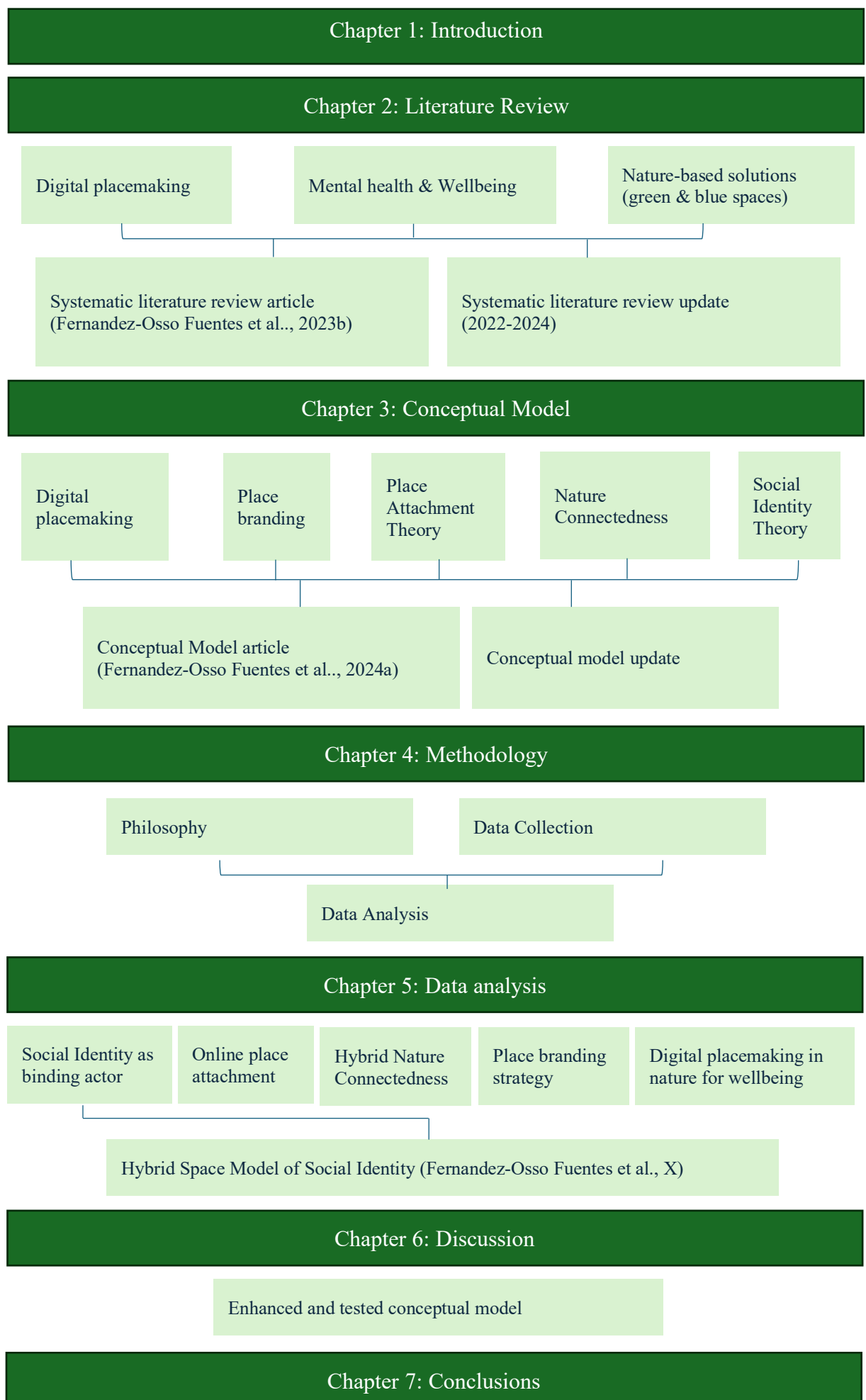


Figure 3.1: Overview of the PhD thesis structure.

1.5. Chapter Summary

This chapter outlines the rationale of the PhD thesis, aims and objectives for the research as well as an outline of the structure of the thesis. This study addresses a significant gap in the literature by exploring the role of digital placemaking in nature-based place branding strategies aimed at enhancing community wellbeing. As urban spaces continue to evolve in the digital age, understanding how these strategies can be effectively implemented is crucial for fostering sustainable, health-promoting environments.

Chapter 2. Digital placemaking, health & wellbeing and nature-based solutions: A systematic review and practice model (Part A).

The following publication was incorporated into this chapter.

Fernandez-Osso Fuentes, M. J., Keegan, B. J., Jones, M. v., & MacIntyre, T. (2023b). Digital placemaking, health & wellbeing and nature-based solutions: A systematic review and practice model. *Urban Forestry & Urban Greening*, 79, 127796. <https://doi.org/10.1016/j.ufug.2022.127796>

Maria Fernandez-Osso Fuentes: Conceptualisation, Methodology, Search and Data Extraction, Analysis, Manuscript Drafting. **Brendan Keegan:** Review and Editing, Supervision. **Marc Jones:** Review and editing. **Tadhg MacIntyre:** Review and Editing.

2.1. Preface

Chapter 1 presents the introduction to this research of digital placemaking in nature for wellbeing and the human-nature disconnection that affects cities. Chapter 2 Part A is the first study of this programme of research, presenting a systematic literature review and practice model on digital placemaking, health & wellbeing and nature-based solutions. This study provides a comprehensive review, synthesizing the existing evidence on the associations between digital placemaking, mental health and wellbeing and green and blue spaces while exploring successful case studies. The systematic literature review aligns with the overall aims of this PhD thesis in exploring the role of digital placemaking in nature for wellbeing and identifies gaps in the literature to further research. The study results address the gap in the literature and provides a critical and evidence-based direction for this PhD thesis as well as an initial model.

The following chapter is comprised of two parts. Part A illustrates a systematic literature review that was published in Urban Forestry & Urban Greening Special Issue on “Augmented Nature Based Solutions (NBS) for Cities: Embedding technologies for improving NBS performance and fostering social inclusion in urban greening strategies” in 2023 (pre-publication in November 2022), (Appendix A). Part B is an update to the published review. Chapter 2 concludes with an overall summary of the combined findings from the two reviews. These main findings of the published article led to the development of the second study of this PhD thesis (Chapter 3). Figure 2.1 shows a summary of the respective reviews.

The PhD candidate undertook all database searches, article screening, data extraction, quality assessments and manuscript draft of all articles. Co-authors reviewed the data, analysed quality assessments and reviewed and edited the manuscript.

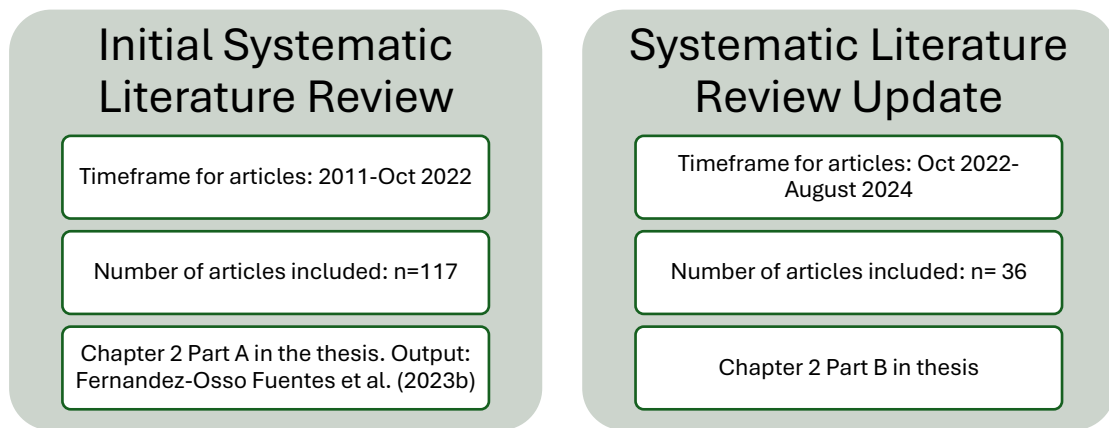


Figure 4.1: Summary of the systematic literature review and review update of digital placemaking in nature for wellbeing

2.2. Abstract

Technology implementations in the urban environment have the potential to reshape how communities experience places, specifically providing a potential enhancer for nature-based solutions in the city. Urban spaces are facing a number of challenges from climate mitigation to negative effects on communities. In this context, nature-based solutions aim to promote nature as an answer to the current climate challenge, linking positive outcomes for society in a cost-effective way. Urban nature could benefit from the implementation of technology to enhance nature experiences and nature's impact on the community. This study aims to review and synthesise existing literature focusing on the associations between digital placemaking, mental health and wellbeing impact and the use of green and blue spaces while exploring successful case studies. Hundred and seventeen studies met the eligibility criteria, most of them used qualitative methods. The findings provide insights into the potential impact of digital placemaking practices for urban nature on citizens' wellbeing and mental health. Our results indicated an absence of agreement on the concept of digital placemaking, and a lack of blue space research while nature was presented as a context and passive element. Mental health and wellbeing are mostly

approached without specifically examining health indicators or assessing the health impact of these practices. Our study proposes a model offering insights into the broad range of best practices for implementing digital placemaking in nature for wellbeing and represents a key contribution to understanding the innovative application of augmenting NBS through digital placemaking impacting the wellbeing of citizens

2.3. Introduction

Surroundings impact a person's quality of life. The value and effect of public spaces have been broadly studied, especially by authors such as Gehl, Jacobs and Whyte who defended the importance of adopting a people-first approach to urbanism, which places people at the heart of the design of public spaces. These concepts are the foundation for placemaking (PPS, 2004). To promote connections with environments and create meaningful places, placemaking was first discussed in the 1960s (Abdel-Aziz et al., 2016). It seeks to improve the quality of public spaces for communities, which is imperative for increasing social bonds and wellbeing (Courage, 2021).

Placemaking has been applied to many different concepts and areas, from urban nature and community gardening (Truong et al., 2022), to participatory planning (Huang, 2019), tourism planning (Lew, 2017), as well as the shift from placemaking to place-keeping (Mattijssen et al., 2017). Part of the debate around placemaking is the use of augmented technology and digital applications to improve communities' relationships with public spaces, specifically those that follow urban greening strategies and nature-based solutions (NBS) (Tsekeri et al., 2022).

Digital placemaking is the implementation of technology in placemaking practices, from using mobile games to explore the environment (Hjorth & Richardson, 2017; Qabshoqa, 2018) to the role of social media in allowing communities to connect in digital and

analogue ways with their surroundings (Breek et al., 2018). Digital placemaking has the potential to benefit communities by adding value to public spaces, economic growth, cultural wealth, and overall better community life (Morrison, 2021). It could reconvert urban areas into community hubs, revitalising its heritage and experiences through social media and place branding (Soedarsono et al., 2021; Sugangga et al., 2021). This technological application to placemaking practices can enhance the impact in cities and public spaces, not only generating a stronger sense of place and belonging within communities (Halegoua & Polson, 2021) but also making spaces more accessible and inclusive to all (Bedford et al., 2022; Szaszák & Kecskés, 2020)

Despite the benefits of these practices, it is important to also address potential risks and impacts that have been reported on digital placemaking practices, such as gentrification (Bottero et al., 2022; Bronsvort & Uitermark, 2022), the environmental harm from e-waste (Bedford et al., 2022), exposing pre-existing inequalities and exclusions (Halegoua & Polson, 2021), light pollution (Foth & Caldwell, 2018), or projects not genuinely engaging and putting the community first (Foth et al., 2018; Kamols et al., 2021; Monno & Khakee, 2012).

Digital technology affects how we experience our surroundings. From a study by Prescott, (2019), almost all adults aged 16 to 44 years used the internet daily (99%) in the United Kingdom, while 87% of the population own smartphones (Deloitte, 2021). Most citizens interact with the environment through some type of digital device. Thus, digital placemaking has the potential to shape reality in urban spaces, potentially helping people connect with nature for example through augmented reality (Clowater, 2021). When applied to the management of urban nature spaces, it can benefit from measuring performances, supporting decision-making and connecting communities with the spaces in the world of the internet we are living in.

Specifically, digital placemaking could be a key approach to improving public spaces and urban nature environments, since sixty-eight per cent of the world's population will live in urban areas by 2050 (United Nations, 2018). Since the industrialisation process cities have suffered a loss of public spaces (Paquin, 2019), diminishing the opportunities for engagement with natural environments, which has potential negative impacts on communities' health (Bashan et al., 2021). Despite the positive effects of urban development on issues such as poverty or inequality (United Nations, 2008), urban environments' negative consequences on citizens' wellbeing (e.g., social isolation) have also been illustrated (Marshall, 2021). These concerns were amplified by the COVID-19 pandemic (Zacher & Rudolph, 2021), raising awareness of the importance of urban green spaces in peoples' mental health and wellbeing (Heckert & Bristowe, 2021; Tomasso et al., 2021). Nature is proposed to have a positive effect on citizens' health through increased opportunities for physical activity, greater social interaction, protection from pollutants and stress reduction (Bowler et al., 2010; Hartig et al., 2014). There is extensive empirical literature on the benefits of nature exposure for health (Bratman et al., 2019; Jimenez et al., 2021). However, the wellbeing impact of digital technology as a mediator between nature and citizens has not been fully addressed (Van Houwelingen-Snippe et al., 2020).

The need for the inclusion of nature in cities has been highlighted for several years, most recently in a report by the WHO Regional Office for Europe (2021) presenting the beneficial impact on health and wellbeing of nature, specifically the crucial role of green and blue spaces for urban planning and climate change through NBS. The report differentiates green space and blue space, where green space is understood as "urban forests, parks, playgrounds, allotments and urban farming locations" (p. 8), and blue spaces are "coasts, lakes, ponds and pond systems, wadis systems, artificial buffer basins

and water courses” (p. 24). Regarding NBS, these practices aim to promote nature as an answer to climate mitigation and adaptation (Nesshöver et al., 2017) in a cost-effective way. The implementation of NBS in international policy and business discourses is spreading and gaining relevance (Seddon et al., 2020). NBS promote the maintenance, restoration and enhancement of biodiversity and ecosystems as a way to address environmental challenges, while also being a design and planning tool (Giachino et al., 2021). Furthermore, they provide several benefits such as the health and wellbeing of citizens (European Commission, 2016). Recent studies have highlighted the value and importance of implementing digital technology in NBS, enriching their potential effects while increasing citizens’ awareness (Tsekeri et al., 2022). These innovative and integrative tools could bridge the gaps and limitations of NBS while supporting decision-making and governance (César de Lima Araújo et al., 2021). Smart technologies applied to NBS are proven to facilitate the management and awareness of these practices, but it is also crucial to address their potential risks (Li & Nassauer, 2021).

The incorporation of digital innovation in the citizens’ wellbeing-nature equation would benefit from ‘indirect interactions’ with nature, which have beneficial evidence for communities increasing their wellbeing and reducing stress levels (Cox et al., 2017). Digital placemaking could assist in establishing these interactions by creating hybrid experiences in a place. Moreover, the increased attention to nature-based technologies and the implementation of digital tools to enhance design solutions for healthy environments (WHO Regional Office for Europe, 2021) support the potential synergies and benefits from the implementation of digital technologies as enhancers and facilitators of urban nature. Technology could act, not only as a tool within NBS but also as an enhancer of its long-term relationships and impacts on the community. Digital placemaking is presented in this study as a novel approach to NBS that could increase the

environmental performance and social impact of these practices in the cities while supporting the mental health and wellbeing of their inhabitants. Aside from digital placemaking as an NBS tool, there is scope for it to create positive effects such as co-created activities that augment the sense of belonging within communities, as well as other key contributions that have not been explored yet.

Bill Gates famously said that *the Internet is becoming the town square for the global village of tomorrow*. Media and electronic technologies have made this idea of the ‘global village’ possible, changing the ways we perceive and think about our surroundings (Relph, 2007). This quote illustrates how technology can draw on characteristics of the physical world, and in relation to NBS there is the possibility to create hybrid urban nature environments through digital placemaking that improve the wellbeing of citizens.

With the present study, we are exploring how digital connectivity can help increase the sense of place in urban nature environments when introducing technology within NBS. Risks of digital solutions in urban greening strategies within NBS and the ability of this technology to connect communities are addressed. The study systematically review and synthesise the existing literature focusing on the impact of digital placemaking on mental health and wellbeing through green and blue space connections, offering an insight into the broad range of best practices of digital placemaking when enhancing the performance and impact of NBS. We introduce an innovative technique, that of digital placemaking, to augment the application of NBS, thus potentially impacting the wellbeing of citizens. A model for implementing digital placemaking for nature connections and psychological wellbeing in communities is also proposed, offering a thorough understanding of the potential of embedding technologies inside NBS to increase their performance, while fostering social inclusion and cohesion in bringing nature into the urban environment.

2.4. Materials and method

This systematic review was performed and is reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Page et al., 2021). The protocol for the review was registered with PROSPERO an international database of literature reviews created by the University of York (<https://www.crd.york.ac.uk/prospero/>) (registration number: 2022 CRD42022316039) (Fernandez-Osso Fuentes et al., 2022).

2.4.1. Search strategy & study identification

The literature review focuses on published articles in the following databases: Web of Science, Scopus, Emerald, ACM DL (Association for Computing Machinery Digital Library) and Google Scholar. An initial search was conducted between the 30th of November and the 1st of December 2021. The dataset was updated on the 5th of October 2022.

An initial search was conducted (Health and wellbeing AND digital AND “green space” AND placemaking) to create a keyword bank that informed our final search. The final search was grouped into three themes and two tiers (see Table 2.1). A number of synonyms of digital placemaking, mental health/wellbeing and green/blue space were included to ensure any relevant publications were not overlooked (Jalali & Wohlin, 2012).

The review process followed similar works in cognate disciplines. The process identified relevant articles through the following: (a) literature search in selected databases; (b) export of results into Microsoft Excel to store, remove duplicates and apply exclusion criteria; (c) results from *b* exported into Rayyan software (<http://rayyan.qcri.org>) for title and abstract screening; (d) review of conflicts from *c* by two team members; (e) full-text screening of articles identified as relevant through *c* and *d* by two team members; (f)

review of conflicts from *e* by a third team member; (g) quality assessment applied by two team members independently; (h) review of conflicts from *g* by a third team member.

2.4.2. Eligibility criteria

Articles were considered eligible to be included in the review if they met the following criteria: (a) represented original research published in a peer-reviewed journal; (b) were published in the English language; (c) feature the use of digital placemaking (even if the term was not specifically mentioned but placemaking, location-based technology or digital technology of some sort was cited following our related keywords using in the search strategy); (d) disciplines related to the three main themes of research; (e) relevant book chapters and conference proceedings that are pertinent to our research question. This criterion was applied to all three themes datasets collected and results were compared among themes to remove all duplications. The dataset was updated between September and October 2022 to include the full-year range found during our data collection and analysis – initial landmark study from 2016 as a criterion was removed – and 2022 update during review process. The eligibility criteria process was applied to this data update. A final dataset of 117 records was selected for the systematic review (see Figure 2.2).

2.4.3. Data extraction

The following data were extracted from eligible studies: report author, year and source of publication, case study (if available), method/study design, sample characteristics, type of intervention, measure of performance, theoretical approach, key findings and gap in literature for future research. Data extraction was completed using Microsoft Excel by one team member and checked by a second one (BK, MJ, TM). Disagreements were solved by a third team member.

Theme	Search string		Google Scholar	Web of Science	Scopus	Emerald	ACM DL	PubMed	Total
Digital Placemaking	Tier 1	digital AND place OR placemaking OR place-making OR place making OR place marketing OR digital place* OR environmental placemaking OR environmental place-making OR environmental place making OR smart cities placemaking OR smart cities place-making OR smart cities place making OR digital placemaking practice OR digital place-making practice OR digital place making practice OR creative placemaking OR creative place-making OR creative place making OR social practice placemaking OR social practice place-making OR social practice place making OR digital placemaking and community development OR digital place-making and community development OR digital place making and community development	28400	591406	29800	82	628225	45014	694702
	keywords used in tier1 phrase	Placemaking OR place-making OR place making	694000	276803	63543	251000	549549	26515	1861410
		digital AND placemaking OR digital AND place-making OR digital AND place making	1630000	7778	2078	45000	378033	410	2063299
		Digital place*	1670000	34486	49709	46000	473934	11101	2285230
		Environmental placemaking OR environmental place-making OR environmental place making	53400	29737	5484	77000	560667	4146	730434
		Smart cities placemaking OR smart cities place-making OR smart cities place making	18000	668	295	10000	554085	6	583054
		Creative placemaking OR creative place-making OR creative place making	1860000	2815	1187	43000	565263	159	2472424

		Digital placemaking practice OR digital place-making practice OR digital place making practice	3130	1086	461	36	565290	87	570090
		Digital Placemaking and community development OR digital place-making and community development OR digital place making and community development	3260	252	89	35	581130	16	584782
		Social practice placemaking OR social practice place-making OR social practice place making	87000	8673	3499	142000	572097	1404	814673
	Tier 2	inclusive smart city OR participatory city making OR urban interaction design OR social media OR digital storytelling OR interaction design OR digital nature OR human-technology interaction	22400	669971	642178	929	614211	235242	2184931
	keywords used in tier2 phrase	Inclusive smart city	130000	490	404	2000	492390	43	625327
		Participatory city making	912000	1801	1089	6000	590960	209	1512059
		Urban interaction design	195000	8275	6205	25000	527834	2202	764516
		Social media	918000	199045	220064	121000	262803	37839	1758751
		Digital storytelling	154000	3352	3473	2000	386425	198	549448
		Interaction design	158000	440879	394477	132000	525912	187556	1838824
		Digital nature	1260000	34356	29251	37000	437486	10590	1808683
		Human-technology interaction	18400	383	477	358	498372	266	518256
Health and Wellbeing	Tier 1	Health AND wellbeing OR health* OR wellbeing AND well-being	626000	7800347	6256914	164000	94476	5653872	20595609
	keywords used in tier1 phrase	health AND wellbeing	781000	42015	56175	10000	3098	85256	977544
		Health*	650000	7793169	6244808	163000	93719	6356200	21300896
		wellbeing AND well-being	534000	7186	35744	6000	3782	110027	696739
	Tier 2	healthy environment OR community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or	18400	2030479	1901451	1000	566298	563576	3050725

		wellbeing and healing OR well-being and healing OR stress levels							
	keywords used in tier2 phrase	Healthy environment	1240000	66969	46891	28000	313103	60827	1755790
		Community wellbeing OR community well-being	1930000	35459	33016	38000	475457	662555	3174487
		Community health	715000	730091	503121	83000	188027	9208214	11427453
		Public health	642000	833690	840440	102000	183665	9040928	11642723
		Social wellbeing OR social well-being	701000	88281	90022	53000	495168	722084	2149555
		Wellbeing and healing OR well-being and healing	43300	1844	2574	695	454927	72053	575393
		Stress levels	63700	545670	617095	90000	407668	330973	2055106
Green and Blue Spaces	Tier 1	urban green space OR public green space OR blue space OR nature-based solutions	26300	35564	26289	4000	569282	6792	668227
	keywords used in tier1 phrase	Urban green space	1740000	11330	9744	8000	349011	1606	2119691
		Public green space	2260000	4994	3845	17000	396836	1652	2684327
		blue space	2290000	22018	14446	10000	342739	4190	2683393
		Nature-based solutions	25300	1694	1649	620	555834	349	585446
	Tier 2	public open space OR community gardens OR green gentrification OR environmental ecology OR sustainable development goals OR urban ecology	30400	236820	160225	2000	570315	141237	1140997
	keywords used in tier2 phrase	Public open space	1960000	8931	6934	51000	447145	1566	2475576
		Community gardens	17900	9008	6109	9000	152152	3594	197763
		Green gentrification	27100	268	185	359	57098	17	85027
		Environmental ecology	716000	177564	97384	11000	290001	131288	1423237
		Sustainable development goals	1830000	33310	40635	47000	505789	4585	2461319
		Urban ecology	1740000	22678	17815	5000	32183	9062	1826738

Table 2.1: Search strings grouped in themes

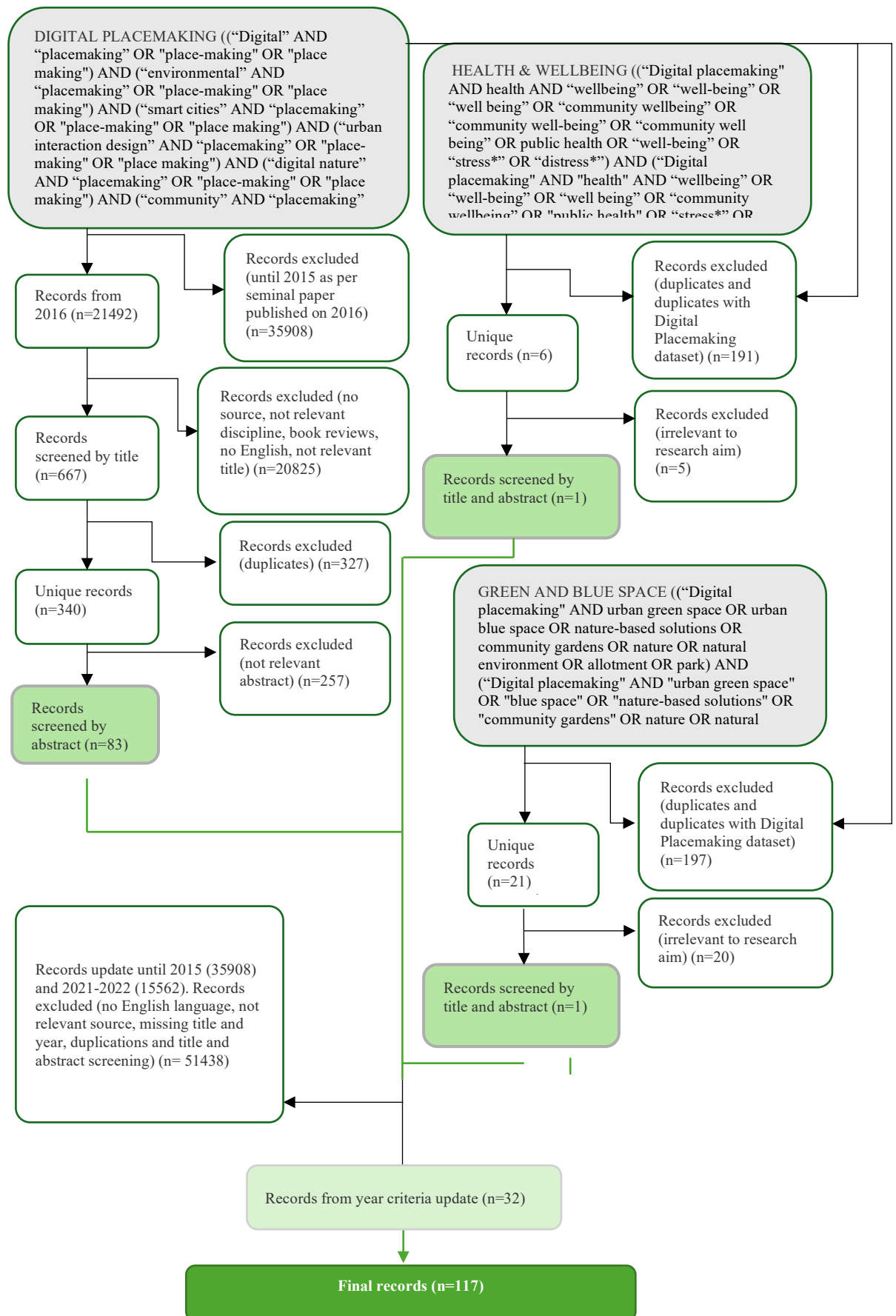


Figure 2.2: Study selection chart

2.4.4. *Qualitative assessment*

The quality of eligible studies was assessed using the Mixed Method Appraisal Tool (MMAT) (Hong et al., 2018). This qualitative assessment for risk of bias and quality of evidence of the studies permits an evaluation of the methodological quality of studies from five categories: qualitative research, randomised controlled trials, non-randomised studies, quantitative studies, and mixed-method studies. This tool was designed for the appraisal stage of systematic mixed studies reviews and allows us to appraise the quality of different methodological studies. The MMAT was applied independently by two team members to each paper and a third team member was included to solve disagreements. Quality assessment was conducted according to the MMAT guidelines for each paper, answering “yes”, “no” or “can’t tell” to the methodological quality criteria. Each paper then received a score following a 5-point Likert scale, 5 being the maximum score. The majority of the results received 3 or 4 points (26%; n=30 each), whereas 15% (n=18) of results received the highest score (5 points) for high quality (Appendix C).

2.4.5. *Data synthesis*

Data from the studies were collated and summarised following the thematic analysis method (Braun & Clarke, 2012; 2021). This method allows us to identify and classify data insights into patterns of meaning across the dataset collected. A concept matrix which included the record information (title, author, year, source, and publisher), mention of digital placemaking, health & wellbeing, green & blue space, codes and themes, research question, case study (if so, city and country), method of the study, sample characteristic, type of intervention, the measure of performance, theoretical approach, key findings, the gap in the literature found and MMAT score was developed. Codes and themes followed the thematic coding process: familiarisation with the data, generation of initial codes, search of themes, review of potential themes, defining and naming themes,

and report production. Themes and codes along with the allocation of articles to themes were checked in roundtable discussions.

2.5. **Findings**

The thematic analysis of the dataset produced ten key themes as can be seen in Table 2.2.

This section will discuss each of the themes providing further detail on the extant knowledge base, a deeper understanding of the characteristics of digital placemaking and their relationship to mental health/wellbeing and green/blue spaces.

Theme	Times in dataset (TID)	%	Codes	TID
Placemaking	84	71,79	Digital placemaking	37
			Placemaking	28
			Creative placemaking	4
			Virtual placemaking	3
			Healthy placemaking	2
			Smart placemaking	2
			Smart placemaking	2
			Green placemaking	2
			Radical placemaking	1
			Ethical placemaking	1
			Hybrid placemaking	1
			Mobile placemaking	1
Community engagement	54	46,15	Community engagement	49
			Community participation	3
			Citizen engagement	2
Hybrid reality	39	33,33	Hybrid space	12
			Augmented reality	9
			Location-based mobile	6
			Virtual reality	5
			Geo-location	2
			Immersive digital experience	2
			Expanded reality experience	1
			Digitalisation	1
			GIS	1
Sense of place	38	32,48	Sense of place	24
			Identity	8

			Place attachment	5
			Place branding	1
Inclusion	12	10,26	Inclusion	9
			Accessibility	2
			Social justice	1
Social media	18	15,38	Social media	14
			Mobile media	2
			Digital media	2
Smart city	17	14,53	Smart city	11
			Smart cities tech	6
Co-creation	13	11,11	Co-creation	11
			Co-governance	2
Wellbeing	17	14,53	Wellbeing	4
			Social wellbeing	3
			Health indicators	2
			Mental health	2
			Place wellbeing	2
			Community wellbeing	1
			Wellness of city residents	1
			Stress	1
			Healthy living	1
Nature in cities	14	11,97	Nature in cities	4
			Contrast tech-nature	2
			Nature-based solutions	3
			Green planning	1
			Urban Agriculture	1
			Therapeutic green space	1
			Green infrastructure	1
			Blue space	1

Table 2.2: Themes and codes from Thematic Analysis

2.5.1. General observations

The majority of studies were case studies (72%; n=84). Qualitative methods were predominant (90%; n=105), with a split of 4% (n=4) of quantitative and 6% (n=7) of mixed methods for the rest of the records. There was no consistency in publication sources with articles from environment to culture, technology, sustainability, or tourism, proving

this concept as a multidisciplinary process with no specific area of concentration. Very few studies investigated the combined effects of digital placemaking, mental health/wellbeing and green/blue space as shown in Table 2.3.

Areas of interest mentioned	N° articles
Digital placemaking	96
Health & Wellbeing	29
Green & Blue Space	25
No Digital Placemaking	21
No Health & Wellbeing	88
No Green & Blue Space	92
Placemaking, health & wellbeing, green & blue space	8
Digital placemaking, health & wellbeing, green & blue space	4

Table 2.3: Studies by area of interest mentioned

2.5.2. Theoretical perspectives on digital placemaking

Despite being the most recurrent theme among all records (72%, n=84), digital placemaking is found to be a complex term, with different terminologies and definitional discrepancies.

From our results, Relph (2007) compares virtual and real places alluding to virtual placemaking, but it would be Latorre (2011) who defined digital placemaking as the integration of social media in placemaking practices (Appendix B). However, Basaraba's review (2021) studied the multidisciplinary approach of the concept, which emerged as 'digital placemaking' in media studies in 2015. Digital placemaking is a complex concept that has been implemented in different fields without being tied to one specific piece of technology (Chen et al., 2022; Głównyński, 2022). Yet, the first disagreement found in our results on the concept of digital placemaking is to understand if it is a type of placemaking itself or if it is a subcategory of creative placemaking.

Placemaking practices have been applied to a variety of disciplines evolving into different subgroups within the concept. However, the most cited classification is described by Wyckoff (2014) – standard placemaking as the universal term whose types are strategic, tactical, and creative placemaking. Some authors present digital placemaking as a subcategory of creative placemaking (Basaraba, 2021; Paquin, 2019; Sanaeipoor & Emami, 2020a; Stokes et al., 2018), understanding it is the application of media to creative placemaking – defined by Markusen and Gadwa (2010) as the use of arts, creative and cultural thinking to improve the interest of a place. However, most authors identify digital placemaking as an independent category that could be defined as the implementation of technology in these practices that enables communities to interact with hybrid digital-physical places (Foth, 2017b; Fredericks et al., 2018; Halegoua & Polson, 2021; Labayen & Gutierrez, 2021; Pavlovskaya, 2016; Toland et al., 2020; Wang, 2019).

We have found terminology disagreements among different scholars, who do not mention digital placemaking itself but define ‘applications’ of placemaking that implement technology, understood as digital placemaking. Furthermore, some authors mention these terms in their work without defining them (Alvarez et al., 2017; Besek, 2021; Biquelet-Lock, 2021; Breek et al., 2018; 2021; Busse, 2021; Chaudhry et al., 2019; Cilliers et al., 2015; Clowater, 2021; Edwards et al., 2020; Globa et al., 2019; Gobbo & Benedetti, 2021; Harner et al., 2017; Houghton et al., 2015; Hunter et al., 2022; MacIntyre et al., 2019; Marshall, 2021; Mcarthur & Xu, 2021; Ozduzen et al., 2021; Rzeszewski & Naji, 2022; Soedarsono et al., 2021; Truong et al., 2022; Wright, 2021; Zhang & Gong, 2021). The absence of an explicit clarification of these concepts presented from the results of the analysis, as well as the different terms employed, emphasizes the confusion and lack of consensus on digital placemaking (see Table 5 in Appendix B).

Besides the term digital placemaking, our analysis of findings has produced two additional groups. One group links hybrid realities to placemaking such as virtual placemaking (Devine, 2017; Qabshoqa, 2018; Relph, 2007), radical placemaking (Gonsalves et al., 2021), hybrid placemaking (Bilandzic & Johnson, 2013), and smart placemaking (Najafi et al., 2021; Sepe, 2015), focusing on the creation of hybrid realities that could create a sense of immersion. The second group investigates social media use through mobile media in placemaking (Breek et al., 2018; Latorre, 2011; Polson, 2015; Waite, 2020).

Regarding theoretical contributions, Foth (2017a) applied Lefebvre’s theory of “the right to the city” (1996) to placemaking in the digital era as a way to bring social change and renew the urban environment, which proves the potential benefit of digital placemaking for social and behavioural change to create inclusive environments. Gulsrud et al. (2018) employ Tuan’s theory (1977) and Williams’ theory (2014) on emotional attachment to a place, placemaking potential to create diverse identity spaces to understand the use of technology to create climate resilience. Toland et al. (2020) re-evaluated the term *digital placemaking*, analysing the evolution of its definition to propose the term DigitalXPlace. Furthermore, scholars called for further research to understand sustainable ways of digital placemaking (Foth, 2017a) and detailed digital placemaking strategies that incorporate the community view and outcomes (Keegan, 2021).

2.5.2.1. *Key characteristics*

From our findings, digital placemaking is described as having a set of key characteristics and other additional characteristics (see Table 2.4).

Area	Theme	Identified as	TID
Digital placemaking	Placemaking	Key characteristic	84
	Community Engagement		54

	Hybrid Reality		39
	Sense of Place		38
	Inclusion		12
	Smart City	Additional characteristics	17
	Co-Creation		13
	Social Media		18

Table 2.4: Key themes in digital placemaking

The systematic review identified hybrid realities as a theme within the concept of digital placemaking, as the implementation of technology in urban environments allows citizens to experience physical-digital realities (Kostopoulou & Fatah gen Schieck, 2021; Wang, 2019). Location-based technology is found as an essential element of hybrid realities, which is also understood as a key characteristic of digital placemaking (Clarke, 2021; Keegan, 2021; MacIntyre et al., 2019; Pang et al., 2020a; Witteborn, 2021). Results of the review showed that hybrid realities include location-based technology and games (Bilandzic & Johnson, 2013; Frith & Richter, 2021; Gobbo & Benedetti, 2021; Harner et al., 2017; Hjorth & Richardson, 2017; Pang et al., 2020a; Pavlovskaya, 2016; Qabshoqa, 2018), augmented realities (Abdel-Aziz et al., 2016; Boffi, 2021; Clowater, 2021; Her, 2021; Hjorth & Richardson, 2017; Hunter et al., 2022; Sanaeipoor & Emami, 2020a), immersive digital experiences (Globa et al., 2019), virtual reality (Kuchelmeister et al., 2020; Rzeszewski & Naji, 2022; Van Houwelingen-Snippe et al., 2021), and digital pop-up artefacts (Fredericks et al., 2018). All of them help create realities that combine the physical and digital world with different intensities – virtual reality refers to a fully immersive experience in the digital environment, in contrast to digital pop-up artefacts that combine analogue and digital media for community engagement.

De Souza e Silva's theory (2006) on hybrid spaces was frequently cited to describe the digital overlay across the actual environment (Frith & Richter, 2021; Hjorth &

Richardson, 2017; Wang, 2019; 2022). Qabshoqa (2018) and Kostopoulou and Fatah gen Schieck (2021) applied the idea of overlaying realities through urban gamification and local augmentation of memories respectively, with the potential to positively redefine public spaces (Abdel-Aziz et al., 2016). These technologies do not aim to replace reality (Her, 2021), but to enhance its experiences and renew the excitement for physical space engagement and connections (Clowater, 2021; Kostopoulou & Fatah gen Schieck, 2021; Wang, 2019). The proliferation of technology in our daily life has shaped how we come to know the physical world (Clowater, 2021; Frith & Richter, 2021). Potential risks and negative effects of hybrid realities are the possible cause of displacement (Kostopoulou & Fatah gen Schieck, 2021), private data collection (Hjorth & Richardson, 2017), or increasing disparities within communities (Birnbaum et al., 2021).

The second key theme found is sense of place, in that individuals spend time living and emotionally interacting with space beyond being physically in it (Abdel-Aziz et al., 2016; Birnbaum et al., 2021; Freeman et al., 2019). Scholars understand it as one of the objectives of placemaking (Chen et al., 2022; Fredericks et al., 2018; Rutha & Abbas, 2021), and it is usually presented as linked to place attachment (Birnbaum et al., 2021; Freeman et al., 2019; Kale, 2019; Polson, 2015; Rutha & Abbas, 2021; Toomey et al., 2021) and identity (Agyekum & Newbold, 2019; Breek et al., 2018; Harner et al., 2017; Relph, 2007; Soedarsono et al., 2021). Most authors referred to Tuan's theory (Basaraba, 2021; Devine, 2017; Gulsrud et al., 2018; Harner et al., 2017; Rutha & Abbas, 2021; Rzeszewski & Naji, 2022; Toomey et al., 2021), which studies the human emotions and relationships to a specific place (Tuan, 1977), also presented as one of the foundations of placemaking (Clark & Lupton, 2021; Devine, 2017). Sense of place layers the physical space with meaning and cultural symbols (Foth et al., 2021), bringing a variety of benefits to communities, such as enabling community building (Breek et al., 2018), creating sense

of ownership and entitlement (Kale, 2019), and development of community and individual identity (Chen et al., 2022; El Khafif et al., 2021; Harner et al., 2017; Kale, 2019). Scholars have reflected on the creation of sense of place in digital environments, fostering emotional online connections to create meaningful locations (Clowater, 2021; Haleboua & Polson, 2021; Harner et al., 2017; Johnstone et al., 2016; Norum & Polson, 2021; Relph, 2007; Sanaeipoor & Emami, 2020a; Witteborn, 2021). There is evidence of the potential benefit of sense of place through digital placemaking in communities, especially when looking into how digital networked technologies could foster a sense of connectedness (Johnstone et al., 2016).

A third key theme was community engagement. Defined as a process of involving people to collaborate in decisions and outcomes to benefit their communities (Clarke, 2021; Foth, 2017b; Fredericks et al., 2018; Freeman et al., 2019), it is also described to empower communities (Fisher et al., 2018) and improve social cohesion among members (Najafi et al., 2021). It includes community participation (Alvarez et al., 2017; Courage, 2021; Harner et al., 2017; Toland et al., 2020; Witteborn, 2021; Zhang & Gong, 2021), and citizen engagement (Basaraba, 2021; Paraschivoiu & Layer-Wagner, 2021). It is also defended by Sanaeipoor and Emami (2020b) as “necessary for placemaking strategies to succeed” (p. 91). Our findings showed studies that reflected how community engagement could benefit from technology (Abdel-Aziz et al., 2016; Bilandzic & Johnson, 2013; Breck et al., 2018; Clarke, 2021; Fisher et al., 2018; Harner et al., 2017; Paraschivoiu & Layer-Wagner, 2021; Sanaeipoor & Emami, 2020a; Toland et al., 2020; Tomitsch et al., 2015), exploring the potential positive effect in easing the ability to connect communities and enhance engagement through bottom-up initiatives. Sanaeipoor and Emami (2020b) explored community engagement framed within smart city theory where participation is key, while Paraschivoiu and Layer-Wagner (2021) applied citizen engagement theory

with behaviour change through gamification to address climate change. However, we have found a lack of specifications regarding how to engage with communities successfully within the dataset, particularly when involving placemaking and active living projects for communities (Pang et al., 2020a).

The final key theme identified through our thematic analysis is inclusion. Digital placemaking brings inclusivity to individuals with movement restrictions (Clarke, 2021; Karge, 2018; Szaszák & Kecskés, 2020), marginalised communities whose narratives have been ignored (Foth, 2017a; Gonsalves et al., 2021; Stokes et al., 2021), and facilitates general information accessibility (Her, 2021; Sugangga et al., 2021). It allows citizens to connect with the same level of opportunities as the rest of the community. Therefore, inclusion is crucial for placemaking (Foth, 2017a) and the implementation of technology could open new barrier-free opportunities for communities (Clarke, 2021). Szaszák and Kecskés (2020) studied the implications of technology to create disability-inclusive placemaking in Hungary, showcasing a lack of digital replacement in less basic levels of the spatial Maslow pyramid. Even though inclusion is mentioned as an essential aspect of placemaking, studies tend to overlook it. This could be a consequence of targeting specific groups or economic activities which leads to a loss of diversity (Chen et al., 2022). There is a lack of exploration and tests of solutions and innovations to make nature accessible for those with limited access using other types of technologies rather than GPS or GIS as well as an exploration of the effects of different types of digital nature in older adults' wellbeing (Van Houwelingen-Snippe et al., 2021).

2.5.2.2. Additional characteristics

From our results, we have found themes that were approached and described in the dataset understood as additional characteristics since they are not presented as essential to digital

placemaking but enhance and benefit their application. These themes add potential value to digital placemaking practices.

Smart cities are found in our results as a theme linked to hybrid realities but expanded to cyberinfrastructures in cities (Freeman et al., 2019). Smart cities' final goal is to employ technology to benefit citizens' life (Wang, 2019), usually including ICTs in the urban environment (Chaudhry et al., 2019; Grace et al., 2020; Sanaeipoor & Emami, 2020a; Szaszák & Kecskés, 2020), and Internet of Things (IoT) (Freeman et al., 2019; Peacock et al., 2021; Sanaeipoor & Emami, 2020a). This theme could collect data from citizens through technology (Peacock et al., 2021; Sanaeipoor & Emami, 2020a; Vallicelli, 2018). Grace et al. (2020) combine the smart city paradigm with the biophilic city paradigm to create the smart-natural interface, constructed by five spaces: connectivity, vision, placemaking, monitoring and smart citizen-led. We have found smart cities are not a requirement for digital placemaking, but they would facilitate its development.

Co-creation as a theme is found to be highly linked with governance practice for consultation and planning decisions, which uses community participation as a tool. Some authors refer to it as co-governance (Gulsrud et al., 2018), collaboration in city-making processes (Bicquelet-Lock, 2021; Fredericks et al., 2018; Toomey et al., 2021), or co-design (Sanaeipoor & Emami, 2020a), as it describes bottom-up initiatives. This theme is linked to smart cities, as digital technologies embedded in the urban area are presented to include citizens' opinions and inputs in the decision-making. Therefore, technology is implemented as a tool to engage citizens in co-producing with organisations and institutions different solutions for their urban environment. Grace et al. (2020) described smart city governance to include co-creation processes and Bicquelet-Lock (2021) recognised collaboration and co-production with communities as a key step in healthy placemaking.

Social media is identified as an independent theme since it was the primary tool researched in digital placemaking to understand the community's sentiment toward a place. Described as an instrument to enable information exchange and social interactions, it increases the social relationships in communities (Breek et al., 2018). It has the potential to stimulate offline interactions through online relations (Breek et al., 2018; Waite, 2020). Recently, Keegan and Schifanella (2022) presented how the contributions of social media to placemaking have received little attention in the literature. Some authors mentioned the negative effects of social media on wellbeing such as isolation (Shankardass et al., 2019), and the commodification of culture and gentrification (Bronsvort & Uitermark, 2022).

2.5.3. Mental health and wellbeing implications in digital placemaking

Only 15% (n=17) of records are coded into the mental health and wellbeing theme, referring to community wellbeing (Calderon & Takeshita, 2021; El Khafif et al., 2021; Marshall, 2021), wellness of city residents (Gulrud et al., 2018), stress (Clark & Lupton, 2021), healthy living (Najafi et al., 2021) or place wellbeing (Kale, 2019). A specific type of placemaking that focuses on the health impact of public design (Bicquelet-Lock, 2021; Ng, 2016) is also found.

Wellbeing is the most common term used, usually impacted by pleasure and sensory engagement (Kale, 2019) or social isolation (Marshall, 2021). It is a broad concept that combines health, positive affective states, health behaviours, and social engagement, among other wellness indicators (Shankardass et al., 2019). Wright (2021) describes placemaking and wellbeing as aiming to benefit people in an integrative way.

We have identified three main categories in this theme: connected with nature and social resilience (Beam et al., 2018; Gulrud et al., 2018; MacIntyre et al., 2019; Van

Houwelingen-Snippe et al., 2021), with sense of place and place engagement (Kale, 2019; Shankardass et al., 2019), and the physical and psychological benefits or social relationships (Courage, 2021).

Beam et al. (2018) referred to biophilia theory (Kahn, 1997) to understand the human need to bond with nature and the crucial benefits to health, wellbeing, and resilience. Regarding urban environments, Marshall, (2021) and Eckenwiler (2021) outlined the negative health impact on their citizens such as isolation, depression and mobility restriction. NBS could help mitigate the current climate challenges and negative effects of urban environments while bringing benefits to the health and wellbeing of communities (MacIntyre et al., 2019).

Looking into the potential benefits of technology for wellbeing, some authors aim to explore the effects of the increase of digital networks in individuals' lives through digital innovation but without alluding to digital placemaking (Clark & Lupton, 2021; El Khafif et al., 2021; Shankardass et al., 2019; Van Houwelingen-Snippe et al., 2021). Furthermore, natural environment digitalization and its potential effects on wellbeing are mentioned by some authors as potential areas to explore (Keegan, 2021; MacIntyre et al., 2019; Van Houwelingen-Snippe et al., 2021).

Neither specific best practices have been found for the implementation of technology in urban environments for citizens' mental health and wellbeing through NBS, nor how to enhance its performance and impact through digital placemaking.

Most scholars approach this theme in a broad sense, without specific case studies that look into precise health indicators on digital placemaking, only two studies included health indicators applied to sense of place (Agyekum & Newbold, 2019; El Khafif et al., 2021). The evident lack of studies examining specific health indicators in digital

placemaking is proven by the need for the standardisation in NBS evaluation that includes health and wellbeing metrics (MacIntyre et al., 2019) and the wellbeing impact of digital and physical place interactions including geosocial data, health and social planning interventions (Shankardass et al., 2019) as areas for future research.

2.5.4. Green and Blue space implications in digital placemaking

The final theme is related to green and blue spaces (12%; n= 14), which include nature in cities (Karge, 2018; Ng, 2016), therapeutic green space (Kale, 2019), NBS (Gulsrud et al., 2018; MacIntyre et al., 2019), green planning and infrastructure (Cilliers et al., 2015; Truong et al., 2022) and green agriculture (Lyle et al., 2015).

The first result and most clear within this theme is that digital placemaking has not been explored through blue spaces, with only one study addressing blue spaces from an analogue placemaking approach (Toomey et al., 2021).

Findings focused on green spaces emphasised the eco-benefits of nature for wellbeing and health in cities (Gulsrud et al., 2018; Kale, 2019; Ng, 2016), which could be achieved through green implementations such as green corridors, urban green infrastructure (Truong et al., 2022) or green walls (MacIntyre et al., 2019). Regarding this, Cilliers et al. (2015) introduced the term ‘green placemaking’ as the application of green planning approaches to placemaking, creating sustainable and competitive public spaces. The authors encouraged the benefits of combining these two practices as it allows the integration of placemaking’s social functions with green planning’s environmental functions.

The NBS approach is only mentioned in three studies within the dataset. It is approached connected to climate resilience in the city, where technology is used as a strategy for socio-ecological principles (Gulsrud et al., 2018); as a tool for NBS in urban design (J.

Boros & Mahmoud, 2021); and highlighting the positive frame that NBS are described in while exploring different interventions in cities, presenting the potential benefit of introducing digital innovations such as digital placemaking (MacIntyre et al., 2019). Boros and Mahmoud (2021) allude to the different placemaking tools provided in literature for community engagement that can be used with NBS, while non-human elements and ecological systems in placemaking have been ignored traditionally. This supports our research and model developed to understand digital placemaking practices in urban nature spaces where nature's role is a key element.

Nature is mostly described as the context where a project happens or partially happens, but there are no specific mentions of specifications or technological representations of nature. Only Edwards et al. (2020) and Van Houwelingen-Snippe et al. (2021) referred to the use of technology as a potential benefit for future research, whereas Grace et al. (2020) 'smart-natural' city interface briefly mentions placemaking as one of the spaces in this interface without understanding on how to implement it or the effect of this specific characteristic in the community. Moss et al. (2021) present how nature has been absent in most smart cities' strategies, therefore being essential to understand how it is addressed in the urban digitalisation, what part nature plays in this context and what goal is targeted. These authors describe urban nature as being mediated by technological devices, even if it has not been acknowledged in literature and policies. The particular impact of digital placemaking in communities, specifically its wellbeing and mental health effect on NBS, is an area that has been overlooked in the literature. However, existing and future NBS studies and projects should assure to cover the social impact of these practices and the opportunities that technology and digital placemaking bring to NBS performance.

2.5.5. Combined areas

The results of our analysis showcase that only three studies mentioned digital placemaking, health/wellbeing and green space (Keegan, 2021; MacIntyre et al., 2019; Toland et al., 2020) without specific investigation of the combination of these three areas of interest but suggesting to further explore them to understand digital placemaking implications for communities and the environment.

Four results combine mental health/wellbeing and green space with ‘digital’ placemaking – presenting placemaking but mentioning the implementation of technology in some ways (Edwards et al., 2020; Grace et al., 2020; Gulsrud et al., 2018; Najafi et al., 2021). Gulsrud et al. (2018) expand green placemaking as a type that integrates socio-cultural and scientific knowledge to promote urban biodiversity, combining technological strategies with climate adaptation solutions in the case study analysed. This concept is found as the only placemaking term that combines technology and urban biodiversity mentioned to affect the wellbeing of citizens briefly. Finally, one record explores healthy placemaking – without specific digital implications – with green space and mental health/wellbeing (Ng, 2016).

Besides the gaps described, we can demonstrate there is a lack of understanding of the impact of digital placemaking on the mental health and wellbeing of citizens through green and blue space and NBS. There is one mention of blue space in the data set analysed, focusing on green space. Even though some articles present these three areas, they are explored broadly and partially, offering an incomplete concept of digital placemaking, without analysing specifically its potential use in NBS involving green and blue spaces as well as its particular mental health and wellbeing social impact and bonds within communities.

2.6. Discussion

The aim of the study was to understand the relationships among digital placemaking, urban nature and mental health while introducing digital placemaking as a new technique to augment NBS in urban nature environments impacting the health and wellbeing of the citizens. The review of 117 studies adds to the debate from Basaraba (2021), Courage (2021), and Van Houwelingen-Snippe et al. (2021) by focusing on the mental health and wellbeing social impact of digital placemaking when connecting with nature through NBS. The data synthesis conducted for this review indicated a lack of agreement on the concept and characteristics of digital placemaking (Basaraba, 2021; Chen et al., 2022; Courage, 2021; Karge, 2018; Keegan, 2021; Sanaeipoor & Emami, 2020a), especially when considering mental health and wellbeing effects (Najafi et al., 2021; Shankardass et al., 2019; Wright, 2021), combined with green and blue space (Edwards et al., 2020; MacIntyre et al., 2019). The findings reveal a lack of studies involving digital placemaking and blue spaces as well as a lack of application for NBS. Therefore, we advance upon and contribute to this debate by presenting this review and model.

Our study results identified four key characteristics in digital placemaking practices – hybrid reality, sense of place, community engagement and inclusion. From them, only hybrid realities were presented as unique, whereas the other key themes were mainly studied in placemaking but highlighted their potential benefit from technology. We can confirm digital placemaking's unique characteristic is the ability to create physical-digital experiences that can improve sense of place, engagement and inclusion of communities.

Problems or challenges derived from digital placemaking are usually presented briefly in the dataset, alluding mainly to privacy concerns (Hjorth & Richardson, 2017; Kostopoulou & Fatah gen Schieck, 2021; Li & Alencar, 2022; Pang et al., 2020b; Peacock

et al., 2021; Wilken & Humphreys, 2021), exposing and amplifying community inequalities (Bronsvoort & Uitermark, 2022; Halegoua & Polson, 2021; Witteborn, 2021), gentrification (Foth, 2017a; Karge, 2018; Sanaeipoor & Emami, 2020a) and a lack of community purpose and environment disconnection (Chen et al., 2022). Despite these limitations, digital placemaking is presented with positivity but further understanding of the risks from these practices would benefit a deepen explanation of this concept.

By supporting mental health and wellbeing through NBS and digital placemaking practices, a potentially positive impact on the social sphere of the community could be achieved. There is evidence supporting the positive effect of digital placemaking on mental health and wellbeing, but we have found a lack of application of specific health indicators to digital placemaking, as well as the specific study of the wellbeing impact of digital spaces (MacIntyre et al., 2019; Shankardass et al., 2019). Future studies involving NBS should include specific metrics and technologies to measure environmental performance and social impact – specifically mental health and social cohesion indicators – of these practices in order to provide strong evidence of their benefits.

The findings of this review highlight absence of blue space mentions involving digital placemaking, opening this area for further research. We have found a misconception of nature as only green space, neglecting the potential of blue spaces for the mental health and wellbeing of communities. Recent investigations demonstrating the neglected role of nature in smart cities (Grace et al., 2020; Moss et al., 2021) support our study results by presenting nature environments are a context, without understanding it as an active element for investigation involving performance and impact. The implementation of NBS in cities through digital placemaking would benefit from further investigations on environmental performance and community effects and impact. Accordingly, future

studies need to consider additional methods of data collection and analysis on this matter, such as walking or swimming interviews, auto-ethnographies or netnographic studies.

The digital placemaking approach to NBS has not been thoroughly explored, as shown in our review results. Therefore, we propose a novel approach to NBS through our review and model. Our proposed approach to digital placemaking follows (Foth, 2017b) understanding of placemaking as beyond the commercial aspect but as a strategy that fosters social change and urban renewal through democratisation. The augmentation of spaces through digital placemaking is proven to be an enhancer of public space experiences (Latorre, 2011; Wang, 2019), and could benefit NBS practices in urban nature environments (Boros & Mahmoud, 2021; MacIntyre, 2019), generating sense of place and place attachment (Breek et al., 2018; Halegoua & Polson, 2021), as well as creating inclusive and accessible places to the community (Szaszák & Kecskés, 2020). This technological application for urban nature can expand its effects and political agenda of urban digitalisation (Moss et al., 2021), creating long-term relations and adapting these practices to the world of digital we are living in.

The present review has discovered a litany of studies in the past which have shown evidence of the potential application of digital placemaking practices in urban spaces. Despite the concept confusion and lack of consensus found in the digital placemaking literature, we have collated a number of characteristics of these practices that aim to contribute to clarifying the concept of placemaking and its potential application to NBS for wellbeing. For a thorough understanding and informed view on the adoption of these practices, we propose the following study and model, which aims to inform about potential applications and risks of digital placemaking practices when connecting citizens with nature and impacting their wellbeing. The Digital Placemaking for Nature &

Wellbeing model brings together the findings from the digital placemaking literature, applied to urban nature and NBS while connecting with wellness.

The proposed Digital Placemaking for Nature & Wellbeing Model (see Figure 2.3) is an overview of the current landscape in the respective areas. It will advise researchers and practitioners on how to fully implement digital placemaking for NBS performance and wellbeing impact, focusing on its mental health and wellbeing influence through connecting with nature. The model aims to serve as a help and guideline to avoid overlooking essential aspects of digital placemaking when applied to urban nature environments for health and wellbeing. This model will be further developed and examined in the future stages of this research.

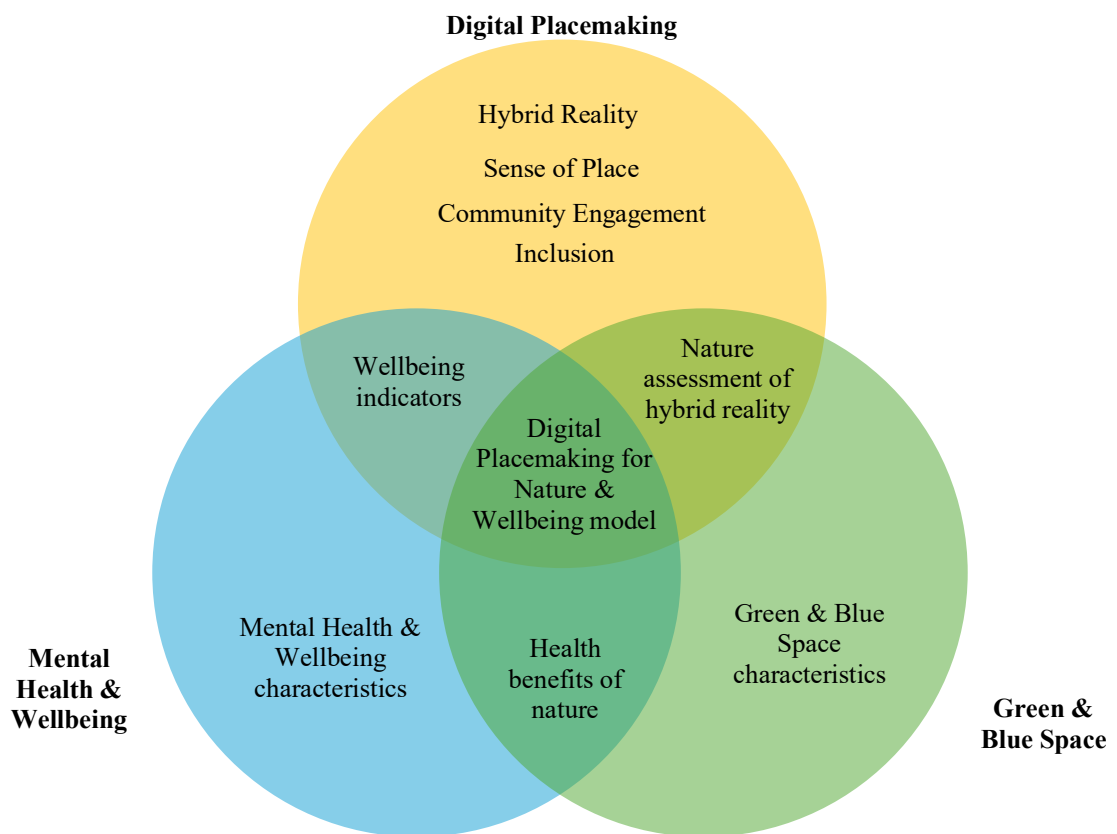


Figure 2.3: Digital Nature & Health Placemaking Model

The model is formed by three interrelated spheres. The digital placemaking sphere includes the four main characteristics from our review, creating a type of hybrid environment which promotes sense of place and community engagement in the public space, while assuring it is inclusive and accessible to all. These characteristics need to be assessed and planned when designing the project to assure it covers all the essential elements of a digital placemaking practice. Following Tomitsch et al. (2015), a holistic and responsive approach to technology implementations in placemaking practices in the city can reflect rising levels of social wellbeing and connectedness. The ecological framework of placemaking they propose is advanced by the informed results in our review to understand the key elements of digital placemaking to be assessed during the development of a project. Moreover, these characteristics are also informed by Edwards et al. (2020) guidelines for technology and people, where the design should be rooted in the context where it is developed, integrating social dimensions and encouraging intimate experiences.

The green and blue space sphere focus on the natural aspect – digital and analogue – of the hybrid reality. This section ensures the project includes and promotes nature connections in the urban environment, specifically since urban nature is being mediated by technological devices (Moss et al., 2021). It is crucial to measure the density, aspect and characteristics of the ‘nature’ element in digital placemaking, which will affect the type of strength of its connection with psychological wellbeing and the overall experience in the public space. Nature needs to be addressed in depth, beyond just a non-human element and a context where the digital placemaking project is developed (Chen et al., 2022). Therefore, an assessment of the “nature” element in the hybrid environment created is essential for the correct development and goal achievement of the Digital Placemaking for Nature & Wellbeing model. MacIntyre et al. (2019) encourage the

importance of community engagement with green spaces when implementing NBS. To enhance this engagement, it is essential to understand how the hybrid environment is going to interact with the natural space and how it is going to be portrayed (Moss et al., 2021). NBS should be strategically designed to ensure climate mitigation and citizen engagement activities (e.g. Gulsrud et al. 2018). The way nature is portrayed through technological applications is key to the potential effects on wellbeing (Van Houwelingen-Snippe et al., 2021).

The third sphere reflects the mental health and wellbeing impact of this digital placemaking experience. Mental health and wellbeing of the community will be assessed before their interaction with the experience. Specific health indicators and metrics that appraise the experience from a community or an individual level will also be implemented during and/or after the experience, depending on the scope of the project. This health and wellbeing evaluation is crucial to understand the impact of the hybrid environment (MacIntyre et al., 2019; Shankardass et al., 2019).

The three spheres are interconnected and affect each other in the development of the different aspects. This Digital Placemaking for Nature & Wellbeing model aims to bridge the different gaps found in our review to propose a guide to support placemakers in developing digital applications for urban nature spaces with a wellbeing impact approach. This technological application to enhance physical experiences and connect citizens with nature is informed by the results from our review, which defend and proves the value of digital placemaking for NBS. The model presents an application of digital placemaking for NBS that helps both to measure its impact and to enhance the experience and performance created for the community.

2.6.1. *Limitations*

This review presents some limitations. A common limitation to most reviews is the inclusion and exclusion criteria applied such as English as the only language accepted, search strings used as well as the databases. Since the digital placemaking concept is multidisciplinary and lacks consensus on definitions and applications, the keywords included aimed to avoid overlooking suitable studies, but it is possible that different studies could have been identified when using different search terms or databases. Additionally, grey literature was excluded from the review. Finally, the data synthesis process through reflexive thematic analysis informed by the research question and aims, which in turn would exclude outlier themes.

2.7. Conclusion

In systematically reviewing the above literature, hitherto unknown links are made between digital technology in placemaking, their mental health and wellbeing impact, and its use with nature and NBS. The review outcome offers a useful overview of key studies, which allow us to understand further the way technology – specifically digital placemaking – can enhance the performance and social impact of NBS, not only in green and blue spaces increasing its overall efficiency but also for nature amplifying its impact in the community. The results pointed to a lack of agreement in the reviewed academic literature on digital placemaking's impact and use in urban environments. The study identified four key characteristics of digital placemaking as well as a general and incomplete approach when assessing the mental health and wellbeing impact and their connection with green and blue space. This paper contributes to understanding the concept of digital placemaking and its potential use to increase citizens' health when connecting with nature while highlighting the benefits of bringing green and blue space

back into the urban environment. It also contributes to presenting an innovative application of digital placemaking for NBS to impact citizens' wellbeing. Our study offers a platform for understanding the opportunities of embedding digital placemaking practices in and for NBS's social impact while stimulating prospective research debates on this topic to promote the implementation of green and blue space strategies into the urban environment to enhance citizens' wellbeing through digital placemaking. Moreover, our research offers insight into the broad range of best practices for implementing digital placemaking practices in the urban environment through our Digital Placemaking for Nature & Wellbeing model. The findings highlight the need for further research that acknowledges the complex nature of digital placemaking in combination with mental health/wellbeing and green/blue space. An enhanced understanding of this area will help maximise the impact of digital placemaking on urban citizens' wellbeing and the climate resilience of the city.

Future studies could focus their attention on the implementation of digital placemaking for communities. A better understanding of health indicators and wellbeing metrics would benefit from assessing the impact of digital and physical place interactions. There is also an opportunity to investigate blue space's effect through digital placemaking. Moreover, there are emerging debates that offer a platform for further debate in new areas where digital placemaking might be able to fit, such as participatory design methods for sustainable placemaking practices (Clarke, 2021), positive design for NBS (Birkeland, 2022), or planning for health and wellbeing (Liaros, 2022)

As explored in this study, digital placemaking presents an innovative technique to augment the application of NBS. Neither has been applied in the mental health and wellbeing sphere nor the green and blue space environments. Hence, our systematic

literature review addresses this gap, representing a key contribution to the three areas of interest in our study.

Chapter 2. An update to the systematic literature review (Part B).

2.8. Introduction

The findings from the systematic literature review suggest a lack of agreement in the reviewed literature on the digital placemaking impact on nature and wellbeing as well as the four main characteristics of the concept. There was insufficient evidence on the assessment of its implementation in nature for wellbeing. However, the augmentation of place experiences through digital placemaking is found to enhance consumer experiences (Latorre, 2011; Wang, 2019) and could benefit nature-based solutions practices (Boros & Mahmoud, 2021) to generate a sense of place attachment (Breek et al., 2018; Haleboua & Polson, 2021), which can be expanded to urban nature spaces for urban digitalisation (Moss et al., 2021) to create long term relationships.

There are valuable reasons for updating the systematic literature review. They mainly include the year update from publication to thesis submission and the dissemination of new studies in the area. Review updates are pertinent if different findings or conclusions are determined as they could impact practice, policy and research priorities (Moher et al., 2008). Therefore, Chapter 2 Part B provides an update of the published systematic literature review to determine whether the findings of the published study are still relevant and applicable. This review aims to evaluate whether there was new knowledge between 2022 and 2024 that may strengthen the initial review findings.

2.9. Methods

The updated review was undertaken following the methodological guidelines established in Part A (Fernandez-Osso Fuentes et al., 2023b). The purpose of the review was to identify digital placemaking studies that included nature and/or wellbeing from the publication of Part A. The following databases were searched: Web of Science, Scopus, Emerald, ACM DL (Association for Computing Machinery Digital Library) and Google Scholar. The same keyword strategy detailed in Chapter 2 Part A was followed, formed by three themes and two tiers of searches (see Table 2.1). The search was limited to articles published between October 2022 and September 2024. Article eligibility, data extraction and study quality rating were undertaken using the methods outlined in Chapter 2 Part A. Qualitative assessment also employed the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018) for risk of bias and quality of evidence of the studies in the literature review update (see Appendix D).

The eligibility criteria process was applied to this data update and a final dataset of 36 records was selected for the systematic review (see Figure 2.4). Data extraction and synthesis followed the same process as detailed in Part A.

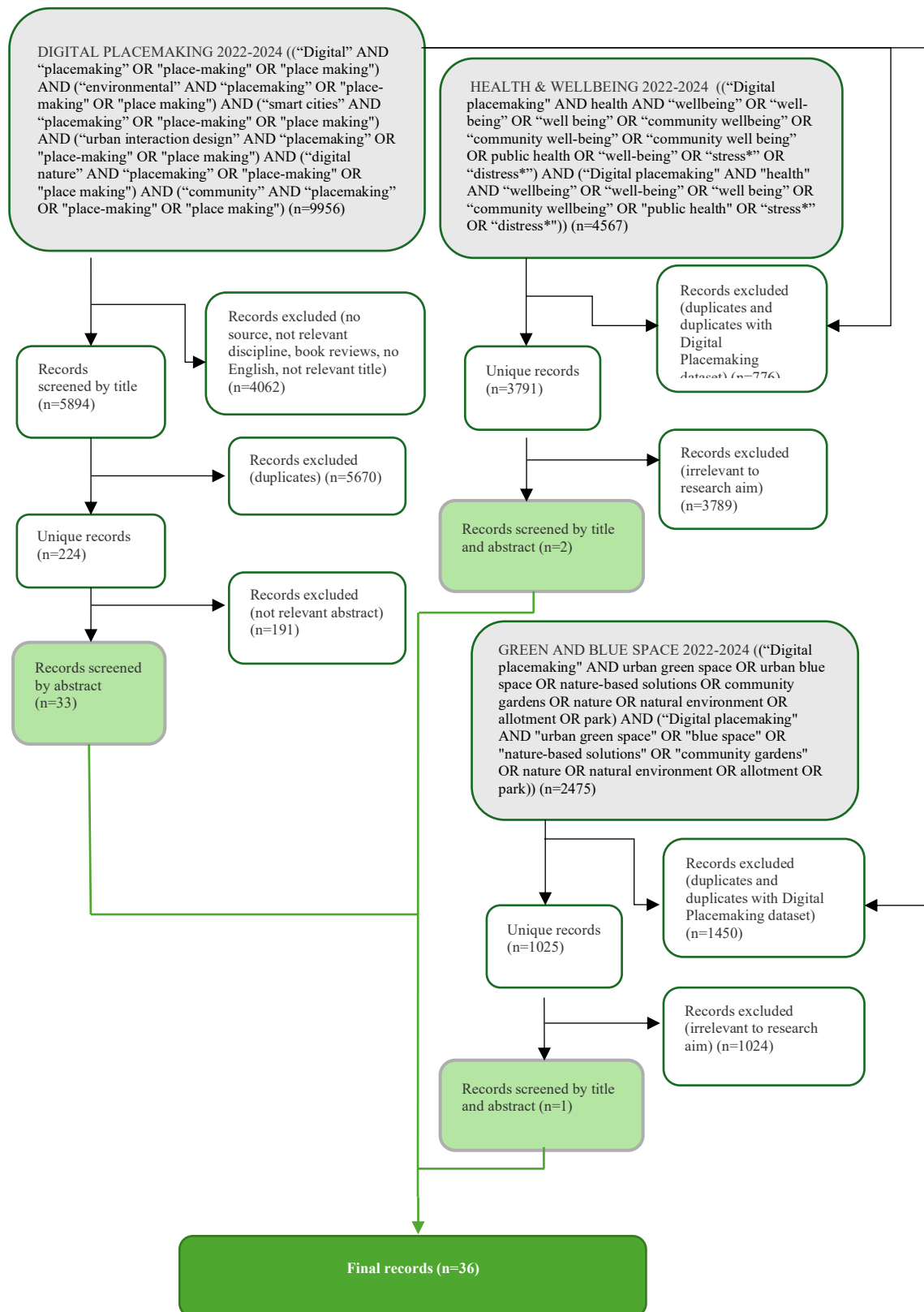


Figure 2.4: Study selection chart for the systematic literature review update.

2.10. Findings

Thirty-six new papers were found in the updated literature and analysed in a similar way to the initial review. The thematic analysis of the dataset produced key themes according to Part A (Table 2.5). This section will discuss the themes providing further detail on the use of digital placemaking and its relationship to wellbeing and nature.

Themes	TID	Codes	TID
Digital placemaking	36	Placemaking	2
		Digital placemaking	34
Community engagement	23	Community engagement	23
Hybrid reality	27	Hybrid reality	27
Sense of place	21	Sense of place	1
		Place attachment	4
		Sense of presence	1
		Identity	15
Social media	7	Social media	4
		Facebook	1
		Instagram	1
		Tiktok	1
Smart city	7	Smart city	7
Co-creation	16	Co-creation	16
Inclusion	23	Inclusion	23
Wellbeing	19	Wellbeing	19
Nature in cities	13	Nature	11
		Sustainability	2

Table 2.5: Themes and codes from Thematic Analysis

2.10.1. General Observations

The majority of studies analysed were case studies (60%, n=21). Qualitative methods were predominant again (78%, n=28), with the rest being mixed methods (22%, n=8) and no quantitative studies. There was no consistency in the fields and areas in the publication sources. Despite most articles referring to digital placemaking in some form (e.g., referring to placemaking using technology without specifically mentioning the term

digital placemaking), an increase in articles combining digital placemaking, nature and wellbeing is found (see Table 2.6).

Areas of interest	N° articles in Part B (n=117)	% Articles in Part A	N° articles in Part B (n=36)	% Articles in Part B	% Variation
Digital Placemaking	96	82%	34	94%	+12%
Health & Wellbeing	29	25%	19	53%	+28%
Green & Blue Space	25	21%	16	44%	+23%
No Digital Placemaking	21	18%	4	11%	-7%
No Health & Wellbeing	88	75%	17	49%	-26%
No Green & Blue Space	92	79%	20	57%	-22%
Placemaking, Health & Wellbeing, Green & Blue Space	8	7%	2	6%	-1%
Digital Placemaking, Health & Wellbeing, Green & Blue Space	4	3%	10	28%	+25%

Table 2.6: Studies by area of interest mentioned comparing Part A and Part B.

2.10.2. Theoretical perspectives on digital placemaking

The complexity around the concept of digital placemaking is still evident in the second part of the systematic literature review. Two additional reviews have been published (Amirzadeh & Sharifi, 2024; Najafi et al., 2022). Najafi et al. (2022) focus on digital placemaking and senior participants and how the technology presents a number of challenges when engaging with this group, whereas Amirzadeh and Sharifi (2024) develop a thorough understanding of the evolution of placemaking from the late twentieth

century until now through the analysis of nine paradigms. Digital placemaking is one of these paradigms, along with sustainable placemaking (including green placemaking or nature-based placemaking), and healthy placemaking. In their review, the authors present fundamental aspects of the evolution of placemaking such as the notion of sense of place, bottom-up and participatory processes, the concept of sustainability and the potential to shape place identity as well as the value of healthy environments.

Regarding the terminology used, findings suggest a continuation of the complexity and confusion in digital placemaking. Terminology disagreements are found, from spelling differences to a combination of terms that describe placemaking combined with technology. Many studies referred to digital placemaking without explicitly mentioning it but describing a combination of placemaking and digital technology (Klein, 2022), radical placemaking (Almqvist et al., 2023; Gonsalves et al., 2023), augmented placemaking (Hespanhol, 2022), critical placemaking (Moodley & Marks, 2023), and platform placemaking (Törnberg, 2022). Other related concepts were also found in the dataset such as ethical placemaking (Kolotouchkina et al., 2022), careful placemaking (Low et al., 2022) or relational placemaking (te Lintelo et al., 2024). In the Appendix E, an overview of the different definitions and concepts regarding digital placemaking and placemaking are presented. It is important to note that not all records included a definition of the concept explored (Boros et al., 2024; Costa et al., 2024; Dai & Liu, 2024; Khamis & El Harairy, 2023; Kolotouchkina et al., 2022; Low et al., 2022; Nikšič et al., 2023; Sacramento et al., 2022; Thompson et al., 2023; Yang, 2023), which also demonstrate the complexity and confusion around the term.

The dataset analysed in this section does not present the previous dilemma of digital placemaking as a type of placemaking or a subcategory of creative placemaking. Records analysed described digital placemaking as an evolution of placemaking due to the current

technological context of citizens. From the end of 2022, a trend of considering digital placemaking as a natural evolution of placemaking due to the incorporation of technology in citizens daily interactions is found in the dataset (Kotus et al., 2022; Maciej, 2024; Törnberg, 2022). Despite the variety of terminology used, the definitions refer to a digital mediation of place experiences also promoting social interactions (Amirzadeh & Sharifi, 2024). The division described in Part A of two approaches of digital placemaking, one linking hybrid realities to placemaking practices and another referring to social media uses in placemaking, is not found in the updated dataset. Studies refer to hybrid environments and social media, but an overall approach to digital placemaking has shifted to enhancing physical places to create sense of attachment and belonging with place and with others (Hespanhol, 2022; Imara et al., 2024; Kotus et al., 2022; Maciej, 2024; Najafi et al., 2022; Noronha et al., 2023; Ouda, 2022). No specific technologies are included in the approach, referring to a broad understanding of digital tools. Therefore, from the end of 2022 an advancement in the considerations of digital placemaking is found to detach from specific technologies and social media uses into a broader digital conceptualisation. Theoretical contributions continue to apply key social geographers and social theorists to understand how places and spaces are constructed (Cresswell, 1996; Lefebvre, 1996), also alluding to the notion of sense of place (Relph, 2007; Tuan, 1977) to understand how meaning transforms space into places (Almqvist et al., 2023; Amirzadeh & Sharifi, 2024; Atteneder & Lohmeier, 2024; Dai & Liu, 2024; Gonsalves et al., 2024; Kotus et al., 2022; Low et al., 2022; Maciej, 2024). These works provide the value and significance of cultural, emotional and experiential dimensions shaping belonging feelings with locations. Studies also refer to the theoretical base of placemaking by Jacobs (1961), Lynch (1960) and Whyte (1980) (Amirzadeh & Sharifi, 2024; Hespanhol, 2022; Najafi et al., 2022; Ouda, 2022; Razi & Ziminski, 2022), also applying frameworks by Project

for Public Spaces and democratic placemaking approaches by Kent & Madden (2003), such as Amirzadeh and Sharifi (2024), Antonić et al. (2023), Atteneder and Lohmeier (2024), Klein (2022), Najafi et al. (2022), and Gehl Institute (Ouda, 2022). In understanding the evolution of feelings of attachment to place and the creation of places mediated with technology, Kotus et al. (2022) refers to Leszczynski (2015) as an evolution of the conceptualisation of net localities and hybrid realities by De Souza e Silva (2013), where digital/real space relations are not separated but accepted as a form of communicating specialities. Other studies combine Information and Communication Technologies (ICT) in that context, alluding to Relph's (2021) call for digital media to create enhanced place experiences to ensure its wide adoption (Dai & Liu, 2024), social affection created through ICT (Nikšić et al., 2023), or participatory governance processes through ICT tools (Costa et al., 2024).

2.10.2.1. Basic characteristics

The four basic characteristics found in the previous section are confirmed in the update of the systematic literature review. Digital placemaking is found connected to four key or basic characteristics – besides placemaking – along with additional aspects found in some of the studies (Table 2.7).

Area	Theme	Identified as	TID
Digital placemaking	Placemaking	Key/basic characteristics	36
	Hybrid reality/environment		27
	Community engagement		23
	Inclusion		23
	Sense of place		21
	Co-creation	Additional characteristics	16
	Smart city		7
	Social media		7

Table 2.7: Key themes in digital placemaking.

Placemaking as a concept does not present novel approaches, there are no further terminologies that refer to digital placemaking, in contrast with part A. The articles analysed in this section refer to placemaking in its analogue understanding (e.g., Ebaid, 2023; Loroño-Leturiondo & Illingworth, 2023), digital placemaking (e.g., Amirzadeh & Sharifi, 2024; Imara et al., 2024; Noronha et al., 2023) and general implementations of technology in placemaking (e.g., Costa et al., 2024; Klein, 2022; Thompson et al., 2023). Three different terms are found in this review, which refer to the implementation of technology in placemaking practices: radical placemaking (Almqvist et al., 2023; Gonsalves et al., 2023; 2024), augmented placemaking (Hespanhol, 2022), and platform placemaking (Törnberg, 2022).

Hybrid realities as a basic characteristic were confirmed but the characteristic has evolved into hybrid environments, which refers to an intrinsic combination of digital and physical environments where the physical experience is enhanced by a digital layer. Results of the review showed that hybrid environments include virtual reality, augmented reality and mixed reality technologies (Amirzadeh & Sharifi, 2024; Kotus et al., 2022; Naji & Rzeszewski, 2022), gamification (Chen et al., 2024; Klein, 2022; Kotus et al., 2022; Low et al., 2022), immersive physical and digital experiences (Gonsalves et al., 2023; 2024; Hespanhol, 2022; Ouda, 2022; Yang, 2023), use of HCI for participation in place (Almqvist et al., 2023; AntoniĆ et al., 2023; Noronha et al., 2023) and data and information augmentation in place (Boros et al., 2024; Maciej, 2024). The hybrid environment described in this theme is an evolution from the implementation of digital technologies in daily experiences with place, expanding the opportunities to connect with physical and virtual places (Dai & Liu, 2024). Urban experiences are defined by digital technology as they mediate everyday spatial practices (Kolotouchkina et al., 2022; Kotus et al., 2022; Maciej, 2024; Törnberg, 2022).

To understand the effect and dynamics in the hybrid environment, scholars continue to refer to the concept of net localities by De Souza e Silva (2013) (Amirzadeh & Sharifi, 2024; Low et al., 2022), also applying related theories by Leszczynski (2018) (Kotus et al., 2022; Maciej, 2024) or Relph (2007) sense of virtual place including multiple senses and emotions and having a community expression (Dai & Liu, 2024). Some studies defended the idea of hybrid environments as an enhancement of place experiences without meaning to replace the world, which tends to be a misconception (Kotus et al., 2022; Najafi & Mohammadi, 2024).

The results of the analysis described positive outcomes from the implementation of hybrid environments as the creation of meaning-making experiences that contribute to the creation of sense of place. It also alludes to supporting branding goals through the implementation of local voices (Razi & Ziminski, 2022), the positive use of ICT for quality of life and social affection for place (Nikšič et al., 2023), its use for participatory opportunities in governance processes (Antonić et al., 2023; Dai & Liu, 2024) and to foster community engagement through social media, platform collaborating, forums, online activities, enhancing local cohesion and public wellbeing (Amirzadeh & Sharifi, 2024; Dai & Liu, 2024). However, negative aspects and potential risks refer to disorientation by blurring real and virtual realities (Dai & Liu, 2024), technology as insufficient compared to physical place experiences (Kotus et al., 2022), addiction and isolation (Chen et al., 2024) or the replacement of real and authentic aspects of place for mainstream symbolisms (Törnberg, 2022).

The second theme confirmed as a key or basic characteristic of digital placemaking is community engagement. Studies describe engagement focused on social media for communication and relationships (Costa et al., 2024; Dai & Liu, 2024; Yang, 2023), interactive experiences for public engagement (Almqvist et al., 2023; Noronha et al.,

2023), and the use of online platforms (Najafi et al., 2022; Razi & Ziminski, 2022). Specifically, the essential aspect of community engagement in placemaking is also confirmed, as it promotes community sociability and connectivity (Thompson et al., 2023), and collective connection with others and with the place (Ebaid, 2023; Najafi & Mohammadi, 2024; Slingerland et al., 2022; Yang, 2023). It brings back the focus to the community and creates spaces for the community (Amirzadeh & Sharifi, 2024).

When involving technology, scholars refer to opportunities for cohesion and engagement of all towards social justice (Gonsalves et al., 2023; Moodley & Marks, 2023), empathy (Klein, 2022; Naji & Rzeszewski, 2022) and strengthening local identity and sense of place (Dai & Liu, 2024). Further benefits of community engagement in these experiences discuss promoting social connection which positively affects health (Thompson et al., 2023), strengthens communities (Atteneder & Lohmeier, 2024; Loroño-Leturiondo & Illingworth, 2023), and promotes belonging feelings through tangible and intangible mediums (Gonsalves et al., 2024). The community engagement developed in digital placemaking promotes place attachment and sense of place (Ouda, 2022; Razi & Ziminski, 2022), empowerment feelings (Hurley, 2023) and social interactions (Najafi & Mohammadi, 2024), due to the collective approach achieved (Najafi et al., 2022). However, risks and negative effects are described, such as the exclusion of participants due to the use of technology (Hespanhol, 2022). A lack of further understanding of negative implications specifically for community engagement processes and how to actively involve community members in the experiences is also found in the update of the systematic literature review.

Inclusion is the third theme found in the analysis, which confirms it as a basic characteristic of digital placemaking. The dataset analysis referred mainly to the inclusion of the whole community, referring to all ages and abilities (Costa et al., 2024; Thompson

et al., 2023), the inclusion of marginalised communities specifically (Amirzadeh & Sharifi, 2024; Gonsalves et al., 2024; Hurley, 2023; Klein, 2022; Kolotouchkina et al., 2022; Moodley & Marks, 2023), and the inclusion of seniors when involving technology (Najafi et al., 2022). Specific concepts related to placemaking where inclusion is the main driver are also found: critical placemaking (Moodley & Marks, 2023), ethical placemaking (Kolotouchkina et al., 2022), and democratic placemaking (Amirzadeh & Sharifi, 2024). However, these variations are mainly focused on analogue experiences.

Regarding the benefits of inclusive practices in placemaking, scholars describe social acceptance and engagement with others (Moodley & Marks, 2023) and links to healthier communities (Amirzadeh & Sharifi, 2024; Gonsalves et al., 2023; Loroño-Leturiondo & Illingworth, 2023). Inclusion in placemaking builds stronger cohesive communities through diversity and connection with people, societies and spaces (Ebaid, 2023; Loroño-Leturiondo & Illingworth, 2023; Ouda, 2022). When specifically including technology in the experience, the benefits described allude to inclusive and extensive sense of place (Dai & Liu, 2024), accessibility (Ebaid, 2023; Klein, 2022; Kolotouchkina et al., 2022; Ouda, 2022; Slingerland et al., 2022), social justice (Gonsalves et al., 2023), and cultural diversity and social capital (Hespanhol, 2022; Klein, 2022; Kurniawaty et al., 2022). However, the digital element brings a number of risks and disadvantages for inclusion, such as not reaching the whole population (Costa et al., 2024), promoting the digital divide and literacy (Klein, 2022; Kolotouchkina et al., 2022; Maciej, 2024; Najafi et al., 2022), concerning social equity (Najafi & Mohammadi, 2024), privileging certain communities over others (Atteneder & Lohmeier, 2024; Hespanhol, 2022), and the challenge of algorithms fostering these risks (Hurley, 2023). Along with the results from Part A, inclusion keeps being described as crucial in placemaking and digital placemaking but its real implementation in the process is absent, with scholars such as Kurniawaty et

al. (2022) final recommendations for digital placemaking to creating inclusive experiences to avoid creating social gaps.

Finally, sense of place is the fourth main theme of basic characteristics of digital placemaking, which is confirmed in this section. Sense of place is essential to understand how people develop emotional attachment to place and how they interact with the environment (Dai & Liu, 2024; Imara et al., 2024; Sacramento et al., 2022). It is used to describe the process of placemaking or sense of attachment to place (Amirzadeh & Sharifi, 2024; Kurniawaty et al., 2022; Naji & Rzeszewski, 2022; Noronha et al., 2023; te Lintelo et al., 2024). Scholars connect sense of place with community attachment with the place (Chen et al., 2024; Moodley & Marks, 2023) and place attachment (Ebaid, 2023; Gonsalves et al., 2024; Moodley & Marks, 2023). Strong links with identity are found in the updated dataset, involving place identity (Imara et al., 2024; Loroño-Leturiondo & Illingworth, 2023; Razi & Ziminski, 2022; Törnberg, 2022), strengthening local identity (Antonić et al., 2023; Dai & Liu, 2024; Najafi & Mohammadi, 2024) and building social identity (Kotus et al., 2022; Sacramento et al., 2022; Törnberg, 2022). Finally, connections with place branding (Ebaid, 2023) and place image as a result of combining sense of place and identity are also found (Imara et al., 2024; Klein, 2022; Törnberg, 2022). These attachments and identities are mainly described in analogue processes. However, when involving digital elements, Dai and Liu (2024) refer to Relph (2007) understanding of sense of virtual place to be developed through community engagement. In this context, digital placemaking is found to create sense of place through meaningful interventions (Atteneder & Lohmeier, 2024; Naji & Rzeszewski, 2022). Digital placemaking can also foster sense of place identity and meaning-making through community agency (Atteneder & Lohmeier, 2024; Razi & Ziminski, 2022). Storytelling is mentioned in several studies to help foster sense of place and attachment to place

through engaging in digital narratives (Gonsalves et al., 2024; Hespanhol, 2022; Hurley, 2023; Naji & Rzeszewski, 2022; Noronha et al., 2023), developing belonging feelings with others and with the place.

Most studies analysed describe the digital element in digital placemaking as bridging the gap between the physical and virtual space while enhancing community connection with the place (Najafi & Mohammadi, 2024), developing personal connections and ownership feelings (Low et al., 2022), and fostering social relations and sense of place that benefit wellbeing (te Lintelo et al., 2024). Despite several benefits of involving digital media in the process, risks and challenges are also considered. Specifically, one study by Atteneder and Lohmeier (2024) describes how sense of place on an individual and community level in digital placemaking is not created through the mediation of digital technology but developed in an offline bubble. Other disadvantages refer to the digital element destroying the sense of place (Kotus et al., 2022), gentrification and sense of loss of belonging in the place (Törnberg, 2022).

2.10.2.2. Additional Characteristics

Co-creation is confirmed as an additional characteristic of digital placemaking, referring to including local communities as cocreators and active participants in the decision-making process (Amirzadeh & Sharifi, 2024). Studies refer to co-creation as essential for governments to understand local communities' needs (Klein, 2022; Najafi & Mohammadi, 2024; Nikšič et al., 2023; Razi & Ziminski, 2022), and for the redistribution of power through bottom-up processes (Costa et al., 2024; Slingerland et al., 2022). The implementation of technology in digital placemaking, specifically ICT, is linked to co-creation (Antonić et al., 2023; Boros et al., 2024; Costa et al., 2024). Scholars refer to the benefits of co-creation processes to foster community empowerment (Costa et al., 2024; Gonsalves et al., 2023; Hurley, 2023), meaning-making (Low et al., 2022) and feelings

of ownership (Ebaid, 2023; Gonsalves et al., 2024; Hespanhol, 2022). Similarly to community engagement, negative aspects refer to the exclusion of some audiences and participants in the co-creation process due to technology (Costa et al., 2024). Moreover, despite being mentioned as essential, there is a lack of real co-creation processes in government plans (Antonić et al., 2023). Therefore, a level of uncertain on how the sense of place, and its connected processes involving attachment and identity, can be developed through digital placemaking is found in the updated dataset.

The smart city theme has shown no particular change from the previous section, with its approach focused on city planning (Dai & Liu, 2024; Naji & Rzeszewski, 2022), and data measurement for the optimisation of resources (Amirzadeh & Sharifi, 2024). Scholars refer to several benefits of smart cities, such as the improvement of relationships in communities and public spaces through technology which leads to healthier cities (Thompson et al., 2023). Smart cities are considered an evolution of placemaking as it incorporates contemporary technology in public space design (Klein, 2022). However, as mentioned earlier, the implementation of technology in public spaces affecting communities can lead to risks such as the digital division (Kolotouchkina et al., 2022) or the lack of participatory and bottom-up approaches (Low et al., 2022).

Finally, a decrease in the social media theme is found in the updated review. It is still considered a tool in placemaking (Atteneder & Lohmeier, 2024; Naji & Rzeszewski, 2022), specifically valuable for governments as a communication instrument (Costa et al., 2024; Dai & Liu, 2024). However, social media is key in fostering community relationships among members (Costa et al., 2024; Dai & Liu, 2024; te Lintelo et al., 2024). A new approach to the use of social media in digital placemaking refers to branding opportunities (Razi & Ziminski, 2022). In the update, TikTok is considered a social media tool in digital placemaking (Hurley, 2023), which was not found in the previous section.

Finally, concerns regarding the production of subjective images of places (Sacramento et al., 2022) and data usage and privacy (Yang, 2023) are also described.

2.10.3. Mental health and wellbeing implications in digital placemaking

An increase of studies including mental health and/or wellbeing in the topic is found in the update of the systematic review (51%, n=18). Studies refer to wellbeing (Dai & Liu, 2024; Imara et al., 2024; Low et al., 2022; Moodley & Marks, 2023; Razi & Ziminski, 2022; te Lintelo et al., 2024), health (Costa et al., 2024; Ebaid, 2023; Nikšič et al., 2023; Thompson et al., 2023), and quality of life (Amirzadeh & Sharifi, 2024; Ouda, 2022). Several studies describe benefits on mental health and wellbeing from analogue experiences of placemaking without any digital interaction, improving wellbeing and quality of life (Moodley & Marks, 2023), wellbeing outcomes through placemaking due to community connection among members and ownership feelings (Ebaid, 2023; Moodley & Marks, 2023), also connecting health benefits with nature in placemaking (Loroño-Leturiondo & Illingworth, 2023). Concepts such as critical placemaking or healthy placemaking are described as intrinsically connecting placemaking with wellbeing benefits on an analogue approach (Amirzadeh & Sharifi, 2024; Moodley & Marks, 2023).

Yet, an increase in the potential of digital placemaking experiences in mental health and wellbeing is found in the update. Technology can support placemaking improving health (Nikšič et al., 2023), combining urban planning for happy and liveability in cities that support wellbeing (Imara et al., 2024), and smart cities for health-supportive environments (Najafi et al., 2022; Thompson et al., 2023). On a user level, care and wellbeing are connected with gamification strategies (Low et al., 2022), and also promote community relationships and social cohesion for mental health and wellbeing (Dai & Liu, 2024; Kurniawaty et al., 2022; te Lintelo et al., 2024; Thompson et al., 2023), and resident

wellbeing and agency with space (Razi & Ziminski, 2022). Chen et al. (2024) describe how future studies should explore and assess the psychological effects of digital interventions. Therefore, in the update, an increase of interest and potential use of technology in placemaking to improve mental health and wellbeing is found. Still, studies keep referring to its potential uses and calling for further research in an area that is emergent.

2.10.4. Green and Blue Space implications in digital placemaking

Similarly, studies referring to nature, both green and blue spaces, present an increase compared to the previous section (40%, n=15). A majority of green space descriptions are found in the dataset (Costa et al., 2024; Ebaid, 2023; Nikšič et al., 2023; Thompson et al., 2023) with only four studies mentioning blue spaces along with green spaces (Amirzadeh & Sharifi, 2024; Ebaid, 2023; Hespanhol, 2022; Loroño-Leturiondo & Illingworth, 2023). Studies categorised in this theme also involved climate change (Gonsalves et al., 2024) and sustainability (Amirzadeh & Sharifi, 2024; Chen et al., 2024; Kurniawaty et al., 2022).

Specific references to placemaking that involve nature are explored through effective placemaking, which should improve access and quality of greenspaces (Loroño-Leturiondo & Illingworth, 2023), and placemaking paradigms that involve nature (green placemaking, nature-based placemaking or sustainable placemaking) (Amirzadeh & Sharifi, 2024). Particularly, Amirzadeh and Sharifi (2024) describe sustainability as a key part of the evolution of placemaking, which has accompanied the concept throughout the years referring to the creation of resilient places. Similarly to Part A, the majority of the studies mention nature as a context where the experience happens, with brief explanations of the positive effects on public health (Thompson et al., 2023), or the use of mapping techniques to understand the flora and fauna of the place in the participatory project

involving placemaking (Costa et al., 2024). One study by Boros et al. (2024) refers to the need to consider more-than-human approaches in planning and placemaking as there has been a systematic exclusion of nature and other species from urban practices. Specifically, they propose a shift from nature-as-object to nature-as-subject also in the digital application of storytelling for placemaking and urban design. This shift and consideration are an innovative approach to digital placemaking.

The implementation of digital technology and nature employed a broad spectrum of digital immersion, from digital data storytelling (Boros et al., 2024; Gonsalves et al., 2024), to immersive experiences in nature environments (Hespanhol, 2022). However, negative aspects of this combination allude to the lack of sensory elements (Kotus et al., 2022), or the sustainable footprint of digital tools (Kurniawaty et al., 2022).

2.10.5. Combined areas

The analysis of data resulted in nine studies that mention digital placemaking (including placemaking and technology), health and wellbeing, and green and blue spaces (see Table 2.8). Analysis determined the type of digital placemaking described when addressing health and wellbeing and nature spaces. This is an advancement of section A, with an increase of studies involving the three areas but an evident lack of in-depth understanding of nature and wellbeing is found.

Study	Type of digital placemaking	Type of health and wellbeing mentioned	Type of nature mentioned
Amirzadeh and Sharifi (2024).	Digital placemaking.	Healthy placemaking, involving mental health and physical health and wellbeing. Strong connection with nature.	Sustainable place making paradigm and subcategories of green placemaking, nature-based place making. Green and blue spaces. Strong connection with wellbeing.

		Subcategories of active placemaking.	
Chen et al. (2024).	Digital placemaking.	Mental and physical health benefits through playable digital interventions.	Sustainability opportunities.
Costa et al. (2024).	Placemaking and technology as a tool for participatory purposes.	Health improvement and wellbeing from green projects.	Green space – mapping of fauna and flora and understanding of lack of greenery and its effects.
Gonsalves et al. (2023).	Radical placemaking.	Mindfulness through a holistic approach to placemaking	Sustainability
Hespanhol (2022).	Augmented placemaking.	Psychological benefits of nature (reduce stress and anxiety).	Digital immersive nature environments involving green and blue spaces.
Imara et al. (2024).	Digital placemaking.	Quality of live and liveability in cities that promote wellbeing, social wellbeing fostered in public spaces, urban happiness.	Brief context.
Kotus et al. (2022).	Digital placemaking.	Positive effect from social cohesion.	Challenge of recreate nature interactions due to lack of sensory elements.
Kurniawaty et al., (2022).	Digital placemaking.	Social activities for health and wellbeing (reduction of stress, happiness).	Sustainability approach to digital placemaking.
Nikšić et al. (2023).	Placemaking and technology as a tool for citizen participation.	Health as an inherent aspect for the revitalisation plans. Wellbeing and public health.	Context of one of the case studies, specifically referring to green space. Strong links with health.
Thompson et al. (2023).	Placemaking and mention of smart furniture elements.	Importance of health-supportive environments.	Context where activities and experience were developed. Green space.

Table 2.8: Description of studies that combine digital placemaking, nature and wellbeing.

The results of the analysis showcase an involvement of nature and health in digital placemaking, but a lack of specific study of the degree and impact of the wellbeing outcomes as well as the nature environment enhanced is found. Similarly to Part A, no specific investigation of the three areas of interest is found, with most studies mostly referring to benefits in analogue placemaking processes and alluding to the potential benefit of involving technology. Only Costa et al. (2024) present a more thorough understanding of the green space where the experience is developed, mapping it and deepening the knowledge of the elements involved (fauna and flora). Amirzadeh and Sharifi (2024) describe a great overview of all paradigms and the evolution of placemaking, which includes digital placemaking, healthy placemaking and sustainable placemaking (which involves nature). However, the health and nature approach to placemaking does not consider digital tools to enhance the outcomes or improve the experiences, which are addressed in this thesis.

When directly involving nature and wellbeing in digital placemaking (or related concepts of placemaking and technology), Imara et al. (2024) describe the use of digital as a tool in placemaking for data collection. Nikšič et al. (2023) in one of the case studies explore the use of technology to envision the health benefits of engaging with nature, while Hespanhol (2022) describe the use of immersive technology and nature spaces to bring natural environments closer to citizens. Only one study is critical on using hybrid environments and virtual experiences with nature in digital placemaking (Kotus et al., 2022). Nevertheless, they also declare that these hybrid environments do not aim to replace real experiences, which is a common misconception. Additionally, studies call to increase projects that combine technology in placemaking and nature environments due its potential health and wellbeing improvement (Chen et al., 2024; Costa et al., 2024;

Thompson et al., 2023) and for sustainable resilience (Amirzadeh & Sharifi, 2024), also describing the transformation of the digital language in this context as a result of the awareness of the health benefits of nature (Hespanhol, 2022).

2.11. Discussion

In this systematic literature review update, an examination and summary of the relevant findings on the implications of digital placemaking, mental health and wellbeing, and green and blue spaces is presented by extending the search criteria of the previous review (Fernandez-Osso Fuentes et al., 2023b) to include published studies between October 2022 to September 2024. Thirty-six studies have been published during that time. The digital placemaking studies explored in this review are similar to those included in the previous review. The results from this updated review support the understanding of digital placemaking experiences involving nature spaces and wellbeing outcomes.

The systematic review update suggested a growing interest in digital placemaking and its involvement in nature for wellbeing. The findings from this update are in keeping with the conclusions from the earlier review. The high number of records eligible for the review update indicates the rise of interest in the concept and its involvement in sustainability plans in cities. The emergence of the concept, despite first appearing in 2011, indicates that digital placemaking is gaining attention and achieving a maturing state.

The four basic characteristics of digital placemaking have been confirmed in the update – hybrid environment, sense of place, community engagement and inclusion. Studies tend to overlook the challenges and risks of these practices, with scholars calling to deepen the understanding of the disadvantages of digital placemaking experiences (Amirzadeh & Sharifi, 2024; Slingerland et al., 2022). Some of the key risks mentioned in the review

are related to exclusion of participants (e.g., Costa et al., 2024; Hespanhol, 2022), privacy concerns (Yang, 2023), gentrification (Törnberg, 2022) or lack of sense of place created in digital environments (Atteneder & Lohmeier, 2024).

Overall, studies describe a number of benefits from digital placemaking, connecting wellbeing outcomes to nature experiences (Costa et al., 2024; Hespanhol, 2022; Imara et al., 2024; Kurniawaty et al., 2022; Thompson et al., 2023). However, a lack of application of specific health indicators to digital placemaking or a specific understanding of the characteristics of the nature space where the experience is developed continues to be found in the review of the literature.

The absence of blue space when referring to nature environments in the studies is also continued in the update. No specific study focused on blue spaces and only four mentioned blue spaces along with green spaces (Amirzadeh & Sharifi, 2024; Ebaid, 2023; Hespanhol, 2022; Loroño-Leturiondo & Illingworth, 2023). Therefore, the misconception of nature as only involving green spaces and neglecting the potential of blue spaces for health outcomes is evident in the dataset. Similarly, a lack of involvement in digital placemaking in nature-based solutions is also found in the update, with only one referring to its application (Amirzadeh & Sharifi, 2024). Despite most studies briefly describing nature as the context where the experience takes place, Boros et al. (2024) present a novel approach to nature-as-subject in a more-than-human perspective in placemaking. They call to shift the exclusion of nature and other species in urban practices to ensure they are a key participant and proactive element. This programme of research aims to adopt and extend their approach by ensuring the nature environment is considered an active element in the digital placemaking experience, providing a thorough understanding of its characteristics and elements and how they are enhanced through the hybrid environment to promote nature connection with the community.

Along with our proposed approach to digital placemaking to foster social change and urban renewal through democratisation (Foth, 2017a) described in Part A, this programme of research advances Amirzadeh and Sharifi (2024) understanding of the evolution of placemaking. They describe digital placemaking as one of the paradigms of placemaking, whereas we identify it as an evolution of the concept, which intrinsically includes sustainable placemaking (involving nature) and healthy placemaking (referring to healthy environments for consumers). This PhD thesis answers their call on the future of placemaking to emphasize inclusion, the use of technology, and the creation of resilient cities (nature and sustainable involvement) adapted to the needs of the place. The findings of this programme of research will advance their knowledge by presenting a deep understanding of digital placemaking in nature for wellbeing, which includes all the mentioned aspects. In the healthy and sustainable placemaking paradigms, technology is not mentioned, providing a gap in its use to enhance nature spaces and healthy outcomes through digital placemaking.

The findings on digital placemaking from the literature analysed describe a broad understanding of its technological possibilities, without being bonded to a specific digital dimension. Therefore, the research described in this thesis advances Imara et al. (2024) description of digital technology as a tool for data collection in placemaking when involving nature and wellbeing by demonstrating that the digital element in digital placemaking can collect data but also enhance the place experience by providing meaningful practices to the community and to nature, supporting their wellbeing. The updated review has found greater links to community and social cohesion as dynamics that help in wellbeing and nature (Kotus et al., 2022; Kurniawaty et al., 2022), which can be extended to digital placemaking. These are broadened in the following chapter through the proposed conceptual model. Moreover, this thesis aims to respond to identified gaps

in the use of technology, placemaking and nature environments to promote wellbeing benefits (Costa et al., 2024; Thompson et al., 2023), and the need for transformation of the digital language in this context (Hespanhol, 2022). Therefore, this investigation aims to provide profound knowledge on the use of digital placemaking in nature for wellbeing, advancing the understanding and contributing practitioners with insights on its implementation in cities.

The updated review presents findings aligned with the previous section, which show evidence of the potential application of digital placemaking in nature for wellbeing when developed in urban environments. The confirmation of the characteristics of digital placemaking, as well as the involvement of nature and wellbeing contribute to the clarification of the concept. The model proposed in Part A is advanced in the following chapter to guide and help scholars and practitioners unpack the processes involved in digital placemaking in nature for wellbeing.

2.11.1. Limitations

The review update presents similar limitations as the previous published review. These limitations refer to the inclusion and exclusion criteria applied to the systematic literature review which may have excluded relevant studies, as well as the use of keywords in the search strings. The data analysis and synthesis method selected may have excluded outlier themes.

2.12. Conclusion

In conclusion, the inclusion of the thirty-six studies did not alter the overall conclusion of the published review. This review update adds to the body of evidence of the previously published systematic literature review. It provides a current understanding of the involvement of digital placemaking in nature environments (green and blue spaces) for

mental health and wellbeing. Despite the continued confusion around the concept and the lack of specific study of indicators and nature characteristics, the potential of implementing digital placemaking for nature connection and supporting wellbeing is found.

2.13. Overall Conclusion

Overall, the findings across several studies suggest that digital placemaking has the potential to support the consumer mental health and wellbeing when involving nature environments in the place experience. However, there was significant confusion on the use of digital placemaking and its application, the potential benefits, and risks as well as the thorough understanding of its nature and wellbeing implications beyond generalised statements. Therefore, the evidence remains limited and inadequate to draw definitive conclusions on how to implement digital placemaking in nature for wellbeing.

Chapter 3. Conceptualizing digital placemaking in nature for wellbeing (Part A)

The following publication was incorporated into this chapter.

Fernandez-Osso Fuentes, M. J., Keegan, B. J., Jones, M. v., & MacIntyre, T. E. (2024a). Conceptualizing digital placemaking in nature for wellbeing. *Technological Forecasting and Social Change*, 204. <https://doi.org/10.1016/j.techfore.2024.123440>

Maria Fernandez-Osso Fuentes: Conceptualisation, Manuscript Drafting. **Brendan Keegan:** Review and Editing, Supervising. **Marc Jones:** Review and Editing. **Tadhg MacIntyre:** Review and Editing.

3.1. Preface

Chapter 2 highlighted the potential role of digital placemaking in nature for wellbeing, specifically as an augmented NBS through literature exploration. The results indicated a need for further research to determine how the different dynamics and structures involved in digital placemaking can help connect consumers with nature to support their wellbeing. By providing valuable insight regarding the processes involved in digital placemaking and its potential impact on consumers, the previous chapter informed the development of subsequent chapters within this research, in particular the design of the Digital Placemaking in Nature for Wellbeing conceptual model presented in the following chapter.

Chapter 3 (Part A) is the second study of this programme of research, presenting a conceptual model on the dynamics and structures involved in digital placemaking in nature for wellbeing (Appendix F). The conceptual model provides a preliminary explanation of how digital placemaking can foster place attachment and community nature connectedness as a place branding strategy supporting consumer wellbeing. This study aligns with the aims and goals of the PhD thesis in furthering the understanding of the dynamics and processes involved in digital placemaking in nature for wellbeing. The study results address the gaps in the literature and provide a first stepping stone to clarify how digital placemaking as a place branding strategy fosters place attachment and community nature connectedness to support wellbeing. Chapter 3 is formed by two parts. Part A is the conceptual model study published in the journal *Technological Forecasting and Social Change* in July 2024. Part B is an optimization of the published model through the inclusion of new insights from recent literature. This chapter concludes with an overall summary of the evolved model, which is tested in the consequent chapters through a modified Delphi method, which results in a finalised and improved conceptual model

described in Chapter 6. The conceptual model contributes to the overall aims of the thesis by providing a theoretical background that guides the method chosen. The model contributes to advancing the understanding of place branding effects on consumers beyond commercial outcomes; explaining the wellbeing support of nature-based digital placemaking; and providing clarity on the role of technology in these experiences.

3.2. Abstract

Increased urban population has created a disconnection between humans and natural environments that needs to be recognised as a key challenge. This article proposes that disconnection from nature in urban settings can be mitigated by digital placemaking. A conceptual framework which accounts for place attachment and place branding, Social Identity Theory and nature connectedness is presented. The benefit of this approach is that it can help us understand more clearly the different dynamics involved in hybrid place experience as a driver for both social change and consumer wellbeing. This modified hybrid tripartite model creates meaningful places for consumers, fostering their attachment to the space and with others, while simultaneously enhancing their wellbeing. In addition, the model contributes to our understanding of place branding effects on consumers beyond commercial outcomes; explaining the positive effects on wellbeing of nature-based digital placemaking; and providing clarity on the role of technology in nature-based place brand experiences. In synthesising the different dimensions of the framework, potential implications for place managers, marketers and leaders are outlined.

3.3. Introduction

Despite the demonstrated positive impact of engagement with nature on people's wellbeing, the disconnection from nature that humans have been experiencing has increased in urban environments. A combination of decreased opportunities to access and

engage nature and constant engagement with technology have been attributed as causes (Kesebir & Kesebir, 2017; McLean et al., 2021; Pereira-Barboza et al., 2021). Therefore, scholars have proposed a rethink in the ways people engage and build a relationship with nature, where new technology is embraced (Richardson et al., 2018; Riechers et al., 2021). In this article we will present a conceptual model to support the use of digital placemaking in nature for wellbeing, exploring different theories to reframe the human-nature relationship in urban environments.

The exploration of experiences in nature through technology is supported both by digital nature exposure (e.g., Litleskare et al., 2022; Murphy et al., 2022), and the way in which technology is used as a mediator in daily interactions with our environment and with others. These examples of technology use could be redirected in urban environments to help communities connect, engage with, and use nature for health and wellbeing (Murphy et al., 2022; Riechers et al., 2021).

As a process that uses digital media to foster individual and communal place attachment (Halegoua & Polson, 2021), digital placemaking is a viable option in urban environments to foster nature connectedness to support wellbeing. However, literature on the concept is fragmented, lacking a deep understanding of the dynamics involved in the process (Fernandez-Osso Fuentes et al., 2023b).

Drawing from literature in the areas of digital placemaking, psychology of nature and wellness, virtual games and place branding, we propose a model meant to broaden the conceptual domain of digital placemaking to reframe the human-nature relationship in cities through an innovative approach. We propose hybrid nature place experiences, understood as the digital extension of the physical place (Hespanhol, 2022), to act as a driver for social change (Foth, 2017b) and consumer wellbeing (Wright, 2021). This model provides organisations with a clear path to implement technology in nature for

wellbeing, improving climate resilience in cities (Gulsrud et al., 2018) and promoting pro-environmental behaviours (Paraschivoiu & Layer-Wagner, 2021). Our study aims to conceptualize the technology-mediated consumer wellbeing and social change benefits of digital placemaking in nature-based place experiences. The conceptual model of Digital Placemaking in nature for wellbeing, which proposes a future research agenda, addresses phenomena relevant to contemporary organisations interested in new technological approaches to the current climate crisis concerning communities.

Through this conceptual model we provide a critical dialogue using theories, i) to understand the place branding approach's effects on consumers beyond their commercial outcomes; ii) to address the gap in wellbeing effects of digital placemaking experiences in nature environments; iii) to advance the understanding of digital placemaking to support planners and scholars; iv) to contribute to the debate on the role of technology as a mediator in place experiences.

3.4. Theoretical foundations

Digital Placemaking

The potential of digital placemaking to create of a sense of attachment within a community is key (Courage, 2021; Haleboua & Polson, 2021). Placemaking practices were first implemented in urbanism as a strategy to foster innovation and knowledge-intensive activities (Abdel-Aziz et al., 2016; Pancholi et al., 2019). Its digital counterpart has emerged to become an increasingly relevant topic for academics and practitioners working collaboratively with local governments and community groups (Hespanhol, 2018). However, digital placemaking suffers from a definitional dilemma (Fernandez-Osso Fuentes et al., 2023b; Głowczyński, 2022), and consensus on an operational definition is lacking. The conceptualisation is exacerbated by the complex variety of

technologies that can be used (Chen et al., 2022), from social media (Soedarsono et al., 2021) to augmented reality and gamification (Clowater, 2021).

The difference of digital placemaking from other technological dimensions in place resides on the creation of hybrid place experiences that combine online and offline elements while producing a 'sense of place' and belonging through participatory processes (Polson, 2015). Participatory processes and community engagement activities are crucial for digital placemaking.

Gamification processes are commonly used to understand the technological dimension and effects of digital placemaking in communities (e.g., Hjorth & Richardson, 2017; Pang et al., 2020b). Digitally gamified experiences have been demonstrated to foster behaviour change and pro-environmental attitudes (Paraschivoiu & Layer-Wagner, 2021). Experience of navigating virtual environments, that are an analogue for physical environments through gamification, could benefit consumers' wellbeing (Clowater, 2021; Hjorth & Richardson, 2017).

Although there are some potential risks such as limited engagement of marginalised or diverse groups (Peacock et al., 2021), benefits include economic growth or cultural wealth (Morrison, 2021), enhanced community place attachment and sense of place (Halegoua & Polson, 2021), inclusion and social cohesion (Najafi et al., 2021; Szaszák & Kecskés, 2020) and enriched experiences of memorable physical places (Her, 2021). Yet, associated implications for urban nature and consumer wellbeing have been overlooked (Fernandez-Osso Fuentes et al., 2023b). Specifically, nature has been broadly described as a context where the experience is developed. Moreover, wellbeing, which is understood as a broad concept that combines several wellness indicators such as positive affective states or social engagement (Shankardass et al., 2019), is mentioned as a result from the dynamics involved in digital placemaking without further clarification.

Recent explanatory frameworks have emerged (e.g., Chen et al., 2022; Głównyński, 2022; Hespanhol, 2022; Özkul, 2021) to explore the complex dynamics involved in digital placemaking. However, to date, research has overlooked both the effects of urban natural environments and the potential wellbeing effects. Razi and Ziminski (2022) mention social wellbeing as a consequence of place attachment and community identity, without further explanation.

Digital placemaking, in relation to place branding and marketing, has been identified as one of the elements in the place branding trifecta (Keegan, 2021). This can support the development of more meaningful experiences of places (Ellery et al., 2021). The place marketing and branding approach to the concept has been mainly applied to tourism (e.g., Sugangga et al., 2021) from an analogue placemaking perspective (Balsas, 2021; Lew, 2017; Ni & Say, 2022; Richards, 2017), associated with an economic intention. Our proposed model shifts the participant focus from tourists to local residents. This recognised the potential for greater co-creation process of a place image that is part of the identity of the community, fostering belonging to support social wellbeing.

Our conceptual model has been informed by seminal digital placemaking studies (e.g., Halegoua, 2020; Polson, 2015) and a systematic review which identified four basic characteristics: sense of place, community engagement, inclusion and hybrid reality (Fernandez-Osso Fuentes et al., 2023b). Many studies were found to apply place attachment or sense of place to understand the feeling of belonging digitally created with a place. Another clear aspect of digital placemaking is the creation of a community engagement activity that sets up a space for co-creation and social relationships, which affects their identity. Furthermore, wellbeing benefits and improved nature relationships through digital means are only briefly described and mainly studied in analogue applications (Kale, 2019; Ng, 2016). Consequently, it is important to more clearly

understand how these dynamics are interconnected and how they could be applied in urban nature spaces from a place branding approach to help reframe the human-nature relationship in the current climate crisis.

Place Attachment Theory

Place attachment or sense of place is one of the most cited processes involved in a digital placemaking experience (see Breek et al., 2018; Freeman et al., 2019; Haleboua & Polson, 2021; Polson, 2015). Place attachment theory describes how intimate relationships provide people with a safe haven, enabling them to explore their environments and develop an attachment to places, which may provide them with feelings of belonging, relief and psychological and wellbeing benefits (Nisa et al., 2020; Scannell & Gifford, 2017).

Scannell and Gifford's (2010a) place attachment tripartite model aims to explain this multidimensional concept and its effects. The tripartite model proposes three dimensions: person, place and psychological process. The person dimension involves both individual (subjective experiences) and collective (symbolic meaning of place in a community) place attachment; the psychological process of sense of place involves affect (emotional connection), cognition (memories, beliefs, meaning and knowledge) and behaviour (action through proximity-maintaining behaviour and reconstruction of place); and the place dimension is divided between social (facilitation of social relationship and group identity) and physical (features) place attachment.

Lewicka's review (2011) highlighted that the person element has received the most attention in research. The review identified a lack of research on the process through which people collectively create meaningful relations with places. Our model focuses on

communal dynamics that affect the group belonging processes that positively affect consumers.

Moreover, Scannell and Gifford (2017) extend the psychological benefits of place attachment into thirteen categories, including memory support, belonging and connection to nature. The social aspect of place attachment not only is presented as a key element in the person and place dimension of the tripartite, but it also is found as a key psychological benefit. Furthermore, interpersonal relationships in a place provide with belonging and use place attachment as a mediator between social identity and wellbeing (Maricchiolo et al., 2021). Additionally, nature connection is also considered a benefit of this process. Multiple studies explore the combination of place attachment and nature, describing place attachment as a key factor in human-nature interactions (Jayakody et al., 2024) and alluding to positive associations and effects (e.g., Colley & Craig, 2019; Yoshida et al., 2022). Specifically, place attachment to natural settings is a greater predictor of pro-environmental behaviours compared to civic place attachment (Scannell & Gifford, 2010b). Yet, there is a key gap in literature in urban nature spaces and their combination with digital technologies to enhance place attachment experiences.

The increased use of technology in our daily place interactions has made essential the conception of online place attachment. Defined by Schwartz (2015) as a way to create online-offline personal connections to a place through location-based technology, online place attachment bonds users with physical spaces through digital interactions, also as a setting stone to understanding online consumers' actions and their effect on their local community and identity. However, the exploration of online place attachment is very limited. Few researchers have investigated online engagement and place attachment, with Huang et al. (2022) being the exception in their study with university students. Therefore,

the potential implications of online place attachment beyond understanding online consumers' actions are a promising area of research.

Despite using digital devices to explore and engage with surroundings, place attachment's digital dimension is still unclear and underexplored. Specifically looking at fostering a communal place identity and stimulating positive effects of technology in place, consumers online place attachment could be promoted through place branding experiences in urban nature spaces. This could help identify consumers with the place associating it with positive brand outcomes (Pedeliento & Kavaratzis, 2019) such as enhancing their wellbeing.

Place Branding

Highly connected with place attachment, place branding is derived from place marketing, as one of the traditional product marketing mix (Mccarthy, 1960). Place marketing refers to a location as both the product and the place, which benefits involve strategic guidance for place development, attracting investment and creating positive place experiences (Kavaratzis et al., 2017). Place branding is the application of branding principles to places (Reitsamer & Brunner-Sperdin, 2021) and aims to create, influence and reinforce the image of the place and its associations (Warnaby & Medway, 2015; Zenker & Braun, 2010), beyond 'selling' places (Graziano & Albanese, 2020).

Place branding theory was at first focused on the country level (Aronczyk, 2013; Hanna & Rowley, 2008) and tourism destination brands (Ma et al., 2019) with different categorisations, mostly based on destination image and country/city branding (see Chan & Marafa, 2013; de San Eugenio Vela et al., 2013; Kavaratzis, 2005; Kavaratzis & Ashworth, 2005). Works on nation branding also include environmental perspectives (Aronczyk, 2013; Aronczyk & Espinoza, 2021), which are important to understand the

nature lens of our model. Specifically, the reflections on the role of public relations and environmental communication as a cultural producer in international environmental governance (Aronczyk & Espinoza, 2021) are crucial in today's paradigm of climate crisis and international plans to mitigate it.

Nevertheless, our approach to place branding focuses on the community level. Authors such as Aitken and Campelo (2011) recognised the role of brand-community practices and their ownership, where the brand meaning is constantly co-created and represented. The role of the local community shifts towards an active participant or co-creator in the place brand. This is essential to preserve authentic places that are meaningful to their inhabitants, as it enhances the identity and the local culture of a place with memorable experiences (Aitken & Campelo, 2011; Kavaratzis, 2005). Braun et al. (2013) describe different functions of local consumers in place branding, such as residents as place brand ambassadors. To implement place branding the power of the brand is relocated to the residents (Zenker & Erfgen, 2014). To explore success measurements in this context, Zenker and Martin (2011) propose an inclusive approach to understanding target groups' diversity and place complexity.

Similarly to online place attachment and the need to understand place branding in the current digital context, online place branding is first introduced by Florek (2011). Online place branding is defined to have two main directions: promotion and communication channels, and the creation of online communication. Only recently, studies on online place branding emerged to try to understand how the digital realm affects place branding, such as Briciu et al. (2020) or Graziano and Albanese (2020), who call for place branding to be supported by online and offline actions due to the growth of new technologies. Moreover, limited nature involvement in place branding studies can be found, and usually from a tourism perspective. Graziano and Albanese's case study (2020) on online place

branding of a natural space requests to involve locals in place-image building processes for place branding effectiveness. Therefore, we aim to understand how online place branding is applied beyond the communication of a brand, its effect on local consumers for wellbeing and social change through attachment and engagement with nature.

Concerning place attachment, multiple studies have explored their interrelations, specifically the co-creation of place branding and the result of place attachment (Leal et al., 2022), its use with place brand credibility and technology while categorizing the brand as part of the self (Reitsamer & Brunner-Sperdin, 2021), or its disregard in commercial settings (Debenedetti et al., 2014). Pedeliento and Kavaratzis (2019) conceptualise place brand and place branding as the interplay between culture, identity and image, where place attachment is a result of being culturally bonded to a collective and a place whilst a social identity is also developed.

Thus, place branding and place attachment are interconnected as they both affect consumers on how they feel attached and identify with a place. This connection is understood from a group level as consumers interact with the place and among themselves. This interaction generates group identification and trust, which could impact their relationship with nature and support their wellbeing.

Social Identity Theory

The third key theory involved in a digital placemaking experience is Social Identity Theory. The creation of community engagement spaces that offer a forum for co-creation and social interactions is found to affect their identity. Social Identity Theory is one of the most influential approaches to group processes and intergroup relations worldwide (Hornsey, 2008). It refers to a personal sense of belonging to a social group, where individuals identify themselves according to the group they are members (Makri et al.,

2021; Tajfel & Turner, 1986). Therefore, it is commonly applied in relation to Self-Categorisation Theory (Turner et al., 1987). Social Identity Theory suggests that group membership is internalised by individuals, becoming part of one's self-concept (Heath et al., 2017; Tajfel, 1978). It enhances self-esteem (Haslam et al., 2009) and residents health and wellbeing (Bowe et al., 2020). Furthermore, in the present climate crisis, the impact of group identification also affects the willingness to contribute to urban regeneration and the development of environmental attitudes (Fielding & Hornsey, 2016; Heath et al., 2017; Maricchiolo et al., 2021).

As described earlier, 'belonging' referring to connecting with others and the influence it has on an individual is one of the psychological benefits of place attachment (Scannell & Gifford, 2017), and it is a key aspect in the place attachment tripartite (Scannell & Gifford, 2010a). Hence, the clear interconnection between these two theories helps shape individuals' relations with a place and with others affecting their own identity formation. However, these theories have not been combined and presented in a similar setting before.

The connection with others and with a place that develops a sense of belonging is crucial to understanding the Social Identity Theory approach to health (Haslam et al., 2018), which is mediated through a positive relationship with place identity and social relations – both dimensions of place attachment (Maricchiolo et al., 2021). Our model would follow this approach by exploring social identity and wellbeing through place attachment for place brand consumers mediated with technology.

Social Identity Theory has been applied to numerous fields, including several aspects of branding. From understanding group dynamics in brand communities and their self-definition (Kuo & Hou, 2017), to brand relationships in digital global social media networks (Akram et al., 2022), Facebook communities (Zhang et al., 2010), gamers' team dynamics (Liao et al., 2020), and social networking sites (Shih et al., 2021). The branding

approach to this theory is focused on brand awareness and consumer behaviour, with studies exploring digital environments. However, the potential impact of participatory dynamics or environmental characteristics has been overlooked.

Studies on Social Identity Theory, place attachment and place branding, demonstrate the benefit from each other, impacting consumers' place image, belonging and group membership. In our proposed model, we redirect these dynamics to enhanced nature-based place experiences using technology. This can potentially support consumers reframe their relationship with nature.

Nature Connectedness

The key aspect we are addressing in the model is to help reframe the human-nature relationship through digital mediation. Nature has been approached in the above sections, commonly referring to 'connecting to nature' as goals or outcomes. Nature connectedness refers to an individual's subjective sense of connection with nature, which can also be measured as a state (Capaldi et al., 2015). This psychological construct emerged from the biophilia hypothesis (Wilson, 1984), which predicts that people's psychological health is related to their relationship with nature (Howell et al., 2011). Evidence has supported the emotional, psychological and wellbeing benefits of nature connectedness (Nisbet et al., 2011; Pensini et al., 2016; Pritchard et al., 2020).

The sense of community and feeling of belonging with nature is linked to feeling connected to it and being less likely to harm it (Mayer & Frantz, 2004). While the construct suffers from a definitional dilemma with challenges in measurement (MacIntyre et al., 2019), researchers typically agree that it refers to how people think about, feel about, and see themselves as part of nature (Richardson et al., 2020). However, the impact of nature connectedness could be how it may support spill-over behaviours, in terms of

pro-environmental behaviour and environmental concern (Richardson et al., 2020). Evidence also suggests that it is trainable and fostered by applying interventions such as the ‘pathways to nature connectedness’ (Lumber et al., 2017).

Linked to pro-environmental behaviours (Gosling & Williams, 2010), place attachment is found as a positive mediator effect between nature connectedness and wellbeing (Basu et al., 2020). Scannell and Gifford (2017) describe ‘connection to nature’ as one of the psychological benefits of place attachment, demonstrating their interconnections.

As mentioned earlier, group identification affects urban regeneration willingness and pro-environmental attitudes (Fielding & Hornsey, 2016; Heath et al., 2017; Maricchiolo et al., 2021). The need to feel part of a broader natural world and a natural community is crucial to understanding nature connectedness (Mayer et al., 2009). But only Mackay et al. (2021) mention ‘nature connection’ as a form of collective identification understood from a social identity perspective. Clear connections between social identity and place are described earlier but specific implications of nature have been overlooked.

The potential of simulated and indirect experiences of nature (images or videos) have been explored, demonstrating positive psychological benefits while experiences in nature have substantially greater benefits (Mayer et al., 2009). Recently, Sheffield et al. (2022) proposed nature connectedness as a useful construct to renew the human-nature relationship, positively affecting our sense of wellbeing. In their review, there is clear evidence of the effect of contact and engagement with nature to increase nature connectedness, “but neither the type of contact (indirect v direct), quality of engagement (passive vs. active) or timing of the intervention were significant predictors of effect size for nature connectedness” (pp. 15). The digital approach to nature experiences has mostly focused on virtual nature, exploring the links among nature connectedness, wellbeing and place attachment in digital experiences (Brambilla et al., 2022; Litleskare et al., 2022).

Immersive virtual nature is studied on its similarity with real nature effects through virtual reality (Brambilla et al., 2022), or if seasonality affects immersive virtual nature outcomes (Litleskare & Calogiuri, 2022). Nonetheless, we propose a broader technological approach in a location, opening opportunities for potential consumers and digital mediums that are part of the interactive physical experience of nature.

Studies have pointed at the interconnections between nature connectedness and place attachment, wellbeing benefits from social identity, or place branding and place attachment impacts. However, research conducted to identify and understand the interconnections and potential wellbeing impact of digital placemaking in nature spaces has not been addressed, which is why we present a conceptual model to understand how to reframe the human-nature relationship through hybrid place experiences.

3.5. Digital placemaking in nature for wellbeing. Conceptual model development

The previous section presents initial relations between the dynamics involved in digital placemaking in nature for wellbeing as isolated processes. This provides the foundation to understand how they are involved in digital placemaking at an urban nature space supporting wellbeing, as a driver for social change and climate resilience. If we combine these processes in urban nature spaces shifting the way we engage with technology, for it to act as a medium to expand place experiences, branded place experiences could affect consumers' intentions, behaviours and wellbeing using digital placemaking. As a participatory place branding strategy (Zenker & Erfgen, 2014), it can reframe urban nature spaces to foster place attachment (Scannell & Gifford, 2010a), where consumers' nature connectedness and group identification is enhanced (Basu et al., 2020; Bowe et al., 2020), impacting their wellbeing (Haslam et al., 2018; Maricchiolo et al., 2021) (Figure

3.1). This model informs place managers and marketers to ensure their practices benefit local consumers – current place consumers or potential consumers.

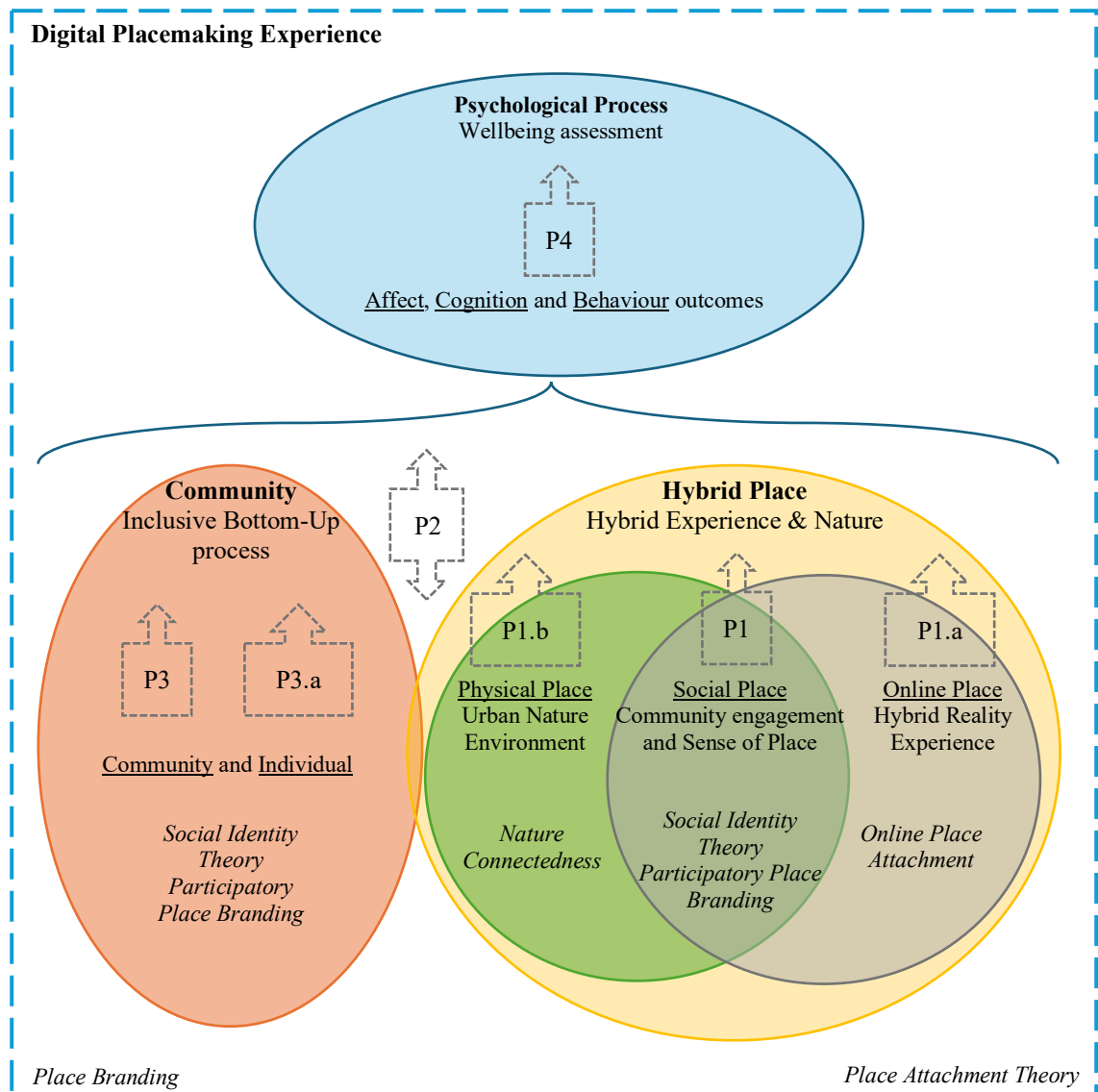


Figure 3.1: Digital Placemaking in nature for wellbeing Conceptual Model (version 1). Developed from the extant literature, such as Scannell and Gifford (2010a), Schwartz (2015), Aitken and Campelo (2011), Bowe et al. (2020), Basu et al. (2020), Zenker and Erfgen (2014), Haslam et al. (2018) and Polson (2015).

Our model is a bottom-up process informed by the described theories and constructs, applying the four basic characteristics of digital placemaking identified in our review and following a proposed modification of the place attachment tripartite by Scannell and

Gifford (2010a). This directs the conceptualisation of four main propositions for Digital Placemaking in nature for wellbeing.

Our modification of the place attachment tripartite adapts it to the hybrid reality experience constructed from digital placemaking in urban nature, to understand how it affects community identity and sense of belonging to physical spaces through technological mediation. Our modification is formed by the community, hybrid place and psychological process dimensions. The community dimension includes the individual and community elements, which overlap and are explored following Social Identity Theory (Haslam et al., 2018; Tajfel & Turner, 1986) to understand its dynamics in building the sense of self and its effects on wellbeing, and participatory place branding (Zenker & Erfgen, 2014). The individual element identifies personal connections that create sense of place, whereas the community element refers to shared meanings and symbols with a place among members. The hybrid place dimension is formed by the social, physical and online place attachment. The social place attachment refers to how the place allows social relationships and group identity, strongly linked to community engagement activities and social identity generation (Haslam et al., 2018; Tajfel & Turner, 1986; Zenker & Erfgen, 2014). The physical place attachment indicates the physical features of the natural place, from a nature connectedness perspective (Basu et al., 2020; Capaldi et al., 2015; Murphy et al., 2022). Finally, the online place attachment (Schwartz, 2015) is approached from hybrid reality experiences, combining physical and online connections to a place through location-based technology (Hespanhol, 2022; Polson, 2015). Lastly, the psychological process dimension is formed by affect (emotional connection), cognition (memories, beliefs, meanings and knowledge) and behaviour (actions), developed through digital placemaking activities and assessed from a wellbeing perspective.

We propose to approach digital placemaking from a participatory place branding perspective (Zenker & Erfgen, 2014), specifically in the community dimension and social place element. This ensures local consumers' opinions, visions and ideas are leading throughout the digital placemaking experience. The development of the digital placemaking experience will be informed by Zenker and Erfgen's (2014) three-stage process and we advise using different tools and measurements suggested by Zenker and Martin (2011), depending on the characteristics of the initiative.

In this context, digital placemaking hybrid place experiences (Hespanhol, 2022; Polson, 2015) can promote sense of belonging and authenticity, creating meaningful experiences for consumer communities that impact their vision of a place, and the vision of them within that place. The proven connection between social identity and wellbeing (Haslam et al., 2009) mediated through place attachment (Cole et al., 2021; Maricchiolo et al., 2021), the key role of place attachment in human-nature interactions (Jayakody et al., 2024) including nature connectedness (Basu et al., 2020; Gosling & Williams, 2010), and the value of digitally mediated experiences fostering pro-environmental behaviours (Paraschivoiu & Layer-Wagner, 2021) leads to a number of propositions:

P1. Digital placemaking creates sense of place between the community and the space where it is developed, facilitating group belongingness and identity among members and with the place.

P1.a. Digital placemaking experiences foster community hybrid place attachment, promoting authenticity and differentiating them from others.

P1.b. When applied in urban nature environments, digital placemaking fosters place attachment with the urban nature place but also nature connectedness through community engagement in that place.

We propose an innovative approach to digital placemaking from a participatory place branding perspective, where local consumers are brand ambassadors and co-creators of the place (Aitken & Campelo, 2011; Kalandides et al., 2012; Kavaratzis & Hatch, 2013). In this bottom-up model, local consumers are co-creators in each stage. Placemaking is considered a community of practice (Courage, 2021), where participation is essential to develop identity and mutual recognition, and hybrid place experiences help foster belonging (Polson, 2015). Therefore, Social Identity Theory predicts placemaking practices' effect on the community identity.

P2. Digital placemaking facilitates place brand and consumer interactions through hybrid participation (online and offline) that fosters group identity and belonging.

Digital placemaking approached from participatory place branding fulfils two objectives. First, it promotes internal voices in the community as brand ambassadors (Braun et al., 2013), increasing brand commitment (Hatch & Schultz, 2009) and co-creation of the place brand (Aitken & Campelo, 2011; Kalandides et al., 2012; Kavaratzis & Hatch, 2013). Second, it ensures locals are included in every step of the process for its success (Graziano & Albanese, 2020), specifically underrepresented groups, as an inclusive practice (Foth, 2017b).

P3. Community consumers engaged in digital placemaking from a participatory place branding perspective become place brand ambassadors.

P3.a. Excluded or marginalised members have the opportunity to connect with others and with the place through digital placemaking as an inclusive and barrier-free practice.

Place attachment, Social Identity Theory and nature connectedness have been studied and linked to benefit human wellbeing (Basu et al., 2020; Lewicka, 2011; Maricchiolo et al.,

2021; Scannell & Gifford, 2017). Nowadays, digital nature interactions are being considered a promoter of nature connections and wellbeing in communities (Litleskare et al., 2022), but they could benefit from implementing a place branding approach through which consumers are attracted to the place experience. Additionally, specific wellbeing benefits could be targeted through the digital placemaking experience and gamification, also promoting pro-environmental behaviours (Paraschivoiu & Layer-Wagner, 2021), and positive environmental experiences (Aronczyk & Espinoza, 2021).

P4. Consumers participating in digital placemaking nature-based place brand experiences can benefit from several wellbeing outcomes, feeling emotionally attached to the place, to the community and to nature.

These propositions address each characteristic of digital placemaking to understand how it can be used to enhance consumer wellbeing through nature-based place brand experiences, promoting social change. They explain how digital placemaking can foster community urban nature connections to benefit consumers' wellbeing and theorize that digital placemaking applied as a place branding strategy can create, change or promote specific consumer community experiences, interactions and identity values.

3.6. Discussion

This conceptual model aims to produce knowledge and forecast digital placemaking benefits for consumers' wellbeing and social change, using technology as a mediator in nature-based place brand experiences. The place branding approach we propose creates, changes, and/or promotes specific community experiences and belonging (Bowe et al., 2020), place attachment interactions (Scannell & Gifford, 2010a), and identity values for their wellbeing (Maricchiolo et al., 2021), which can affect environmental attitudes (Fielding & Hornsey, 2016; Heath et al., 2017; Maricchiolo et al., 2021).

The present paper aims to conceptualize the technology-mediated consumer wellbeing and social change benefits of digital placemaking in nature-based place experiences. We explore the broad concept of digital placemaking and present the lack of studies deepening its application to nature environments supporting wellbeing. Then, we adopt a participatory place branding approach (Zenker & Erfgen, 2014) which follows a proposed extension of the place attachment tripartite (Scannell & Gifford, 2010a) used to define the conceptual model of Digital Placemaking in Nature for Wellbeing. We systematically combined developments in the place attachment and place branding literature with developments in Social Identity Theory (Haslam et al., 2018; Tajfel & Turner, 1986) and nature connectedness construct (Basu et al., 2020; Howell et al., 2011; Mayer & Frantz, 2004; Murphy et al., 2022) exploring their wellbeing effects, to create guidelines for digital placemaking.

Our conceptual framework presents a modification of the place attachment tripartite (Scannell & Gifford, 2010a) to hybrid realities applied to urban nature spaces from a participatory place branding perspective. According to the original tripartite (Scannell & Gifford, 2010a), place attachment is created through individual, place and psychological process dimensions. However, this model does not consider the use of technology in our daily interactions. We extend the original tripartite in three ways. First, we re-focus the individual dimension by prioritising the community element which has been overlooked in the past (Lewicka, 2011), applying a Social Identity Theory perspective and its impact on people's wellbeing (Haslam et al., 2018; Tajfel & Turner, 1986). Second, we extend the place dimension by incorporating online place attachment (Schwartz, 2015) towards hybrid place attachment. Finally, we complement the tripartite by addressing the natural space element in the hybrid place dimension to understand how to specifically build hybrid place attachment for nature connectedness (Basu et al., 2020; Capaldi et al., 2015).

Furthermore, we introduce participatory place branding (Zenker & Erfgen, 2014) as an approach to the overall model to benefit from these processes and strategies and ensure the community is an active part of the dynamics described, creating attractive and meaningful experiences to provoke social change.

Our propositions are in line with Scannell & Gifford (2010a) and Zenker & Erfgen (2014) and supported by the findings of Maricchiolo et al. (2021) and Basu et al. (2020) that place attachment acts as a mediator for wellbeing and nature connectedness. The propositions are also consistent with the work of Halegoua and Polson (2021) who defined digital placemaking as a process that creates place attachment between a community and a space, Polson's (2015) understanding of hybrid place experiences for belonging and Foth (2017b), which understand it as a tool for social change. We answer the call by Graziano and Albanese (2020) to include locals in place branding strategies for its success and the need to advance online place branding with the growing technological evolution. The innovation of this model resides in the combination of areas of study that are interlinked but were studied in silos in the past.

We propose a digital transformation to be included in future strategies by place professionals such as placemakers or place managers following the effect of technology and digital formats in consumers' behaviours. Therefore, providing them with a guide and explanation of the dynamics involved in hybrid place experiences can inform projects that explore how to implement nature-based solutions in the current technological paradigm, how to help citizens connect with their natural spaces, or explore digital opportunities in cities to positively affect consumers. Digital placemaking is presented as a new and adapted perspective to the current consumer behaviour context. Furthermore, Mao et al. (2020) study indicate a number of benefits from technological innovations for society such as improving cultural diversity and social change. Along these lines, our

model approaches digital placemaking as a tool for social change (Foth, 2017b) that can potentially benefit urban communities by fostering pro-environmental behaviours through gamification (Paraschivoiu & Layer-Wagner, 2021; Richardson et al., 2020).

Following Pancholi et al. (2019) findings of placemaking outcomes beyond the physical aspect to holistic economic, cultural, spatial, social and organisational, our model describes a number of dynamics that benefit urban communities' wellbeing, place attachment, group belongingness and nature connectedness. The innovation of including Social Identity Theory in our model is influenced by Akram et al. (2022) study on the effect of consumer engagement and social identity in brand relationships in digital social media networks, the wellbeing approach to the theory by Haslam et al. (2018), and its connection with place attachment and wellbeing (Maricchiolo et al., 2021).

We argue that the human-nature disconnection (Beery et al., 2023; Kesebir & Kesebir, 2017), specifically in urban environments, could be improved by promoting place branding and place attachment processes through digital placemaking. Moreover, our model extends Jayakody et al. (2024)'s work on place attachment as being essential in human-nature relationships for wellbeing by exploring the impact of hybrid place experiences. These authors show how place interactions and proximity are key for the development of a strong place identity with the natural space and how place attachment contributes to creating meaningful bonding with nature and with others. We extend these results and explore the impact of hybrid place experiences through digital placemaking, where individuals not only interact with a place online and offline but also with other community members which helps to enhance benefits. This brings nature and place experiences to more participants who are not able to physically be in the place or interact with the place as others – also alluding to the inclusion aspect of digital placemaking.

To ensure a collective positive identity and appealing experience is created, we respond to the call for applying place marketing and branding to placemaking (Ellery et al., 2021) while considering digital placemaking a part of the place branding trifecta (Keegan, 2021). We propose the hybrid place attachment tripartite that combines participatory place branding, nature connectedness and Social Identity Theory elements. Our model also responds to Aronczyk & Espinoza's (2021) work on strategic nature and environmentalism from a marketing and branding perspective to present organisations and practitioners of place with a way to reframe the human-nature relationship in cities, fostering social connections, wellbeing and belonging feelings that also promote pro-environmental behaviours and social change. This positive and community-centred approach to hybrid place experiences ensures this branded and cultural production promotes a valuable approach to our environments.

Contributions

This study presents four contributions to help reframe the human-nature relationships by predicting and incorporating technology through digital placemaking in natural environments as a place branding strategy that enhances consumers' wellbeing and social change. First, our model goes beyond the generalised commercial outcome of place branding strategies (Graziano & Albanese, 2020) to understand how hybrid place experiences in nature spaces foster place attachment and group identity (Basu et al., 2020; Kuo & Hou, 2017; Maricchiolo et al., 2021), nature connectedness (Capaldi et al., 2015), supporting consumer wellbeing (Huang et al., 2022; Pritchard et al., 2020) and promote social change (Foth, 2017b). By unpacking the elements involved in our innovative model we predict digital placemaking strategies as a tool to enhance nature-based place experiences, social change and consumers' wellbeing. Our place branding approach

enhances specific values that are transferred to the community (Aitken & Campelo, 2011; Kavaratzis & Hatch, 2013).

Secondly, existing studies and frameworks mention the wellbeing effects of digital placemaking practices but without further understanding of internal mechanisms (e.g., Razi & Ziminski, 2022). We contribute to addressing this gap by engaging in theories and constructs to predict how branded place experiences that improve consumers' wellbeing – through place attachment (Huang et al., 2022), community belonging (Bowe et al., 2020), social identity (Maricchiolo et al., 2021) and nature connectedness (Basu et al., 2020). We present a model that specifically looks at wellbeing effects, which should be tested in an empirical scenario.

Our third contribution is to advance the knowledge of digital placemaking and support practitioners with a fundamental understanding and guide of digital placemaking experiences from interdisciplinary perspectives. In unpacking these dynamics, the paper has practical relevance for place managers, environmental psychologists, and place marketers. We have highlighted the relationships between specific digital placemaking applications and consumers' outcomes through our modification of the place attachment tripartite (Scannell & Gifford, 2010a) to include hybrid environments (Hespanhol, 2022; Polson, 2015) and online place attachment (Schwartz, 2015), nature connectedness linked to wellbeing (Basu et al., 2020; Maricchiolo et al., 2021), and participatory place branding (Zenker & Erfgen, 2014). This model informs the current rise of projects and policies that advocate for improving and augmenting nature in cities, specifically nature-based solutions and the increased interest in the use of technology for healthy environments (WHO Regional Office for Europe, 2021).

Finally, our model contributes to the debate about the role of technology in place experiences for consumers. The overarching premise of this paper is that digital

placemaking benefits consumers' wellbeing and social change through technology mediation in nature-based place brand experiences. We do not present digital placemaking as a nature replacement, but as an enhancer that aims to reframe the human-nature relationship (Riechers et al., 2021). Since technology is part of our daily routines, we should use it to our benefit and foster relationships that would promote pro-environmental behaviours. The benefits of connecting with nature are supported by evidence from the extant literature (e.g., Bratman et al., 2019; Jimenez et al., 2021), yet consumers are still struggling to create healthy habits that involve nature experiences (Riechers et al., 2021). It is certain that digital placemaking presents several drawbacks for citizens (e.g., Bottero et al., 2022; Foth & Caldwell, 2018), and they will need to be addressed.

3.7. Limitations and future research

This analysis presents a conceptual framework developed from the extant literature across place branding, place attachment, Social Identity Theory, nature connectedness and digital placemaking. The propositions which form the basis of the conceptual model serve as suggestions for future research. The presented Digital Placemaking in nature for wellbeing model is currently being tested through a modified Delphi study (Fernandez-Osso Fuentes et al., 2023a) to obtain consensus and explore the characteristics of digital placemaking as a medium to promote place attachment and place branding processes in urban nature environments, fostering community nature connectedness while impacting consumers' wellbeing and social change.

Plausible limitations include the framework being based on the idea of a hybrid reality experience as the optimum way to approach the connection between the physical and online space in the current global context. We acknowledge technological mediation such

as digital placemaking presents a series of challenges that need to be considered. For example, digitally excluded individuals and communities may not benefit from a digital placemaking approach. Further study on the potential drawbacks of digital placemaking in nature for wellbeing and how to minimize their impact is needed. Despite being justified and described as a guideline, our model has to be tested in a real practical case to confirm the assumptions and prepositions defined. Finally, we presented the model in an optimal environment scenario, but we understand its application depends on the characteristics of the community, the place, and the resources.

Further understanding of the best assessment tools depending on the project goal and research aim is also required. Digital placemaking is an interdisciplinary process that can be applied from different perspectives such as organizational management, urbanism, or creative arts.

We have identified new interactions and processes, extending the existing place attachment tripartite by Scannell and Gifford (2010a) into hybrid realities and urban nature environments, applied to digital placemaking practices as part of participatory place branding processes. From a practical perspective, we offer insights into enhancing consumers' wellbeing and social change through digitally mediated urban nature experiences combining place branding and place attachment. Our model guides place managers when implementing digital placemaking experiences to foster community relationships and place attachment through hybrid place experiences to support consumers' wellbeing but also city resilience, pro-environmental behaviours, and economic and cultural growth. Digital Placemaking in nature for wellbeing bring numerous benefits to consumers, organizations, and nature.

Chapter 3. Refined conceptualization of the model digital placemaking in nature for wellbeing (Part B)

3.8. Introduction

The conceptual model in Chapter 3 Part A provides a theoretical framework that guides the potential implementation of digital placemaking to support consumer wellbeing in nature-based place brand experiences. The modified tripartite conceptualizes the technology-mediated benefits of digital placemaking in urban nature environments. Drawing on place attachment theory, place branding, Social Identity Theory and nature connectedness as theoretical lenses, an initial understanding of the dynamics and structures involved in digital placemaking in nature for wellbeing and its impact on the place consumers is presented.

There are several relevant reasons for optimizing the conceptual model, the main one is to include relevant studies from the systematic review update and the publication of the conceptual model article to the thesis submission, as well as the inclusion of relevant studies in the area. Conceptual frameworks aim to describe existing practice, forecast its evolution, and define fundamental terms and issues while being refined over time to ensure the model suits the needs of researchers and users (Lambert, 2008). Therefore, Chapter 3 Part B provides an optimised and refined conceptual model of Digital Placemaking in Nature for Wellbeing to adjust the model based on new literature and justify the relevance of new theoretical perspectives if necessary. Due to the review

timescale process of the article in part A, a refinement of the model seemed relevant to ensure articles published during the review process were considered as new knowledge. Thus, pertinent studies published since the conceptual model article are considered and discussed with other relevant sources that enrich and advance the conceptual model of this thesis. This optimization of the model aims to ensure the conceptualization that guides the modified Delphi study can be strengthened from the initial published model.

3.9. Theoretical Foundations. New Insights.

Since the submission and publication of the conceptual model (Fernandez-Osso Fuentes et al., 2024a), pertinent studies that provide further depth to the dynamics involved in digital placemaking in nature for wellbeing have been published. These studies expand elements of the model and provide new angles important for this PhD thesis to consider.

In this updated section, the key theoretical foundations of Digital Placemaking in Nature for Wellbeing are extended with new developments in literature that contribute to optimise the conceptual model and ensure it complements the understanding of these processes. The refinement of the conceptual model is informed by the published model and key seminal studies in digital placemaking, place attachment, place branding, nature connectedness and Social Identity Theory, as well as by the systematic literature review published and updated in this thesis. The model contributes to advancing the knowledge of digital placemaking while unpacking the processes that may affect consumers' wellbeing and nature connection.

Digital placemaking

The review described in Chapter 2 encapsulates the evolution of the concept of digital placemaking over time involving its implications in nature for wellbeing. Recent reviews of the evolution of the concept describe several paradigms where placemaking creates

environmentally healthy places (sustainable placemaking), creates places that prioritise mental wellbeing (healthy placemaking), and involves digital media (digital placemaking) (Amirzadeh & Sharifi, 2024). Nonetheless, these paradigms and evolution underestimate the constant use of technology in people's daily interactions (e.g., Hurley, 2023; Maciej, 2024), where digital tools in digital placemaking lack a comprehensive approach to address sustainability (Petrovski et al., 2024).

When considering the connections between digital placemaking and branding, studies have focused on the economic purpose of tourism in placemaking (e.g., Tomassini & Cavagnaro, 2022) with limited involvement of technology (e.g., Törnberg, 2022). However, one of the main purposes of approaching digital placemaking as a place branding strategy resides in the creation of authentic place experiences that empower collective identities and sustainable planning (Evans, 2015). In their study, Evans refers to Mommaas's (2002) understanding of city branding to meet the need for identification and positive meaning in spaces that create civic pride. In the conceptual model of this thesis, the value of adopting a place branding strategy in digital placemaking resides in the possibilities for shaping the place image, brand and perception through community engagement, inclusion, and hybrid environments while fostering place attachment. Moreover, studies describe the role of placemaking and social media in supporting place brands through the construction of the image of the place to shape the cultural production of the city (Cameron, 2020).

In Chapter 2 Part B, the hybrid reality characteristic of digital placemaking has evolved into a hybrid environment. A hybrid environment refers to an intrinsic combination of digital and physical elements that create the environment in which digital placemaking users move and interact. This hybrid environment is an evolution from the implementation of digital technologies mediating people's daily life (Kolotouchkina et

al., 2022; Kotus et al., 2022; Maciej, 2024; Törnberg, 2022), which expands the opportunities to connect with places (Dai & Liu, 2024).

Therefore, despite the critics of top-down placemaking projects that focus on economic gain, and the trend of involving branding and tourism in placemaking practices, further studies can explore the potential of implementing digital placemaking as a place branding strategy to co-create the place image, perception and brand with the community to foster civic pride, belonging and identity.

Place Attachment Theory

The four basic characteristics of digital placemaking found in the review article have been confirmed in the update described in Chapter 2 Part B. Therefore, the undoubted connections between digital placemaking and place attachment are evident in the literature. Digital placemaking fosters sense of place and place attachment, which creates an emotional connection with the environment (e.g., Gonsalves et al., 2024; Imara et al., 2024). However, digital placemaking is still considered a fundamental reason for the disconnection between people and place, negatively impacting the self-definition of the consumer identity (Shih et al., 2021).

In the update of the review, an increase of studies connecting sense of place, place attachment and identity processes is found (e.g., Atteneder & Lohmeier, 2024; Najafi & Mohammadi, 2024; Sacramento et al., 2022). Studies have explored the connection between place attachment and identity, mainly describing place identity's individual focus – aligned with Lewicka (2011). Place identity and place attachment are different but highly connected, where symbols play an important step in the development of attachment and identity processes (Hernández et al., 2007). Specifically, Qazimi (2014) investigates the relationship between identity and the physical environment, considering

Social Identity Theory as well as Identity Process Theory to explain this relationship beyond the notion of place identity. Place identity refers to a combination of memories, ideas, and feelings about a physical space (Proshansky, 1978). Place attachment is part of place identity, but place identity is considered a substructure of social identity (Qazimi, 2014). Therefore, the place is not a category of identity itself but a space where symbols and social categories and concepts are developed, which preserve the identity on various dimensions and levels. The feeling of attachment and belonging to the place is a natural process that inherently contains social relationships.

Considering the digital era, studies have employed co-creative digital storytelling to explore place connections and create emotional belonging with places (e.g., Heck & Tsai, 2022). However, the concept of online place attachment lacks studies that explore specific dynamics, strategies and impacts. Recently, Dai and Liu (2024) presented a conceptual model to enrich the concept of sense of place in the digital age. They understand place attachment theory to be built upon the conception of sense of place, confirming the recognition of the importance of place in understanding how people interact with their environment. In their model, three parts are described: the physical sense of place, the digital sense of place and the hybrid sense of place. The physical sense of place refers to direct interactions with the physical space. The digital sense of place refers to the interactions between individuals in the virtual or digital space. Finally, the hybrid sense of place is formed by the combination of the physical and the digital sense of place, which reinforces place attachment and place connection impacting social processes. This model is aligned with the proposed conceptual model published as part of this thesis (Fernandez-Osso Fuentes et al., 2024a), which focuses on the specific study of place attachment theory and its evolution to include hybrid nature place experiences advancing online place attachment.

Finally, when exploring ways of fostering place attachment in support of sustainable futures, studies that have employed a narrative approach to deepen the understanding of the community need, lack the implementation of digital media to enhance the experience and expand the possibilities for attachment and belonging (e.g., Goudriaan et al., 2023).

Place Branding

Place branding and place attachment are highly connected as described in previous sections. Place branding keeps evolving, with recent studies broadening the considerations of place branding to place-based intangibles (Castaldi & Mendonça, 2024), describing the centric role of local communities in territorial brands (Ginesta et al., 2024), and the use of storytelling as a tool to enhance a place image in destination marketing (Zins & Abbas Adamu, 2024). Place branding is moving towards an intangible realm where the local community is centric, and stories of places are a valuable strategy for improving the overall brand of the place.

Similarly to the lack of understanding of the digital and online dimensions of place attachment, scholars call to rethink the future of place branding. Recent studies state the need to further investigate the use of digital tools in place branding and its effect on stakeholders also helping place branding participants link past, present and future to shape the identity in innovative ways (Reynolds et al., 2024). Moreover, de San Eugenio-Vela et al. (2023) and Kavaratzis and Florek (2021) called to rethink the future of place branding involving its relationship with sustainability, climate challenges and digital media. The call to rethink the place branding roots, with placemaking being one of the four approaches to the concept, was previously stated by Ashworth et al. (2015), but the interconnection between place branding and digital placemaking has been overlooked.

Hanna and Rowley (2015) aimed to discuss the role of digital place brand management, with some initial references to participatory place branding in this context. Participatory place branding can benefit from digital media to create community empowerment, place brand responsibility and multiple identity inclusion (Hudak, 2019). In her study, Hudak (2019) explores the application of digital storytelling to participatory place branding, describing an improvement in the community's wellbeing when adapting Zenker and Erfgen's (2014) model to digital storytelling. Similarly, Stoica et al. (2022) apply digital storytelling for co-branding in places, alluding to authenticity as a key aspect developed. Despite the demonstrated value of place branding for local communities and the importance of implementing participatory approaches for meaningful brands with positive effects, place branding's processes are criticised due to its main economic focus (Govers, 2020), the development of gentrified spaces (Lucarelli, 2018), and the attraction of tourism and investment over other place branding outcomes (Skinner, 2021).

It is important to distinguish the differences between the place brand identity and the place branding image developed in the place branding process. The place brand identity is created by the brand managers to reflect the place, and it is then communicated to influence the perception of the audience, while the place brand image is the audience's perception of the place brand identity (Skinner, 2021; Zenker & Martin, 2011). Therefore, the place branding approach to digital placemaking can help modify the place brand identity and image of a place to ensure it is aligned with the community's needs.

Social Identity Theory

Social identity is strongly connected with two of the basic characteristics of digital placemaking, place attachment and community engagement.

This theory has been crucial when addressing diversity, alluding to the challenges of oversimplified categorizations and discrimination (Holck & Villesèche, 2024). Recently, digital placemaking studies mentioned how it helps build social identity (Kotus et al., 2022; Sacramento et al., 2022; Törnberg, 2022). Despite exploring digital placemaking or the use of social media in placemaking practices, Kotus et al. (2022) and Sacramento et al. (2022) refer to the physicality and analogue ways of fostering social identity process through belonging feelings with the place in placemaking experiences. Törnberg (2022) mentions the impact of the platform Airbnb in changing the unique character and social identity of a place towards feelings of displacement and erasure of long-term communities. In this case, social identity is mentioned as part of digital placemaking experiences referring to negative effects.

Few studies have explored Social Identity Theory and attachment theory in tourism and branding (Dandotiya and Aggarwal, 2023; Jang & Kim, 2024; Wang et al., 2024). In their study, Dandotiya and Aggarwal (2023) focus on place attachment as a multi-dimensional construct that is measured through place identity, place dependence and social bonding through Social Identity Theory. Regarding the impact of digital technology on people's identity, Çöteli (2019) study explores the effects of digital media on culture and identity, connecting culture, brand, social identity and digital identity.

Thus, a lack of deeper understanding of further outcomes and effects of digital placemaking on the social identity of a community is evident. The understanding of the effect of social identity processes in digital placemaking is crucial to gaining knowledge on the implementation of the concept. Social Identity Theory is unexplored in specific digital contexts that foster belonging and attachment processes while impacting the identity formation of the community. The dynamics involved in digital placemaking such as place branding and place attachment, along with the digital dimension created in the

hybrid environment and the community engagement, can foster social identity processes that benefit the community.

Nature Connectedness

Lastly, nature connectedness is the approach chosen to understand the impact and value of developing the digital placemaking experience in the urban nature environment. Nature connectedness reflects on how people think, feel and identify as part of nature (Richardson et al., 2020). Recently, scholars have been pointing towards nature relationships as an evolution of nature connectedness, combining nature connectedness and relational environmental values (Lengieza & Aviste, 2024). Previous connection between the social connections with nature has been explored to improve wellbeing (Leavell et al., 2019; Richardson et al., 2020). Social connection and nature connectedness are described to underpin the same emotions, whereas social relational emotions are essential to understanding nature connectedness processes and increasing wellbeing and pro-environmental attitudes (Petersen et al., 2019). Thus, nature connectedness is strongly linked to social dynamics and identity processes that help creating belonging feelings.

Lately, studies are explicitly including a group identity dimension in nature connectedness as a way to cultivate a stronger relationship with nature and pro-environmental behaviours (e.g., Lengieza & Aviste, 2024; Loy et al., 2024). Scholars have previously deepen this understanding by exploring how people's identity is shaped by the natural environment with the concept of environmental identity, which refers to the attachment to nature leading to incorporating it into one's self-concept (Clayton & Opatow, 2003) and can be understood in the context of connecting with nature. Environmental identity is framed in social identity and alludes to different dimensions of social influence, also considering animals in the socialisation process. Aligned with

Lengieza and Aviste (2024) highlight of the recent paradigmatic shift in human-nature relationships towards a group-level focus the proposed conceptual model implements Social Identity Theory to understand the effect of hybrid environments in nature spaces in the city.

Regarding sustainability, biodiversity is found to increase nature connectedness (Gong et al., 2024), and human-nature connectedness is found to positively affect wellbeing, pro-environmental behaviours and nature conservation (Barragan-Jason et al., 2024; Macias-Zambrano et al., 2024; Samus et al., 2024).

On the digital impact level, digital mediation of nature experiences is found to increase nature connectedness, global identity and pro-environmental behaviours (Loy et al., 2024). However, digital nature experiences are mainly approached using immersive technology (e.g., Brambilla et al., 2024). Livingston (2022) study on app technology to explore outdoors and engage with biodiversity exemplifies the value of less immersive technologies fostering connection with nature and place attachment, also promoting pro-environmental behaviours. Similarly, videos of nature promote psychological restoration (Grassini et al., 2022). However, the digital harm to the environment is evident and needs to be addressed in these practices that combine augmented nature-based solutions in green strategies (Bedford et al., 2022; Mahmoud et al., 2024).

The understanding of nature connectedness and its relationship with social processes on an analogue level, including its wellbeing impacts and pro-environmental behaviours, can be translated into hybrid environments to ensure the digital augmentation of everyday activities also is considered in nature spaces. Therefore, this programme of research also aims to answer Petersen et al. (2019) call to advance knowledge on social relational emotions and human nature connectedness through technology as a medium.

3.10. Digital Placemaking in nature for wellbeing. Conceptual Model Optimisation

In Part A of this chapter, a conceptual model developed from the initial relationships between the dynamics in digital placemaking – place attachment, place branding, Social Identity Theory and nature connectedness – is presented. The conceptual model introduces a foundation to unpack these processes to understand the role of digital placemaking for social change and climate resilience. In this section, a revision of the aspects of the model in light of new literature is presented. The elements of the model are strengthened with new literature to provide insights for future interactions, as well as reinforce original assumptions. The new refinements presented strengthened the conceptual model maintaining the alignment with the research questions, aims and goals of this programme of research.

The bottom-up model proposes a modification of the place attachment tripartite by Scannell and Gifford (2010a) described earlier, which combines participatory place branding (Zenker & Erfgen, 2014), and nature connectedness (Basu et al., 2020; Bowe et al., 2020), to support wellbeing (Haslam et al., 2018; Maricchiolo et al., 2021). The conceptual model published added to the tripartite to include urban nature environments and online attachment in the place dimension, as well as refocusing the individual dimension on a community level. In the revisited model of this section, the hybrid reality element is changed to hybrid environment in the place dimension, focusing on the combination of digital and physical layers in the place experience, without only referring to fully immersive realities (Figure 3.2).

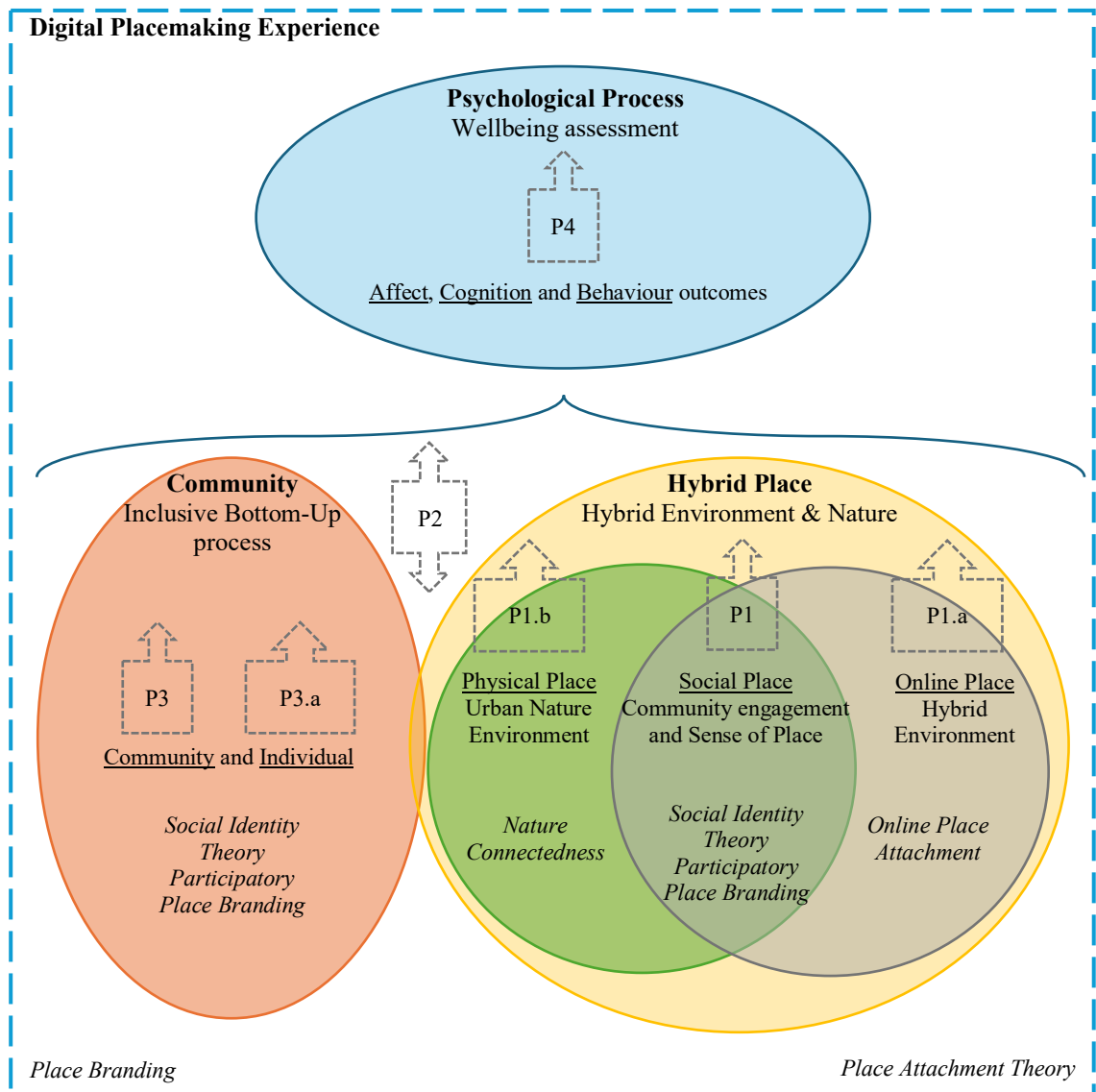


Figure 3.2: Digital Placemaking in nature for wellbeing Conceptual Model (version 2). Developed from the extant literature, such as Scannell and Gifford (2010a), Schwartz (2015), Aitken and Campelo (2011), Hespanhol (2022), Bowe et al. (2020), Basu et al. (2020), Zenker and Erfgen (2014), Haslam et al. (2018) and Polson (2015), Dai and Liu (2024)

The model is revisited through the adaptation of its propositions in light of new literature (Table 3.1).

Published conceptual model (Chapter 3, part A)	Revisited conceptual model (Chapter 3, part B)	Change implemented	Reference
P1. Digital placemaking creates sense of place between the community and the space where it is developed, facilitating group belongingness and identity among members and with the place.	P1. Digital placemaking creates sense of place between the community and the space where it is developed, facilitating <u>group belonging</u> and <u>social identity</u> among members and with the place.	Social identity is clearly stated in relation to digital placemaking	Amirzadeh and Sharifi (2024); Maciej (2024); Qazimi (2014); Hespanhol (2022)
P1.a. Digital placemaking experiences foster community hybrid place attachment, promoting authenticity and differentiating them from others.	P1.a. Digital placemaking experiences foster community <u>hybrid sense of place attachment</u> , promoting authenticity and differentiating them from others.	Hybrid sense of place attachment is included.	Dai and Liu (2024)
P1.b. When applied in urban nature environments, digital placemaking fosters place attachment with the urban nature place but also nature connectedness through community engagement in that place.	P1.b. <u>Digital placemaking fosters nature connectedness through place attachment with the urban nature place, fostering digital and physical</u> community engagement and identification in that place.	Focus shifted to fostering nature connectedness in digital placemaking through place attachment on a community identity level.	Clayton and Opotow (2003); Qazimi (2014); Lengieza and Aviste (2024)
P2. Digital placemaking facilitates place brand and consumer interactions through hybrid participation (online and offline) that fosters group identity and belonging.	P2. Digital placemaking facilitates <u>place branding</u> and consumer interactions through hybrid participation (online and offline) that fosters group identity and belonging	Place branding is clearly stated, alluding to the process rather than a brand outcome.	Ginesta et al., (2024); Reynolds et al., 2024

P3. Community consumers engaged in digital placemaking from a participatory place branding perspective become place brand ambassadors.	P3. Community consumers engaged in digital placemaking from a participatory place branding perspective become place brand ambassadors <u>and storytellers</u> .	Storytelling is included in the proposition.	Zins and Abbas Adamu, (2024); Hudak, 2019; Stoica et al. (2022)
P3.a. Excluded or marginalised members have the opportunity to connect with others and with the place through digital placemaking as an inclusive and barrier-free practice.	P3.a. Excluded or marginalised members have the opportunity to connect with others and with the place through digital placemaking as an inclusive and barrier-free practice	No change implemented	
P4. Consumers participating in digital placemaking nature-based place brand experiences can benefit from several wellbeing outcomes, feeling emotionally attached to the place, to the community and to nature.	P4. Consumers participating in digital placemaking nature-based place brand experiences <u>for social change and civic pride</u> can benefit from several wellbeing outcomes, feeling emotionally attached to the place, the community and nature.	Social change and civic pride as drivers of digital placemaking in nature for wellbeing are now included.	Amirzadeh and Sharifi (2024); Evans (2015)

Table 3.1: Comparison of propositions from the published conceptual model with the revisited conceptual model.

Firstly, digital placemaking creates hybrid experiences (Hespanhol, 2022; Polson, 2015) that foster belonging and authenticity feelings, which then create daily experiences that are meaningful for the place consumer (e.g., Maciej, 2024). Digital placemaking's basic characteristic of place attachment, which is built upon sense of place (Dai & Liu, 2024), is strongly connected with social identity. Qazimi (2014) understands place attachment as part of place identity, which is also a substructure of social identity. Social identity Theory is specifically addressed in the first proposition, where the creation of sense of place between the community and the place fosters group belonging and social identity. Moreover, social identity is proven to benefit wellbeing (Haslam et al., 2009) mediated through place attachment (Cole et al., 2021; Maricchiolo et al., 2021). Hybrid sense of place, as a result of combining physical and digital sense of place, is found to reinforce place attachment and place connection impacting social processes (Dai & Liu, 2024). In this context, place attachment also plays a key role in human-nature interactions (Basu et al., 2020; Gosling & Williams, 2010), which can foster pro-environmental behaviours when mediated through technology (Paraschivoiu & Layer-Wagner, 2021). When applying digital placemaking in urban nature environments, it can foster nature connectedness (Livingston, 2022) which can enhance community identification (Clayton & Opatow, 2003) through a shifted focus to group identity (Lengieza & Aviste, 2024). These understandings lead to a number of propositions:

P1. Digital placemaking creates sense of place between the community and the space where it is developed, facilitating group belonging and social identity among members and with the place.

P1.a. Digital placemaking experiences foster community hybrid sense of place attachment, promoting authenticity and differentiating them from others.

P1.b. Digital placemaking fosters nature connectedness through place attachment with the urban nature place, fostering digital and physical community engagement and identification in that place.

The place branding perspective to digital placemaking focuses on co-creating and co-modifying the place brand, image and perception with the place consumers. The focus is on the process of place branding and the local consumers being considered brand ambassadors and co-creators (Aitken & Campelo, 2011; Ginesta et al., 2024; Kalandides et al., 2012; Kavaratzis & Hatch, 2021). Based on the consideration of placemaking as a community of practice (Courage, 2021), participation is essential to develop identity and mutual recognition, where the hybrid environment in digital placemaking can help foster belonging (Polson, 2015). Specifically, when alluding to the opportunities for participatory place branding in digital placemaking, Çöteli (2019) demonstrate the connection between culture, brand and social identity in digital media. Finally, there is potential in the use of digital tools in place branding for stakeholder involvement and identity processes (Reynolds et al., 2024).

P2. Digital placemaking facilitates place branding and consumer interactions through hybrid participation (online and offline) that fosters group identity and belonging.

This co-creation of the place brand is based on participatory place branding processes (Hudak, 2019; Zenker & Erfgen, 2014). Storytelling can enhance a place image (Zins & Abbas Adamu, 2024). Moreover, the combination of digital placemaking and participatory place branding aims to promote internal voices as brand ambassadors and storytellers (Braun et al., 2013; Hudak, 2019; Stoica et al., 2022) to increase brand commitment and co-creation (Aitken & Campelo, 2011; Hatch & Schultz, 2009; Kalandides et al., 2012; Kavaratzis & Hatch, 2013). In addition, a second goal would

focus on guaranteeing locals are included in every step of the planning and development to ensure success (Graziano & Albanese, 2020). Finally, as a result of the active co-creation and participation of the community, the inclusion of all members is crucial, specifically underrepresented groups (Foth, 2017a).

P3. Community consumers engaged in digital placemaking from a participatory place branding perspective become place brand ambassadors and storytellers.

P3.a. Excluded or marginalised members have the opportunity to connect with others and with the place through digital placemaking as an inclusive and barrier-free practice.

The wellbeing benefits from place attachment, social identity and nature connectedness have been demonstrated in the literature (Basu et al., 2020; Lewicka, 2011; Maricchiolo et al., 2021; Scannell & Gifford, 2017). Nowadays, digital nature is found to promote nature connections and wellbeing (Litleskare et al., 2022). In this context, these processes could benefit from implementing place branding to make places attractive and meaningful for consumers while empowering their collective identity and pride (Evans, 2015). Specifically, these dynamics can be enhanced through the hybrid environment of digital placemaking. Placemaking paradigms such as healthy placemaking or nature-based placemaking (Amirzadeh & Sharifi, 2024) can be improved through the implementation of technology in digital placemaking.

P4. Consumers participating in digital placemaking nature-based place brand experiences for social change and civic pride can benefit from several wellbeing outcomes, feeling emotionally attached to the place, the community and nature.

Therefore, these optimised propositions address each characteristic of digital placemaking to gain knowledge on its use to enhance consumer wellbeing in nature-based

place brand experiences. Digital placemaking can foster community urban nature connection to support wellbeing and its use as a place branding strategy can create, change or promote specific consumer experiences in place, interactions and identity values.

3.11. Discussion

Chapter 3 Part B provides an revisited version of the conceptual model of Digital Placemaking in Nature for Wellbeing published and described in Part A. The model described in Part A is adjusted based on new literature from the systematic literature update and other relevant studies, which is revisited as the field evolves. This optimization of the conceptual model aims to ensure the modified Delphi study is strengthened from the initial published model in Part A.

Pertinent studies providing broad depth to the processes involved in digital placemaking in nature for wellbeing expand the different elements and dimensions of the model, contributing to optimising and ensuring it complements the understanding of these dynamics. The model contributes to the development of knowledge on digital placemaking while unpacking the processes affecting consumers' wellbeing and nature connection. The refinement of the conceptual model is informed by the published model and key seminal studies in digital placemaking, place attachment, place branding, nature connectedness and Social Identity Theory.

The place attachment tripartite modification described in Part A is extended and refined by replacing the hybrid realities understanding with hybrid environments that foster sense of place (Dai & Liu, 2024). Dai and Liu (2024) describe a framework exploring the evolution of the concept of sense of place and the impact of the digital landscape. In their framework, place attachment is built upon sense of place, whereas the hybrid sense of place refers to the combination of physical and digital sense of place and how it reinforces

place attachment and connection impacting social processes. The modified tripartite and its optimisation extend their understanding of hybrid sense of place by referring to the role of online place attachment in digital placemaking, and its potential use to foster nature connectedness and social identity to support consumer wellbeing.

The proposed modified model and its refinement focus on the connection between the dynamics involved in digital placemaking and social identity. Specifically, Qazimi (2014) described how place attachment is part of place identity, which is a substructure of social identity. The model particularly advances their study by addressing the social identity effect of digital placemaking. The exploration of the creation of sense of place attachment between the community and the place can foster group belonging and social identity. In the context of hybrid environments and their effect in place attachment, the modified tripartite extends its effects by focusing on its social identity impact. Moreover, this is also extended to its application in nature for wellbeing, and the understanding of community identification in nature connectedness (Clayton & Opatow, 2003), aligned with the recent paradigmatic shift in human-nature relationships to a group-level focus (Lengieza & Aviste, 2024).

The place branding perspective on digital placemaking presented in the modified tripartite model is advanced in the understanding of its impact on community culture and social identity in branding. Çöteli (2019) demonstrates the connection between culture, brand and social identity in digital media. In the model, the place branding perspective of digital placemaking is called to foster group identity and belonging, which is linked to co-creation and participatory processes. Besides considering local consumers as brand ambassadors (Braun et al., 2013), the optimisation of the model also advances this approach by considering them storytellers (Hudak, 2019; Stoica et al., 2022; Zins & Abbas Adamu, 2024). Hudak (2019) explores participatory place branding processes and

digital storytelling which was found to benefit wellbeing. Similarly, Stoica et al. (2022) investigate co-branding processes in place and the use of digital storytelling to develop authenticity. In both studies, digital placemaking is not directly mentioned, but the processes and planning steps involved could be considered digital placemaking. Zins and Abbas Adamu (2024) study storytelling management for destination marketing organizations as a tool to enhance the place image. Therefore, these studies are extended by proposing a digital placemaking approach where place brand consumers are considered storytellers, influencing their participation and co-creation process while positively affecting their wellbeing. In addition, studying digital placemaking as a place branding strategy answers the call to investigate the use of digital tools in place branding and its effect on stakeholders shaping identity in innovative ways (Reynolds et al., 2024). Following Evans (2015) approach to the combination of placemaking as a place branding strategy to create authentic place experiences that empower collective identities and sustainable planning, the modified tripartite is optimised by considering digital placemaking as a place branding strategy to foster civic pride. The analogue notion of placemaking, also considering other paradigms such as healthy placemaking or nature-based placemaking (Amirzadeh & Sharifi, 2024), is advanced by presenting digital placemaking not as another type or paradigm, but as an evolution of placemaking in the current digital context that communities are immersed in.

Therefore, the modified place attachment tripartite presented in Part A is optimised and refined to tackle the human-nature disconnection that affects cities and to explore the impact of hybrid place environments through digital placemaking in nature to support wellbeing.

3.11.1. Contributions

The specific contributions of the model are described in Part A, and the refinement presented in this section offers similar contributions. The model describes place branding uses for civic pride and social change, beyond commercial outcomes. It specifically aims to explain the wellbeing impact of the processes in digital placemaking by combining theories and constructs that predict this. The model also presents practical use as a guide for professionals and stakeholders, in the current rise of interest for sustainable futures. Finally, the refined model specifically refers to hybrid environments instead of realities in order to clarify that digital placemaking is an enhancement of physical experiences and does not aim to replace them. As consumers use digital technology in daily interactions with their environments that support their activities, digital placemaking is described to augment and enhance their nature place experiences in cities by combining the physical place experience with a digital layer of meaning.

3.12. Limitations and Future Research

The refinement of the model presents similar limitations to Part A. These limitations refer to the use of the propositions described in the model as future research avenues and the need to test the propositions in the next chapters through the modified Delphi study. The conceptual model presented considers hybrid environments as the optimum scenario to address the human-nature disconnection in cities, which also describes a number of challenges such as the exclusion of community members.

3.13. Overall Conclusion

In conclusion, the conceptual model presented in this chapter guides this PhD thesis to aid in answering the research question of how digital placemaking as a place branding strategy promotes place attachment processes to foster community nature connectedness

to support consumer wellbeing. Drawing on place attachment theory, place branding, nature connectedness and Social Identity Theory, the conceptual model of Digital Placemaking in Nature for Wellbeing provides a preliminary explanation of the research question, aligned with the aims and objectives of the thesis. The re-examination of the conceptual model in Part B adds to the body of evidence of the previous model presented in Part A. The refined conceptual model provides a deeper understanding of the potential use of digital placemaking as a place branding strategy to foster place attachment and community nature connectedness to support consumer wellbeing. The conceptual model and its proposed refinement demonstrate the evolution of the understanding of the concept and its implications for place attachment, place branding, nature connectedness and Social Identity Theory since the publication of the model article. Therefore, this chapter summarises how the model (published and refined) contributes to both theory and practice by describing the interconnection among the processes involved in digital placemaking and proposing a guide for place managers, place branding experts, environmental psychologists and placemakers. In the following chapters, the theory will be empirically tested in a modified Delphi study.

Chapter 4. Methodology

4.1. Introduction

This chapter presents the methodological approach to performing the present research. First, an outline of the research paradigm that is most appropriate is outlined. A discussion of the data necessary to address the research aims and objectives is presented which introduces the techniques for collection of data, including sampling strategy and data analysis employed. Finally, the chapter discusses the validity and reliability of the data to conclude with an overview of the limitations and ethical implications of the study.

The research aims of this PhD thesis are:

- To incorporate digital placemaking as a place branding strategy to help reframe the human-nature relationship enhancing urban nature experiences, supporting wellbeing
- To understand how digital placemaking can be implemented from a place branding perspective to promote hybrid place attachment in urban nature spaces, foster community nature connectedness, and support consumer wellbeing.

These aims lead to four research questions that are explored:

1. How does digital placemaking as a place branding strategy promote place attachment processes to foster community-nature connectedness to support consumer wellbeing?
2. How can digital placemaking reframe the human-nature disconnection affecting urban consumers?
3. How are the dynamics involved in digital placemaking in nature for wellbeing interconnected?
4. How can the wellbeing impact of digital placemaking practices in nature be assessed?

4.2. Research Philosophy – Justification of the appropriate paradigm

The understanding of research philosophy is an essential prerequisite in conducting research, where the ontological and epistemological assumptions of the study are stated clearly in the way they affect data collection and analysis approaches. The research philosophy is a belief concerning how the data of phenomena should be gathered, analysed and used (Blaxter et al., 2010). Researchers must consider their own beliefs when approaching the world and its functionality (Bryman, 2016; Creswell, 2007). The literature highlights research philosophy to include ontology, epistemology and methodology (Guba & Lincoln, 1994). Many authors have discussed the different approaches to research philosophy on social sciences (e.g. Guba & Lincoln 1994; Creswell & Creswell 2018).

4.2.1. Ontology

The ontology refers to the nature of reality (Burrell & Morgan, 2017) and its characteristics (Creswell & Poth, 2016). The ontological question enquires about the form and nature of reality and what can be known about it (Guba & Lincoln, 1994; Holden & Lynch, 2004). Ontological assumptions define the way the researchers study the research object.

There are assumptions of an ontological nature – assumptions which concern the very essence of the phenomena under investigation. Social scientists, for example, are faced with a basic *ontological* question: whether the ‘reality’ to be investigated is external to the individual – imposing itself on individual consciousness from without – or the product of individual consciousness; whether the ‘reality’ is of an ‘objective’ nature, or the product of individual cognition; whether ‘reality’ is a given ‘out there’ in the world, or the product of one’s mind. (Burrell & Morgan, 2017, pp.2)

When approaching the ontology of a researcher, there is a division between objectivists and subjectivists (Holden & Lynch, 2004). Objectivists understand that the world is

external to social actors and the phenomena can be tangible and measurable investigated, embracing realism as its most extreme form where social identities are considered physical entities of the natural world that exist independently of how we think of them (Saunders et al., 2023). Subjectivism refers to perceptions and actions of social actors, where reality is influenced by the society where the phenomenon is found (Saunders et al., 2023). Nominalism is the most extreme form of subjectivism, where the order and structure of the social phenomena studies are created by the researcher and other social actors (Saunders et al., 2023). In addition, a less extreme version of subjectivism is social constructionism, which investigates phenomena through observation and revision (Creswell, 2013), where reality is constructed through the interactions of social actors.

In the research described, the study is closer to the subjectivist approach as the researcher understands the world and knowledge is created by social and contextual understanding. The phenomena explored in this research is based on how people experience their relationship with nature and how their perception can shape their actions in building a closer relationship with their environment through digital media. Therefore, the aim is to understand how people have developed individual subjective meanings of experiences (Creswell, 2007), specifically of digital placemaking. From this understanding, reality is socially constructed (Berger & Luckmann, 2016) and a need to understand how these constructions are created and affect consumers of place experiences is described. Digital placemaking bases its conceptualisation on how people engage with each other and with the place, transforming them to create attachment and belonging processes. The reality that is explored in this programme of research is then constructed through social interactions, where the social actors share meanings and realities, which are aligned with social constructionism assumptions.

4.2.2. Epistemology

The epistemology concerns how knowledge is acquired, enquiring about the nature of the relationship between the researcher and reality (Guba & Lincoln, 1994). Regarding epistemology, there is a variety of assumptions that can be acquired. Positivism adopts a realist ontology (Guba & Lincoln, 1994), integrating the empirical understanding that the phenomenon is only tested through the senses as acceptable knowledge and generates hypotheses that are then tested through experiments (McGregor & Murnane, 2010). This approach considers the researcher as unbiased and independent from what is observed (Guba & Lincoln, 1994). Interpretivism champions the crucial role of the researcher in interpreting what is observed, emphasizing subjective meanings and symbolic actions through which reality is constructed (Orlikowski & Baroudi, 1991). It is concerned with understanding of how individuals create, modify and interpret the world (Burrell & Morgan, 2017). However, this interpretation is also acknowledged to be influenced by the researcher's background, personal, cultural and historical experiences (Creswell & Creswell, 2018). Critical realism considers facts as social constructions, focusing on explaining the experience of the underlying structures of reality that shape observable events (Saunders et al., 2023). It embraces epistemological relativism (Reed, 2005), which is a subjectivist approach to knowledge that considers social facts as social constructions agreed on by people (Bhaskar, 2008). Critical realists understand the reality as the most important philosophical consideration with a structured and layered ontology as crucial (Fleetwood, 2005; Saunders et al., 2023). Pragmatism considers the practical meaning of knowledge in specific contents, where 'true' theories and knowledge enable successful action (Saunders et al., 2023). It declares that concepts are only relevant when they support action (Kelemen & Rumens, 2008), and it aims to reconcile objectivism and subjectivism (Saunders et al., 2023).

Considering that epistemology refers to the assumptions about knowledge and how this is communicated to others (Burrell & Morgan, 2017), this research adopts a critical realism epistemology since the researcher tries to explain facts that are social constructions where underlying structures of reality produce observable events. The subjectivist approach to ontology described earlier affects the epistemology of the study, where critical realism understands that social constructions are agreed on by individuals. Therefore, the research described in this PhD thesis aims to understand the processes involved in digital placemaking in nature for wellbeing, where individuals construct the reality and facts socially.

4.2.3. Axiology

According to Saunders et al. (2023), axiology takes value into account when conducting a study. Axiology plays a crucial role when describing the research objectives, methodologies and interpretations. Personal values frequently have biases or prejudices, and business and management research are also affected by them. Moreover, axiology refers to the need of ethical considerations into research design, being foundational in responsible social science research (Al-Mamun et al., 2024). Thus, whether or not the study being done is value-laden or value-free will depend on an axiological assumption (Saunders et al., 2023). By doing this, the researcher takes advantage of the chance to consider how their perspective as an objective or subjective researcher would affect how they understand the knowledge that is being produced.

The axiology approach in critical realism acknowledges the bias by world views, cultural experiences, and the upbringing of the researcher, who tries to minimise these errors. Axiological imperatives derived from critical realism aim to foster responsible research practices that are scientifically grounded yet socially aware (Rogers & Teehankee, 2020).

Therefore, this programme of research understands the need for ethical considerations and the researcher embraces an objective perspective as possible. Following axiological imperatives derived from critical realism, the researcher aims to foster responsible research practices that are scientifically grounded yet socially aware (Rogers & Teehankee 2020). The implementation of transdisciplinary research, where quantitative and qualitative investigations are combined, reflects a commitment to diverse value systems (Monaghan, 2023). Thus, the researcher aims to promote an evaluative approach to knowledge, recognizing that values are integral to both theory and practice in the social sciences (Rogers & Teehankee 2020).

4.2.4. Methodological Associations

The researcher should address the research question guided by their ontology, epistemology and axiology (Bell et al., 2010). The methodology is the technique used to discover reality (Sobh & Perry, 2006). Methodological approaches to a particular paradigm would be more appropriate than others (Guba & Lincoln, 1994). The research methodology should reflect the approaches to investigating the research questions required by the philosophical perspective of the researcher (Saunders et al., 2023).

4.2.5. Research Paradigms

Finally, a paradigm is the overall conceptual framework within which the researcher works (Sobh & Perry, 2006). Guba and Lincoln (1994) define it as the basic belief system that guides the researchers, as it presents a *worldview* that defines the nature of the ‘world’, the individual place in it and its relationships. Perry et al. (1999), based on Guba and Lincoln (1994), consider four research paradigms applied to the relevant ontology, epistemology and methodologies: positivism, realism, critical theory and constructivism (Table 4.1). The researcher employs a full understanding of the research philosophy to

produce the most appropriate research design because understanding the various paradigms is a determining factor for the research project (Guba & Lincoln, 1994).

Paradigm				
Element	Positivism	Constructivism	Critical Theory	Realism
Ontology	Reality is real and apprehensible	Multiple local and Specific “Constructed” realities.	“Virtual” reality is shaped by social, economic, ethnic, political, cultural and gender values, crystallised over time.	Reality is “real” but only imperfectly and probabilistically apprehensible and so triangulation from many sources is required to try to know it.
Epistemology	Findings are true – the researcher is objective by viewing reality through a “one-way mirror”.	Created findings – the researcher is a “passionate participant” within the world being investigated.	Value mediated findings – the researcher is a “transformative intellectual” who changes the social world within which participants live.	Findings are probably true – the researcher is value-aware and needs to triangulate any perceptions he or she is collecting.
Common methodologies	Mostly concerns with a testing of theory. Thus, mainly quantitative methods such as surveys, experiments, and verification of hypotheses.	In-depth unstructured interviews, participant observation, action research and grounded theory research.	Action research and participant observation.	Mainly qualitative methods such as case studies and convergent interviews.

Table 4.1: Sobh and Perry (2006), based on Perry et al. (1999), which itself was based on Guba and Lincoln (1994).

4.2.5.1. *Positivism*

This paradigm understands the reality is driven by natural laws and mechanisms, where knowledge can be summarised in time and context-free generalisations, including cause-effect laws (Guba & Lincoln, 1994). Therefore, knowledge is statistically observed, studied and generalised to a population (Sobh & Perry, 2006). Research can discover the *true* state of affairs, where the researcher and the research object are independent entities (Guba & Lincoln, 1994). The research is objective, and the reality is understood as real and apprehensible (Perry et al., 1999). However, scholars critique this paradigm for its reductionist and deterministic nature (Hesse, 1980). The methodology usually applied in positivism is based on experiments where the hypotheses are empirically tested to verify them (Guba & Lincoln, 1994).

4.2.5.2. *Realism*

Realism perceives the reality as imperfect and probabilistically apprehensible (Perry et al., 1999). The second paradigm refers to extending the findings of a study by analytical generalisations that nest the empirical findings of a study within theories (Sobh & Perry, 2006). Realism generalises theoretical propositions (Yin, 2009) and employs triangulation from different sources to know the reality (Perry et al., 1999).

Particularly, critical realism appeared as a philosophy of social sciences (Sayer, 2004) that understands progress is possible because the intransitive dimensions of reality are a point of reference against which theories can be tested (Bhaskar, 1978). Scholars have linked it to positivism, post-positivism and constructivism (Guba & Lincoln, 1994; Mkansi & Acheampong, 2012). Critical realism is a philosophical framework that navigates between positivism and interpretivism, emphasizing ontology and offering an evaluative approach to knowledge (Monaghan, 2023). It is international and

multidisciplinary in scope It explains the causations of observable events, highlighting the complexity and interactions within reality (Cabote et al., 2024). Critical realism can inform methodologies by providing a model of reality as an open system, influencing research choices at every stage of a study (Fuchs & Robinson, 2023). This approach aids in concept formation, evidence status, and understanding of unique historical events (Mutch, 2023). By combining critical realism with case study methodologies, researchers can delve into complex phenomena (Cabote et al., 2024).

4.2.5.3. *Constructivism*

Constructivism perceives the reality as subjective (Sobh & Perry, 2006). It moves from ontological realism to ontological relativism, where realities are apprehensible as multiple mental constructions that are socially and experientially based (Guba & Lincoln, 1994). Findings are related to individuals' views and the reality is constructed from a multitude of realities (Sobh & Perry, 2006). Perry et al. (1999) describe the constructivist researcher as a participant within the world that creates findings. The researcher aims to distil a consensus construction that is more informed and sophisticated than the predecessors (Guba & Lincoln, 1994).

4.2.5.4. *Critical Theory*

This paradigm also perceives the reality as a subjective construction (Sobh & Perry, 2006). Perceptions are made by their appropriateness to conform to subjective conventions (Perry et al., 1999). The researcher and the research object are interactively connected, which leads to findings being value-mediated (Guba & Lincoln, 1994). The researcher changes the social world within the participant's live and the reality is shaped by social, economic, political, cultural, and gender values crystalised over time (Perry et

al., 1999). From a methodological point of view, critical theory requires dialogues to achieve informed consciousness (Guba & Lincoln, 1994).

4.2.6. Chosen Research Philosophy

In this study, the researcher has adopted a critical realism approach to social science research. Since this study is approached from a place marketing perspective, it is essential to understand the perspective followed in this discipline. There has been a traditional positivistic approach to marketing studies, which was challenged in the second half of the twentieth century (Easton, 2002; Hunt, 1990). Marketing exists within the social world, which leads to a realistic ontological worldview (Zinkhan & Hirschheim, 1992). Critical realism extends beyond casual relationships to explore their development (Mcevoy & Richards, 2006). This research aims to understand how the dynamics involved in digital placemaking are developed and how the wellbeing impact can be understood, in the context of place branding and marketing.

It combines a realist ontology, where the world exists independently of researchers, with a constructivist epistemology, where understanding is shaped by perspectives (Maxwell & Mittapalli, 2011). Critical realism integrates positivistic and interpretivist approaches to offer new insights to development. This investigation seeks to explain the dynamics of digital placemaking in nature for wellbeing, aligned with critical realists's goals (Mcevoy & Richards, 2006). Mixed methods are employed due to their compatibility with both qualitative and quantitative research (Maxwell & Mittapalli, 2011).

Critical realists understand the interpretation of a phenomenon would be shaped by the researchers' subjectivity and context (Creswell & Poth, 2016), but the phenomenon exists independently (Sayer, 2010). This investigation understands that human-nature relationship in cities influenced by technology, exists beyond the researcher's

perspective, though interpretation varies. Critical realists see the world as a multi-dimensional open system (Mcevoy & Richards, 2006), though assumptions cannot be proved or disproved (Easton, 2010). Social sciences are described as they must be critical of their object (Sayer, 1992). Social sciences have been widely applied in organisation and management studies (Sayer, 2004), and marketing (Easton, 2010).

Thus, this research follows a critical realism approach to develop a deeper understanding of reality, beyond general findings or social actors' lived experiences. The aim is to examine digital placemaking as a place branding strategy to foster place attachment and community nature connectedness for wellbeing. Exploring its nuances and elements drives this study, guiding the selection of an appropriate research method.

4.3. Research Methods – Justification for a Mixed Method Research Methodology

It is essential to choose a research method that is appropriate for the nature of the research, the goals of the study and the ontological or epistemological assumptions of the researcher (Veal, 2006). A range of research paradigms have been described as well as the preference of a critical realism approach to the investigation of the phenomena. Mixed methods are understood as studies that either combine methods from different paradigms or use multiple methods within the same paradigm or multiple strategies within methods (Thurston et al., 2008). They can be used in induction, deduction or abduction, depending on the research philosophy (Harrison, 2013). The combination of both qualitative and quantitative methods helps achieving a greater understanding of the research problem:

Mixed methods research is a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches in

combination provides a better understanding of research problems than either approach alone. (Creswell & Plano Clark, 2017, pp. 5)

Therefore, in this study a combination of qualitative methods that produce rich data which helps understanding motives and beliefs, with quantitative methods that further develop the understanding of the phenomena weighting the agreement among participants is presented. Specifically, a critical realist approach to the phenomena recognises the exploratory importance of the context of the phenomena, understanding the process by which an event occurs (Maxwell & Mittapalli, 2011). Critical realism can use mixed methods in an abductive manner, as it involves generating new hypotheses based on observed data and existing theories (Mukumbang, 2023).

In marketing research, mixed methods are described as providing a number of benefits while scholars need to further detail their mixed method approach (Harrison & Reilly, 2011). Mixed methods research in social sciences is common as it combines sets of data and analysis that compensate for the weaknesses of each method (Dawadi et al., 2021). It is also the second dominant method in business and management research, being more frequent in strategic management, international business and marketing (Cameron & Molina-Azorin, 2011). Specifically, it can be used to provide a more comprehensive understanding of consumer behaviour and market trends through the combination of qualitative and quantitative data. However, its implementation can be challenging in both conducting and publishing these studies, leading to different limitations (Harrison & Reilly, 2011). Specifically in business research, despite the increasing use and value of mixed methods, scholars do not demonstrate knowledge of the mixed method literature or procedures, which may be due to a lack of attention to interpretative methods in training and education or the difficulty of learning both qualitative and quantitative approaches (Harrison, 2013).

Due to the novelty and emergence of the concept and the exploratory nature of the research, this research relies upon the opinions and interpretations of key informants and practitioners in digital placemaking, who possess in-depth knowledge of the concept and in related areas regarding technology, nature and wellbeing. These opinions and knowledge constitute the qualitative data of the study, which will be fed back to the participant panel to weigh their agreement level in an attempt to achieve a consensual state of the phenomena explored.

4.3.1. Researching Digital Placemaking in Practice

Since digital placemaking was defined in 2011 (Latorre, 2011), the research around this concept is found across a variety of disciplines. From urbanism (Paquin, 2019) to education and heritage (Champion, 2015), culture and tourism (Lew, 2017) and gamification and social media (Halegoua & Polson, 2021). However, no study has considered the study of the concept involving practitioners and scholars in order to achieve a consensual state of digital placemaking, with clear disagreements and dilemmas regarding the terminology, definition and use (Basaraba, 2021; Chen et al., 2024; Głowczyński, 2022; Keegan, 2021; Sanaeipoor & Emami, 2020b). From a methodological perspective, the majority of studies of digital placemaking are qualitative (Basaraba, 2021), with a distinct lack of quantitative and mixed method research in digital placemaking (Fernandez-Osso Fuentes et al., 2023b). This research examines the dynamics involved in digital placemaking in nature for wellbeing with an expert panel of participants to achieve consensus on the concept and its use in nature for wellbeing.

4.4. Research Strategies

Mixed methods are the chosen approach for this study due to their alignment with the phenomena explored. They are increasingly used in business and management as per their

innovation, added value and greater insight exploration in complex phenomena and discipline-based inquiry (Cameron & Molina-Azorin, 2011). There are different categorisations of mixed methods research design, differing in levels of complexity (e.g., Harrison, 2013; Maxwell & Loomis, 2003). However, Onwuegbuzie and Collins (2007) describe how most mixed methods use time orientation dimensions and the purpose of mixing for its differentiation. Time orientations refer to whether the qualitative and quantitative phases occur at the same time (sequential) or are independent from each other (concurrent). Tariq and Woodman (2013) synthesise the purpose of mixed methods into five types (complementary, development, initiation, expansion and triangulation). Complementarity refers to using data from one method to illustrate the results from another. Development implies the use of results from one method to inform or develop the use of the other method. Initiation implies the use of results from different methods to observe incongruences as a way to generate new insights. Expansion examines different aspects of the research question with different methods. Finally, triangulation uses data obtained by qualitative and quantitative methods to corroborate findings.

The mixed method chosen is a modification of the Delphi methodology whose purpose is to explore the emergent concept of digital placemaking in nature for wellbeing by developing the results from the qualitative stage of the study in the quantitative stage, while the sampling size is identical as the same sample was required to complete both qualitative and quantitative phases. Onwuegbuzie and Collins (2007) suggest selecting a sampling design that is coherent with the purpose and design type of the mixed method. The sampling design criteria should follow time orientation (concurrent vs sequential) and the relationship between the qualitative and quantitative samples (identical, parallel, nested or multilevel) (Table 4.2).

<u>Sampling Relationship</u>	<u>Description</u>
-------------------------------------	---------------------------

Identical Relationship	The same sample members participate in both qualitative and quantitative stages of research.
Parallel Relationship	Different sample groups that come from the same population of interest.
Nested Relationship	Specifies the members for one phase of the research represent a subset of the members of the other phase of the study.
Multilevel Relationship	The use of two or more sets of samples extracted from different levels of the

Table 4.2: Based on Onwuegbuzie and Collins (2007)

The present study is concerned with understanding the dynamics involved in digital placemaking in nature for wellbeing. Moreover, the critical realism approach enables the researcher to investigate the underlying mechanism and its observable elements of the research questions, exploring deeper and often unobservable structures in digital placemaking. When exploring the different research design types in mixed methods, Harrison (2013) differentiates between convergent, embedded, explanatory or exploratory (see Table 4.3). Exploratory designs are useful for exploring relationships with unknown variables, developing new instruments, and refining or testing a developing theory (Creswell & Plano Clark, 2017). Therefore, the purpose of this research is exploratory, as it attempts to advance knowledge on this emergent concept with a group of experts and understand the dynamics involved and the effects produced.

Mixed Method Research Design Type	Description
Convergent Design	Collects qualitative and quantitative data simultaneously, analyses them separately, and mixes the databases by merging both strands of data to bring together the strengths of both data sets comparing, validating, conforming or corroborating findings.
Embedded Design	Collects both quantitative and qualitative data that play a supportive role in larger research, usually conducted when there are different questions that require different data.
Explanatory Design	Collects and analyses quantitative data and builds on it in a qualitative follow-up to provide a better understanding of

	the quantitative results, explaining relationships or study findings.
Exploratory Design	Employs mixed methods to collect qualitative data, which is analysed and built on for the quantitative follow-up.
Hybrid Design	Incorporates aspects of multiple design types, such as exploratory-embedded design.

Table 4.3: Based on Harrison (2013)

Thus, these characteristics lead the modified Delphi as the best fit for the research question, purpose and objectives. The mixed methods employed through the modified Delphi design are based on identical sampling, where the results from one method inform and develop the use of the other method (development type), for an exploratory purpose to advance knowledge on the emergent concept of digital placemaking with a group of experts to understand the dynamics involved when nature is part of the experience, and the wellbeing effects produced.

4.5. Research Procedures

Research methodologies outline the strategy used by the researcher while aiming to achieve the study goals and objectives. Although numerous research methods are available and accessible, it is important to weigh their benefits and limits in order to help the investigator choose the research method that better fits the study's goals and objectives.

Consensus-building methods were considered for this research but rejected in favour of the Delphi technique. Nominal Group Technique (Delbecq & Van de Ven, 2015) or focus groups (Busetto et al., 2020) were considered. Nominal Group Technique involves face-to-face meetings where ideas are collected, discussed and ranked by importance. Focus groups are face-to-face meetings where participants provide ideas and information while a moderator limits the discussion (Gallagher et al., 1993). The characteristics of the

participants of this study led the researcher to choose the Delphi technique as face-to-face meetings would not be possible due to geographical limitations. Moreover, the Delphi technique allows anonymity, asynchronous interactions and the participation of experts that are geographically spread.

Specifically involving digital placemaking, qualitative methods are predominant in digital placemaking studies, with an equal split in quantitative and mixed methods studies (Fernandez-Osso Fuentes et al., 2023b). Basaraba (2021) analyses creative and digital placemaking methods used in studies, describing a majority of interviews, observation or fieldwork, and focus groups or community workshops, also finding studies combining two or three methods of data collection. Digital data analysis of user-generated content as well as on-site methods such as fieldwork and field trials are also common in their review. However, no specific study on digital placemaking as a concept is found to have gathered experts to achieve a consensual definition and understanding of digital placemaking. In ‘Exploring Digital Placemaking’, Halegoua and Polson (2021) introduce the special issue of digital placemaking and different studies that explore the different ways people use digital media and mobilities to become placemaking. In Chapter 2, pivotal studies are identified in digital placemaking involving nature and wellbeing, revealing how studies that include digital placemaking experts are non-existent and a lack of mixed methods approaches. Since this PhD research is an exploration on digital placemaking and its use in nature for wellbeing, no specific case study or project could be use, but an exploration on the concept and the mechanisms involved in nature and wellbeing was required. Referring to this gap, this study aims to contribute to the current body of knowledge in this area. The literature review presented in Chapter 2 reveals how digital placemaking studies are predominantly qualitative, with few notable mixed methods studies (e.g., Fredericks et al., 2018; Soedarsono et al., 2021). Therefore, this

study aims to reveal results in the area of digital placemaking through a mixed method, abductive approach with key informants, grounded in the principles of critical realism by recognising an objective reality that can be understood through the interplay of its structures, mechanisms and human agency.

4.5.1. Systematic Literature Review Procedure

The initial step in this study is to review the literature surrounding digital placemaking in nature for wellbeing. The systematic literature review was conducted to explore previous theory, research and commentary on the topic. It was performed following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Page et al., 2021). Full details on the method followed for the review can be found in Chapter 2 Part A (see [section 2.4](#))

A new search was conducted in September 2024 to update the published paper to new articles on the matter, which followed the same method and is described in Chapter 2 Part B (see [section 2.9](#)).

4.5.2. Data Collection

For the aim of the study, it is important that the data collection method is appropriate. In this study, a modified Delphi method is chosen as the best fit to appraise digital placemaking regarding nature and wellbeing to obtain consensus from experts (Nevo & Chan, 2007) and expanded experts. Using semi-structured interviews, questionnaires and controlled feedback, the research question is explored. Reaching consensus provides a snapshot of knowledge at a point in time (Black et al., 1966; Everett, 2012). Furthermore, the critical realist approach of the investigation is committed to discovering the structures and mechanisms that exist in a digital placemaking experience beyond the immediate observations perceived. The combination of semi-structured interviews with

questionnaires and controlled feedback allows to access participants' interpretations and experiences on the topic, which are shaped by deeper social structures, to then gauge the agreement level among them.

The evolution of the concept from 2011, when it was first defined (Latorre, 2011), and the lack of agreement on its definition and use (Basaraba, 2021; Chen et al., 2024; Keegan, 2021; Sanaeipoor & Emami, 2020a) led the study to aim to achieve consensus on its application as a place branding strategy to urban nature spaces for potential wellbeing benefits. Therefore, by developing a modified Delphi study a deeper understanding of the concept and its applicability to nature and wellbeing combining the opinions of experts and expanded experts will be explored.

Furthermore, besides the lack of information on the different processes involved in a digital placemaking initiative that includes an urban nature space and assesses consumers' wellbeing, there is no specific initiative that includes these three elements to analyse or create a case study for. Therefore, the peculiarities of the concept of digital placemaking, the lack of understanding of its application to nature for wellbeing and the absence of cases have led to forecast its mechanisms and understanding for practitioners and future research to test and implement.

This research aims to understand how a place branding perspective of digital placemaking in nature for wellbeing could be achieved, how are the dynamics involved interconnected and what strategies could be implemented to create hybrid nature experiences in place branding and attachment approach from a social identity perspective. This study is proposed to bridge the lack of agreement on the concept and shed light on the crucial role of digital placemaking in promoting place attachment and place branding to engage consumers with nature while supporting their wellbeing. This research will illuminate areas in which digital placemaking is understood to have effects from different

perspectives and disciplines, including the role of nature and the wellbeing impact. The involvement of expanded experts will overcome the homogeneity of profiles in previous research in this area, while contributing to approach a consensual picture of the potential involvement of digital placemaking as a place branding and place attachment approach to foster nature connectedness, especially in urban environments to impact the wellbeing of consumers.

4.5.2.1. The modified Delphi method

The Delphi method has been broadly used in different disciplines such as health (Miller et al., 2020) and in many social science studies (Singh et al., 2022; White et al., 2018). It has also been used to build practice theory (Brady, 2015). Delphi studies present a number of benefits such as flexibility and simplicity, knowledge sharing, cost-effectiveness, freedom of expression or lack of geographical limitation (Avella, 2016). Specifically, it provides value to studies that explore multidisciplinary problems, where opinions are required from a large group or that collect subjective expertise and inputs (Yang et al., 2012). However, it also presents flaws from the shortcomings of the researcher or panel members. Some disadvantages of the Delphi methods are researcher bias, researcher shortcomings, and panel anonymity (Avella, 2016).

In this study, two modifications of this method are employed: the inclusion of expanded experts (Ketwaroo et al., 2019) as well as experts in the topics explored in the research question, and the initial qualitative round of interviews (Avella, 2016; Hasson et al., 2000). A combination of both open-ended questions and rating scales allows this study to identify features and determine their importance. Previous digital placemaking studies have combined semi-structured interviews with questionnaires to explore place user perceptions (e.g., Wang, 2019). Moreover, the Delphi method in different variants have been applied to explore placemaking (Buckley et al., 2017; Kumar & Nigam, 2023; Lak

& Zarezadeh Kheibari, 2020). However, no digital placemaking study has employed the Delphi technique with experts and expanded experts in the topic. Thus, the choice of a modified Delphi method to achieve consensus among experts reflects critical realism's focus on understanding empirical regularities and underlying mechanisms to explain them, uncovering deeper structures that shape the social phenomena. Further details on the Delphi method followed can be found in Chapter 5 Part A (see [section 5.6](#))

4.5.2.2. *Round one: Semi-Structured Interviews*

Semi-structured interviews have been chosen as the round one data collection instrument to aggregate results and to analyse this research topic (Ghauri & Grønhaug, 2010), following previous Delphi studies (Avella, 2016; Hasson et al., 2000). Other group techniques have been considered (e.g., focus groups) but were dismissed due to the topic's complexity and participants' characteristics such as geographical location. This study's participants are internationals, from the United States, Australia and the United Kingdom among others (see Tables 4.6 and 4.7). Thus, the emulation of a sense-making process with individuals who are not physically together in a time-efficient manner was key in the method decision (Egolfjord & Sund, 2020).

Qualitative interviews allow explorations of themes that are not immediately apparent in the literature (Bell et al., 2010). Interviews provide understanding of the subject's opinions (Saunders et al., 2023). They can be unstructured (in-depth) or semi-structured, where the latter have predetermined questions but also allow interviewees to follow their thoughts and expand where necessary (Bell et al., 2010).

Interviews have been previously used in digital placemaking studies as an effective instrument to explore the topic with users and other stakeholders (e.g., Breek et al., 2021; Maciej, 2024; Norum & Polson, 2021). Following the interdisciplinary nature of the

concept and the lack of agreement, initial questionnaires to gather insights for the Delphi rounds were dismissed as the study aimed to fully understand the views of each participant and allow them to explore and describe themes and topics in depth. This research aims to collect ideas and visions on the use of digital placemaking in nature for wellbeing, but also to arrive at a consensus, if possible. The value of the Delphi to rank anonymously generated ideas to reach a potential consensus was key to selecting this technique. Moreover, semi-structured interviews with digital placemaking experts and expanded experts allow the researcher to guide the conversation with the participants towards the areas of investigation that have emerged from the literature. Therefore, semi-structured interviews were chosen as the most appropriate instrument for the first Delphi round to satisfy the research aims and objectives, allowing key informants to discuss their experiences and opinions on the use of digital placemaking in nature for wellbeing.

Interview data presents a high degree of validity as the participants can freely describe and discuss the topic explored in the study (Saunders et al., 2023). Audio recording of interviews allows them to retain a large quantity of data. However, interviews also present a number of limitations such as a certain degree of skills from the interviewer to elicit information from participants, probing of participants or interviewer bias leading questions or misrepresenting participants' opinions (Saunders et al., 2023). Transcription of interviews is also a costly and time-consuming activity that is part of this process.

Due to the conversational nature of semi-structured interviews, questions can be asked differently and produce different responses (Creswell, 2007). Therefore, an interview protocol was developed to guide interviews and ensure the themes of the research were addressed (see Appendix I). A list of indicative themes explored in the interview and expected gaps in literature to address was created to guide the semi-structured interviews. These questions were based on the initial conceptual model developed on digital

placemaking in nature and wellbeing as a place branding strategy (Chapter 3). Different interview guidelines (Adams, 2015; Rubin & Rubin 2011; Walsh, 2019) were followed when creating the semi-structured interview protocol, and only a brief list of topics discussed was circulated with the participants. The interview protocol was tested in three pilot interviews between November 2022 and January 2023.

Interviews were held from March 2023 to June 2023. The interviews were conducted online using Microsoft Teams and were recorded and transcribed. Data were thematically analysed (Braun & Clarke, 2012; 2021) using MaxQDA software (maxqda.com) (Addas, 2023) and an independent researcher re-coded and checked these results in December 2023 to ensure external validity (Sandelowski, 2004). Findings from the interview were used to develop the Delphi rounds questionnaires. All interview participants were invited to take part in the Delphi rounds.

4.5.2.3. Round two and three: Questionnaires

Questionnaires are used as techniques of data collection that ask individuals to respond to the same set of questions in a predetermined order (de Vaus, 2002). Questionnaires are highly structured and provide a straightforward way of obtaining information (de Vaus, 2002). They can be used in surveys, experiments, or case studies (de Vaus, 2002; Saunders et al., 2007). Questionnaires have been broadly used in marketing studies and in digital placemaking (e.g., Sanaeipoor and Emami, 2020a; Soedarsono et al., 2021).

Saunders et al. (2007) present different types of questionnaires: self-administered questionnaires, which include internet-mediated questionnaires, postal questionnaires and delivery and collection questionnaires; and interviewer-administered questionnaires, including telephone questionnaires and structured interviews. Self-administered questionnaires are completed by the respondent and can be administered electronically

(internet-mediated questionnaire), posted to the respondent (postal questionnaire), or delivered by and (delivery and collection questionnaire). On the contrary, interviewer-administered questionnaires are recorded by the interviewer, via telephone (telephone questionnaire) or in person where the interviewer physically meets the respondent and asks the questions (structured interview). Structured interviews are different from semi-structured and unstructured (in-depth) interviews.

The questions included in a questionnaire can be adopted directly from other questionnaires, adapted from other questionnaires or developed by the researcher. These questions can also be open-ended questions (Dillman, 2000), where the respondents give answers in their own way. Open-ended questions are commonly used in exploratory studies (Saunders et al., 2007). In closed-ended questions (Dillman, 2000) the respondent is given a set of answers to choose from. They are quicker as they require minimal writing and facilitate comparison of responses and can vary from lists to category or ratings. Rating questions are usually employed in studies that collect opinion data, most frequently through Likert-style rating scales in which respondents are asked how strongly they agree or disagree with a statement (Saunders et al., 2007).

De Vaus (2002) describe a three-step process to create a questionnaire, where concepts must be translated into measurable items: clarifying the concepts, developing indicators and evaluating the indicators. Clarifying concepts refers to the process of understanding that concepts are tools used to summarise a set of behaviours, attitudes and characteristics which have something in common. They are created for communication and efficiency purposes. Then, indicators are developed when abstract concepts transform into questionnaire items, in a process called *descending the ladder of abstraction*. This process involves clarifying the concept from an abstract state into specific dimensions and sub-dimensions when indicators can be developed. The researcher needs to consider how

many indicators to use, how to develop them and how to form items into a questionnaire. Finally, indicators are evaluated to ensure the validity and reliability of the items.

Internal validity and reliability of the data collected through questionnaires and the response rate achieved depend on the design of questions, structure and rigour of pilot testing (Saunders et al., 2007). The validity refers to the internal validity of the questionnaire to measure what it intends to measure, content validity of the items to cover the research questions, predictive validity or criterion-related validity of the item to make accurate predictions, and construct validity, whether the item measures the presence of the construct that is intended to measure (Saunders et al., 2007). Similarly, reliability in questionnaires refers to consistency, where respondents consistently interpret the questions (Saunders et al., 2007).

In the modified Delphi method of this research, the Delphi rounds two and three are questionnaires to gauge the agreement of participants. Questionnaires have been broadly used in business studies (Ghauri & Grønhaug, 2010) and are the standard Delphi round data collection method (Avella, 2016). The Delphi rounds take the form of online questionnaires that are sent to the participants. Guidelines for constructing questionnaires for business research were considered (Ghauri & Grønhaug, 2010).

4.5.2.3.1. Delphi Round Two Questionnaire

The Delphi round two questionnaire was sent on 29th November 2023 via email to all interview participants, with the final deadline for completion on 19th January 2024. The extent of seven weeks was due to the holiday season. Participants were given a broad window for completion, and several reminders were sent (Table 4.4).

Emails sent	Date
Delphi Round Two Questionnaire	29/11/2023
Reminder to complete the questionnaire	14/12/2023
Reminder to complete the questionnaire	28/12/2023

Reminder to complete the questionnaire	10/01/2024
Reminder to complete the questionnaire	15/01/2024

Table 4.4: Modified Delphi Round Two reminders sent to participants during the study.

The Delphi round two was created following the codes and themes analysed from the interview data. Questionnaires were divided into four sections. Section one collected demographic data with a singular code for each participant to accomplish anonymity. Sections two, three and four followed themes from the interview round exploring statements on digital placemaking, place attachment and branding, and nature and wellbeing. Each section was also divided into different sets of statements (see Appendix G). The round two questionnaire also included open-ended segments for participants to make any comments, suggestions, or closing remarks. Qualitative comments were thematically analysed, and the comment rate was calculated for 10 open-ended comment questions.

4.5.2.3.2. *Delphi Round Three Questionnaire*

The round three questionnaire was constructed as a consequence of the round two analysis and results (Appendix H). Following the agreement criteria, only agreed items were used in round two (Miller et al., 2020), to reduce completion time and item number.

Round three was sent to participants via email on 12th February 2024. Reminders were sent on a weekly basis until the survey deadline (Table 4.5). Round three included a total of 55 items to review, while round two presented 140 items. Each item included an aggregated group response. Participants were given an option to adjust their ratings if they chose to do so. The goal of round three was to confirm the list of agreed items and ascertain panel consensus. The round three questionnaire also included open-ended segments for participants to make any comments, suggestions, or closing remarks.

Emails sent	Date
Delphi Round Three Questionnaire	12/02/2024
Reminder to complete the questionnaire	20/02/2024
Reminder to complete the questionnaire	27/02/2024
Reminder to complete the questionnaire	5/03/2024

Table 4.5: Modified Delphi Round Three reminders sent to participants during the study.

4.5.2.4. Reliability and validity

The findings from the described method should be trustworthy and so the procedures to generate them should be evaluated. The content and face validity of each instrument are confirmed via expert reviews and pilot tests, providing further evidence of validity and reliability (Miller et al., 2020).

Scholars such as Hasson et al. (2000) defend the increase of validity of Delphi studies as per the use of participants with expertise in the topic explored, as well as per the successive rounds and iterative nature of the method. Furthermore, the use of ‘collective intelligence’ is key to increasing content validity in Delphi studies (Miller et al., 2020), as well as their expertise and knowledgeability to determine the reliability and validity of the results (Giannarou & Zervas, 2014).

Reliability refers to the extent to which a procedure creates similar results under constant conditions on all occasions (Hasson et al., 2000). The use of Guba and Lincoln's (1994) criteria for qualitative studies helps ensure the reliability and credibility of the findings, based on the truthfulness (credibility), applicability (fittingness), auditability (consistency) and confirmability of the results.

The anonymous nature of the study helps participants to freely report their thoughts without being influenced by other experts (Egfford & Sund, 2020). In Delphi studies, the major rigour control is the ability to extend and revise the data by the participants during

the study, as well as the use of consensus in determining what responses are valid (Brady, 2015). Furthermore, the use of other measures to further strengthen the rigour of the Delphi method is advised (Brady, 2015), such as thematic analysis in the interview stage.

4.5.3. Participants

The broad evolution and application of digital placemaking (e.g., Basaraba, 2021; Champion, 2015; Paquin, 2019) suggest the need to include a variety of participants and experts from different disciplines to gather an understanding of this concept and its applicability to nature environments for wellbeing outcomes. In doing so, a modified Delphi method is chosen to combine opinions from experts and expanded experts in the matter.

The experts' group includes specialists in digital placemaking from fields such as technology, urbanism, business and marketing, and environmental sciences. The main expert criteria are publishing on the topic, years working in the field holding a position in an institution or programme and having expertise and authority or influence in the concept of digital placemaking. Scholars in digital placemaking were contacted from the systematic literature review (see Chapter 2) and from digital placemaking events such as Placemaking Europe (<https://placemaking-europe.eu/pwe/>).

The expanded experts' group comprise individuals for whom technology and public spaces are central to their work in different areas, such as architecture, urban planning, software development or creative arts. A strong link between nature and technology is also included, as well as technology and health. From the review, studies have been identified which may apply digital placemaking without acknowledging and mentioning the term. Therefore, there is value in including these opinions to deeply understand these

processes. In this group, placemaking practitioners from placemaking institutions were also included.

Experts and expanded experts were either contacted directly due to their publications and work on digital placemaking or suggested through snowballing sampling with referrals from participants (Naderifar et al., 2017). The inclusion criteria also state that all participants must be 18 years or older at the time of consent. An initial digital form with the information sheet, consent form and pre-interview survey (Appendix I) was sent to ensure the inclusion criteria is applied. Once the criteria were met, they were asked to take part in a semi-structured interview with the researcher, which was recorded (online). Interviews were conducted in English based on the preference of the interviewees in the initial survey. Study details were explained verbally to the participants prior to the interview, allowing them to ask questions or withdraw their consent.

A topic guide was provided to each interviewee following their agreement to take part in the study. The interview guide or protocol (Appendix I) provides a general direction for the interview, allowing participants to elaborate their answers and reflections and for the conversation to evolve. Following the standard in Delphi Studies (Rowe & Wright, 1996), 20 interviews with similar participation of experts and expanded experts were aimed. A total of 26 interviews were completed (see Table 4.7).

An initial pilot interview stage (Table 4.6) with three participants took place between November 2022 and January 2023 where the interview questions were tested. The objective of these pilot interviews was to further refine the structure of the questions and interviews while gathering preliminary insights. Two out of the three pilots agreed to participate fully in the study, while the third participant decided to end their involvement after the interview.

Pilot n°	Role	Category	Location	Interview Date
A	Health and Technology Scholar	Expanded Expert	Finland	22nd November 2022
B	Computer Science Scholar	Expanded Expert	Italy	29th November 2022
C	Branding and Social Media Scholar	Expanded Expert	United Kingdom	17th January 2023

Table 4.6: Pilot Interviews

The modified-Delphi was conducted virtually, with remote interviews recorded through Teams (only audio was kept for transcription purposes). This is due to the variety of locations with experts and expanded from all over the world (see Table 4.7).

Participant	Role	Category	Profile	Location
Expert 1	Professor of Communication and Media and Digital Placemaking scholar	Expert	Academic	United States
Expert 2	Digital placemaking scholar and practitioner	Expert	Practitioner	Italy
Expert 3	Lecturer in rhetoric and digital communication and Digital Placemaking Scholar	Expert	Academic	United States
Expert 4	Digital Placemaking scholar and lecturer in Media Studies	Expert	Academic	United States
Expert 5	Digital placemaking scholar and lecturer in architecture.	Expert	Academic	Australia
Expert 6	International Digital Placemaker and Ethical Product Advisor	Expert	Practitioner	United States
Expert 7	Operation Director at an urban technology company	Expert	Practitioner	Australia
Expert 8	Lecturer in Media and Communications and Digital Placemaking scholar	Expert	Academic	United Kingdom
Expert 9	Associate Professor in Geosciences and Natural Resource Management	Expert	Academic	Denmark
Expert 10	Lecturer in Landscape Architecture and Digital Placemaking Scholar	Expert	Academic	Australia
Expanded Expert 1	Professor in Environmental Psychology	Expanded Expert	Academic	United Kingdom

Expanded Expert 2	Placemaking practitioner with international experience	Expanded Expert	Practitioner	Norway
Expanded Expert 3	Lecturer in Environmental Psychology	Expanded Expert	Academic	United Kingdom
Expanded Expert 4	Placemaking Scholar and practitioner	Expanded Expert	Practitioner	United Kingdom
Expanded Expert 5	Lecturer in Marketing and Place Management	Expanded Expert	Academic	United Kingdom
Expanded Expert 6	Lecturer in place management	Expanded Expert	Academic	United Kingdom
Expanded Expert 7	Placemaking Director in an international organisation	Expanded Expert	Practitioner	Mexico
Expanded Expert 8	Director of non-profit focused on environmental issues, social inequalities, civic engagement and circular economy.	Expanded Expert	Practitioner	Greece
Expanded Expert 9	Placemaking practitioner with international experience	Expanded Expert	Practitioner	India
Expanded Expert 10	Researcher in social determinants of health and nature	Expanded Expert	Academic	United Kingdom
Expanded Expert 11	CEO of a technology, nature and wellbeing company	Expanded Expert	Practitioner	United States
Expanded Expert 12	Director of a society of urban health	Expanded Expert	Practitioner	Spain
Expanded Expert 13	Founder of at ech company on nature, wellbeing and technology	Expanded Expert	Practitioner	United Kingdom
Expanded Expert 14	CEO of a technology, nature and wellbeing company	Expanded Expert	Practitioner	Australia
Expanded Expert 15	Health and Technology Scholar	Expanded Expert	Academic	Finland
Expanded Expert 16	Computer Science Scholar	Expanded Expert	Academic	Italy

Table 4.7: Modified Delphi study participants.

4.5.4. Data Analysis

The aim of the qualitative round is to gather insights on digital placemaking in nature for wellbeing, where data analysis reflects upon the meanings within the results and generates understandings from the knowledge and perception of the participants. Thematic analysis was the most appropriate form of data analysis for the first Delphi round as it involved

the researcher coding the interview transcripts to identify themes and patterns within the data. Other qualitative analysis procedures were considered but disregarded as per the study's aim and purpose. The quantitative rounds were analysed using descriptive statistics to measure consensus, strength, and convergence of opinions. The data analysis techniques selected as the best fit for the research purpose allow to achieve deeper insights into the underlying causes of the phenomena of the investigation, which is supported by critical realism where analysis should uncover the different layers of reality.

Measures were taken to minimize the effect of situational factors and explained the content and face validity of each instrument were confirmed via expert reviews and pilot tests. Further validity and reliability were explained in [section 4.5.2.4](#). The modified Delphi is built on three rounds: round one of semi-structured interviews, and round two and three of questionnaires (see Figure 4.1).

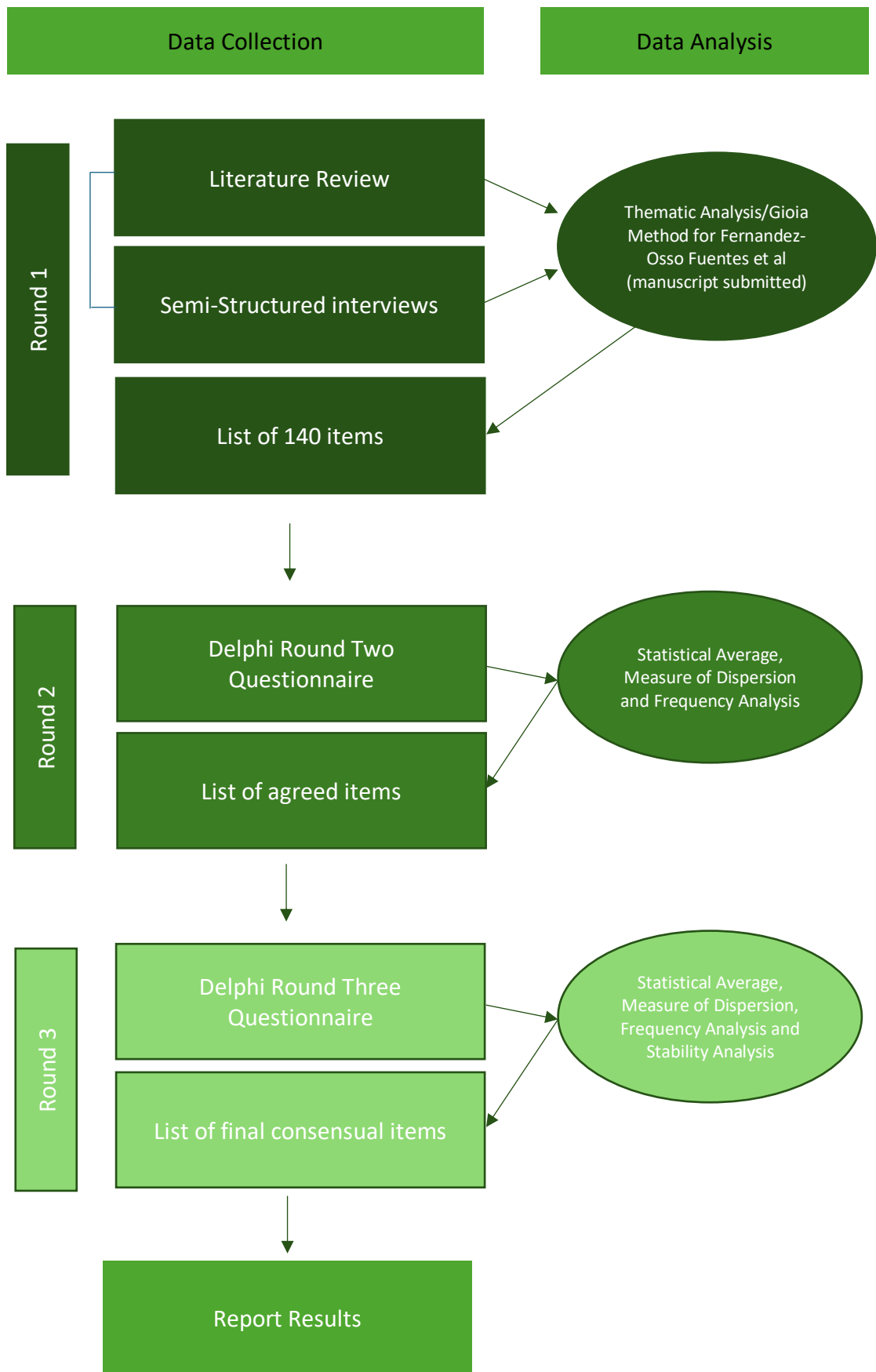


Figure 4.1: Data gathering and analysis procedure for three rounds of conventional Delphi based on Singh et al. (2022).

4.5.4.1. *Delphi Round One*

Qualitative data analysis allows meanings to be understood, where the collection of non-standardised results requires classification into categories and further analysis through the use of conceptualisation (Dey, 1993; Healey & Rawlinson, 1994; Saunders et al., 2007). The analysis of qualitative data aims to reflect upon the meanings within the results to generate insights from the perceptions of the participants of the study (Holstein & Gubrium, 2003). Qualitative data needs to be transcribed for its analysis and reproduced as written account using the actual words (Saunders et al., 2007).

There are different approaches to the analysis of qualitative data, depending on the level of structure, the level of interpretation from the researcher or formal procedure, or inductive or deductive approaches to data analysis (Saunders et al., 2007). Qualitative research can be analysed through three different procedures: content analysis, grounded analysis and thematic analysis (Saunders et al., 2023). Content analysis refers to the frequency of words and concepts in qualitative datasets. Grounded analysis requires the intuitive development of themes from the data. Finally, thematic analysis focuses on the researcher coding the data to identify themes and patterns.

The interview data from the Delphi round one was analysed following the Gioia method (Magnani & Gioia, 2023) for the data presented in the paper Fernandez-Osso Fuentes et al. (manuscript submitted, see [Chapter 5 Part A](#)). This decision was made do the broad use of the Gioia method in qualitative studies in marketing (e.g., Sharples et al., 2023) and to match expectations and key studies in the targeted journal. Further description of this data analysis method can be found in [section 5.6](#).

The rest of the data collected in the first round, presented in Chapter 5 Part B, employs thematic analysis (Braun & Clarke, 2012; 2021), which has been broadly used in

qualitative Delphi studies (e.g., Brady, 2015; Egffjord & Sund, 2020; Singh et al., 2022). This method systematically identifies, organises and offers insights into patterns of meaning or themes across a dataset in an accessible and flexible manner, comprising six-phase steps (Braun & Clarke, 2012) (Table 4.8). This method of analysis aligns themes and codes identified in the literature and the data collected in the study. Interview data was transcribed close to the time it was recorded to facilitate analysis, allowing the researcher to reflect upon the interview recently conducted (Bazeley, 2009; Saunders et al., 2023). Qualitative data analysis through thematic analysis combined coding with reflections, links and notes to facilitate more than one type of analysis (Bazeley, 2009).

Therefore, the inclusion of semi-structured interview data results from thematic analysis reflects the critical realist approach to the investigation, where the insights and understanding of the perspectives and experiences of the participants are crucial for the identification of the mechanism in digital placemaking. The initial qualitative stage allows the exploration of the subjective experiences of the panel members, which are influenced by underlying structures of reality.

Thematic Analysis Description

Phase	Description
1. Familiarising yourself with the data	The researcher immerses themselves in the data, making notes and highlighting items of potential interest
2. Generating initial codes	Data is systematically analysed with a first round of coding. Codes are building blocks of analysis and provide a label for a feature of the data that is potentially relevant for the research question. They provide with an interpretation of the data content.
3. Searching for themes	The analysis take shape as the codes are shifted to themes. A the “captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set” (Braun & Clarke, 2006, pp.82). Themes are generated and constructed while coded data is reviewed to identify similarity and overlaps. It is also important to explore relationships between themes.

	Miscellaneous theme might be useful to be considered. This phase should end with a thematic map outlining themes and data extracts for them.
4. Reviewing potential themes	This phase involves a recursive process for development of themes and revision in relation to coded data and the entire dataset. First, themes are checked against the collated extracts of data to ensure codes are relevant and the boundaries of themes are clear. Second, themes are reviewed in relation to the entire dataset with further refining and reviewing taking place to ensure data is adequately captured.
5. Defining and naming themes	Themes need to be unique and specific. This phase involved deep analytic work. Specific extracts are selected and analysed to setting out the story of each theme, providing a compelling example that illustrates the analytic point. This data must be interpreted and connected to the broader research question and scholarly fields. It should combine descriptive thematic analysis (data being illustrative) and conceptual and interpretative thematic analysis (data is analysed in more detail for its latent meanings)
6. Producing the report	The final report should provide a compelling story about the data based on the analysis undertaken, making an argument that answers the research question. Themes should connect logically and meaningfully. If relevant, they should build on previous themes.

Table 4.8: Thematic Analysis phases from Braun and Clarke (2012)

The data collected and analysed through the semi-structured interviews resulted in themes and sub-themes from a coding system, which were assessed to identify relationships among them (Braun & Clarke, 2012). Themes and sub-themes from the modified Delphi round one are listed in Table 4.9, with a brief description to illustrate how the codes emerged.

A specific software was used in the coding stage (MAXQDA Pro) as per familiarity with it and mixed-methods applications. The selection of the software allowed to also apply statistical analysis of the Delphi rounds' questionnaires. Thematic analysis was also

employed in the free-form comments provided during the Delphi rounds two and three questionnaires. Analysis followed the same phases and stages as in the first Delphi round.

Digital Placemaking	Characteristics	Hybrid Place	Combination of digital and physical attributes in a place.	Hespanhol (2022)
		Co-Creation	Bottom-up process where the community is part of the creative and development process of the digital placemaking experience.	Courage (2021)
		Storytelling	Strategy used in digital placemaking where the community shares their own narratives of the place for inclusion and engagement.	Breek et al. (2021), Gonsalves et al. (2021), Stokes et al. (2018)
		Inclusion and Accessibility	Key characteristic of digital placemaking where the technology is purposefully used to adapt the experience and place to those who might find physical or social barriers.	Clarke (2021), Szaszák and Kecskés (2020)
		Community Connection	Engagement among community members fosters sense of belonging and ownership through digital placemaking	Kale (2019)
		Place Characteristics	Elements that distinguish each place	
		Sense of Place Attachment	Key characteristic in digital placemaking that refers to the relationship created between the place and the community.	Halegoua and Polson (2021)
		Sense of Identity	Connected with the place and the community, it is the feeling of belonging that affects the self-perception of a person and a community	Makri et al. (2021), Özkul (2021), Tajfel and Turner (1986)
		Duration	Period of time when the digital placemaking occurs.	
		Democratisation	Effect from community-driven activities and co-creation processes in digital placemaking that emphasizes the value involvement of the people in the community as equals to the facilitators.	Kale (2019)
		Behaviour Change	Effect from digital placemaking where the community actions change in their habits.	Chen et al. (2022)
		Enhancer	Distinctive element from digital placemaking where the physical experience is augmented through a digital layer	Chew et al. (2020), Bilandzic and Johnson (2020), Sepe (2016)
		Gamification	Strategy used in digital placemaking to engage with the community through play	Clowater (2021), Pang et al. (2020), Paraschivoiu and Layer-Wagner, (2021)
		Call to Action	Element part of the digital placemaking experience that directs the community towards specific activities that aim to promote behaviour change	

Digital Placemaking		Enact Senses	Element in digital placemaking that aims to connect the community with specific senses beyond visual clues.	Norum and Polson (2021).
		Sense of Identity	Connected with the place and the community, it is the feeling of belonging that affects the self-perception of a person and a community	Makri et al. (2021), Özkul (2021), Tajfel and Turner (1986)
	Challenges	Privacy-Online Safety	Potential risk from digital placemaking due to the blurred privacy lines in the online world	
		Digital Equity	Potential risk from the digital placemaking experience where the community does not have access to technology.	
		Top-Down	Development process of the digital placemaking experience where power dynamics follow a unilateral process in a community.	
		Cost	Monetary value of investment to develop a digital placemaking experience.	
		Ethics	Refers to the morals followed by the people who develop digital placemaking and its purpose, and the way they should act to benefit the community and the place.	Amirzadeh and Sharifi (2024), Eckenwiler (2021)
		Digital Stickiness	Engagement created with the digital element in digital placemaking.	
		Addiction/Tech Reliance	Dependent feeling with technology.	
		Motivation	Level of engagement of the community in the digital placemaking experience.	
		Interdisciplinary Team	Group of professionals from different fields and disciplines that work together in digital placemaking.	
		Gentrification	Urbanism process where wealthier and privileged groups move into neighbourhoods that were populated by poor and working-class residents.	Bronsvort and Uitermark (2021)
		Exclusion	Process through which specific community members of groups are not allowed in the digital placemaking experience.	
	Measurement	Quantitative	Quantitative data collection and analysis method, refers to numerical data such as questionnaires.	Saunders et al. (2023)
		Qualitative	Qualitative data collection and analysis method that generated non-numerical data such as interviews	Saunders et al. (2023)
		Others	Other measurement methods mentioned	
		Challenges	Risks involved in the analysis, measurement or assessment of digital placemaking.	

Digital Placemaking	For Nature	Specific measurement and assessment methods for nature as an environment.		
	For Wellbeing	Specific measurement and assessment methods for health and wellbeing.		
	No measure	Absence of measurement, analysis or assessment method in the digital placemaking experience.		
	Definition	Statement that aims to collect the key aspects of digital placemaking.		
	Confusion	Inaccuracies, dilemmas and lack of agreement referring to the definition and explanation of digital placemaking.		
	Audience	Group of people who experience digital placemaking.		
	Success Factors	Elements that facilitate the achievement of goals in a digital placemaking project		
	Social Media	Online platforms that can be used in digital placemaking as location-based technology to facilitate community engagement		Breek et al. (2021)
Technology	Social Media	Technology to Wayfinding Nature	Use of technology in place-based experiences to discover nature spaces.	
		Exposure to Nature	Use of technology in place-based experiences to connect people with nature spaces.	
		Virtual Nature	Technological recreation of a nature space	Brambilla et al. (2024), Litleskare et al. (2022)
		Take Notice	Use of technology in place-based experiences to nudge people into appreciating and draw their attention into nature.	
		Dichotomy	The division into two contrasting things, referring to nature and technology.	
		Awareness	Use of technology in place-based experiences to draw attention to nature.	
		Education	Use of technology in place-based experiences to teach information about nature.	
		Climate Change	Long-term changes in the weather patterns that affect global climates and can be informed to the public through digital placemaking.	
		Imagine Futures	Use of technology in place-based experiences that envision and fantasise about future	Reynolds et al. (2024)
		Management	Use of technology in place-based experiences that focus on the administration, control and supervision of a place.	
		Shared Experience	Use of technology in place-based experiences that foster community relationships in place	

Tech + Nature + Wellbeing	Tech Enhancer Wellbeing	Use of technology in place-based experiences that focus on improving the wellbeing and health of the community	
	Relationship	Use of technology in place-based experiences that foster connection among community members	Goudriaan et al. (2023), Loy et al. (2024).
	Safety	Use of technology in place-based experiences that allow users to foster security in a number of areas.	Kale (2019), Pang et al. (2019), Toland (2020)
	Data Collection	Use of technology in place-based experiences to gather data for analysis.	
	Education	Use of technology in place-based experiences to teach information about the health and wellbeing benefits of nature.	Frith and Richter (2021)
	Tech to promote place	Use of technology in place-based experiences to foster the use of the place.	
	Tech as process-medium	Role of technology as a tool for another purpose and not the final product in digital placemaking	Najafi et al. (2022), Shih et al. (2021)
	Challenges	Risks involved in the use of technology in place-based experiences.	
	Tech to promote conversations	Use of technology in place-based experiences to foster community relationships and narrative sharing.	
	Challenges	Risks derived from the use of place branding strategies.	
Place Branding	Identity	Place branding aspect that refers to a feeling of unity and personality between the place and the community, the essence of the place. When involving digital placemaking, the technological aspect of the concept is connected with the identity formed in place branding.	Aitken and Campelo (2011), Çöteli (2019), Kavartzis (2021), Skinner (2021)
	Participatory	Type of place branding where the community is an active co-creator in the place branding process.	Hatch and Schultz (2009), Zenker and Erfgen (2014)
	Tourism	Use of place branding to encourage travel users in place.	Graziano and Albanese (2020)
	Uniqueness	Aspect enhanced through place branding to promote the authenticity of the place to differentiate it from others.	Aitken and Campelo (2011), Stoica et al. (2022)
	Image	Place branding aspect that refers to the perception of the user from the place brand image.	Skinner (2021)

	Place Management	Wider discipline that includes place branding as another activity in the governance of the place.	Skinner (2021)
	Place Branding - Nature	Place branding processes developed in a nature environment	
	Rebranding	Action of repeating the place branding process to repurpose and change the place brand, image and perception of a place.	
	Hybrid Events	Combination of digital and physical elements in an event developed as part of the place branding strategy.	
Place Attachment	Place Attachment	Relationship develops between a person and a place that fosters feelings of belonging.	Nisa et al. (2020), Scannell and Gifford (2017)
	Identity	Effect of place attachment processes in the local identity of the place and the community, also affected by the use of technology in digital placemaking.	Harner et al. (2017), Schwartz (2015)
	Community Relationships	Connections among community members and the place, beyond individual connections, fostered through place attachment processes and the role of the digital.	Birnbaum et al. (2020), Lewicka (2011)
	Emotional Stories	Effect from the feeling of belonging to place when the place attachment process involves the community.	Heck and Tsai (2022), Schwartz (2015).
	Ownership	Factor in online place attachment that promotes narratives that connect the community with the place.	
	Challenges	Risks derived from place attachment processes.	
	Wellbeing	Outcome from place attachment where the intimate relationship developed between the place and the community provides people with a safe haven, relief and psychological and wellbeing benefits.	Nisa et al. (2020), Scannell and Gifford (2017)
Nature	Nature Connectedness	Refers to the subjective sense and state of connection with nature	Capaldi et al. (2015)
	Nature Connectedness + Tech	Potential use of technology to foster and promote connection to nature.	Brambilla et al. (2024), Litleskare et al. (2022), Livingston's (2022)
	Circular Economy	Model of resource production and consumption that involves the recycling, repairing and reusing of existing materials and products through an iterative process. In this study, it involves the connection among technology and digital placemaking, nature and wellbeing.	
Wellbeing		Concept that combines health, positive affective states, social engagement and wellness indicators	Shankardass et al. (2019).

Table 4.9: Thematic analysis code descriptors.

4.5.4.2. *Delphi Rounds of Questionnaires*

Quantitative data can be analysed using statistical tools in different ways. Data can be analysed by using inferential analysis or descriptive statistics. Inferential analysis refers to the test of hypothesis through statistics, whereas descriptive statistics refers to statistically describing, aggregating and presenting variables numerically (Saunders et al., 2007). Each process employs different tools and data needs to be prepared for analysis through data coding, entry, check and correction of missing values (Saunders et al., 2007). The data collected through questionnaires weighted the level of agreement of the participants with different statements resulting from the round one analysis. Therefore, the analysis developed for the modified Delphi study employed descriptive statistics to describe and compare the numerical variables of the study, following the research questions and objectives.

Descriptive statistics summarise patterns in responses of cases in a sample and provide information about the distribution of variables, such as central tendency, or the variation or dispersion (de Vaus, 2002). The concept of central tendency highlights the average and most common values in a dataset, which can be quantified through the mode (the most frequent value), the median (the middle value when the data is ordered), and the mean (the average) (Saunders et al., 2007). The dispersion indicates the spread of data values around the central tendency, which can be measured as the inter-quartile range (IQR) (a range within the middle 50% of values) or the standard deviation (SD) (the degree to which values vary from the mean) (Saunders et al., 2007). The coefficient of variation is a statistical measure of the variability of a dataset, which provides a standardised measure of dispersion that allows comparisons, using the standard deviation to the mean (Diamantopoulos & Schlegelmilch, 1997; Saunders et al., 2007).

The iterative process of reaching consensus through the Delphi rounds two and three of questionnaires corresponds with critical realism commitment to refining knowledge and understanding the mechanisms that influence observable outcomes. The continuous engagement with data developed through the Delphi rounds supports a deeper understanding of the phenomena explored.

Specific data analysis employed for the Delphi round two and three of questionnaires is described in section [5.6](#) as part of the method section of the paper Fernandez-Osso Fuentes et al. (manuscript submitted).

4.6. Writing and Presenting the Data

Once data has been gathered and analysed, results need to report the findings of the project. Scholars recommend presenting the findings adopting the role of ‘story-teller’ (Miles, 1994). This approach highlights the most important aspects of the results in line with the research objective and aims. The presentation of data is divided into the two data sets gathered, qualitative and quantitative in each Delphi round. First, data presents the themes and subthemes from the interviews, involving the most pertinent concepts in digital placemaking in nature for wellbeing, which then are explored in the Delphi rounds of questionnaires to understand the level of agreement and consensus. The Findings and Discussion chapters of this research present a rich description of the concept of digital placemaking in nature for wellbeing. Additional findings that do not satisfy the overarching aim of the study are discussed in the further research agenda of this investigation in Chapter 7.

4.7. Ethics and Limitations

Prior to the data collection process, the research was granted ethical approval from the Maynooth University Ethics Committee, conducted by the University’s Social Research

Ethics Sub-Committee (SRESC). Since human participants are included in the research, aiming to gather opinions and impressions on digital placemaking in nature for wellbeing, it was essential to reflect on the different risks and benefits of taking part in the study. The application was submitted on 1st November 2022 including key aspects of the research purpose, method and participant protection. The submission of the ethical approval included several forms and documents: interview protocol, pre-interview survey, information sheet, consent form, an example of a Delphi round and key references (Appendix I). This application was approved on the 11th of November 2022.

The nature of inquiry in research should be honest and open, respecting the integrity of participants (Guba & Lincoln, 1994). Confidentiality is also paramount due to any sensitive data in the interview content. Anonymity was clear to the participants throughout the process of data collection. Participants could remain anonymous or waive their anonymity in case they wanted to be personally included in the final study, where their name would appear if quotes were to be used in published work. However, the participants remain anonymous throughout the Delphi rounds. Opportunities for participants to provide data off the record were also facilitated depending on their preference. When participants requested to remain anonymous, their identity was anonymised. Similarly, any reference to specific individuals or cases was also anonymised (Bell et al., 2010). The study included a consent form that was sent prior to data collection, containing research information and full details of ethical considerations, also explained prior to the first Delphi round. The consent forms were signed by all participants. Therefore, ethical considerations were informed by the researcher's commitment to uncovering the truth while being mindful of the implications of this knowledge. Following the critical realism perspective of the research, the goal is to understand the reality and phenomena while contributing to its improvement.

4.7.1. Limitations

There are several contributions from this research, but it is important to also address the different limits and potential challenges that are evident with this study. This study explores the emergent concept of digital placemaking involving nature and wellbeing, which is a fast-evolving concept that is changing constantly over time. Thus, the processes associated with it have changed since the beginning of the study.

The recruitment of experts and expanded experts has been challenging due to the nature of their role and the interdisciplinary approach to the concept. Selection bias can be considered during the recruitment process as another limitation of the study. Despite the research having no geographical limitations in the recruitment process, with participants from countries around the world, the interdisciplinary nature of digital placemaking can be acknowledged as another limitation due to the diverse backgrounds where it has been employed and the variety of terminology.

Specific limits of the Delphi method have been discussed by different scholars. Grime and Wright (2016) describe different sets of biases that the researcher has to solve for the accuracy of the method: final biased consensus, socially induced bias and researcher bias. These can be solved by facilitating information exchange and review by participants, through the anonymous Delphi process, and by using standardised checklists or rubrics when grading responses. However, mixing qualitative responses with standardised quantitative survey measures may help reduce potential bias. Further challenges of a Delphi study include dropout rates during the Delphi rounds (Egfford & Sund, 2020), and saturation (Hennink et al., 2017).

Critics of both qualitative and quantitative research due to several limitations such as the generalisation of findings being not representative of the entire population or the lack of

incorporating experiential knowledge in quantitative data. However, this study aims to overcome these limits by combining quantitative and qualitative data to explore the concept of digital placemaking in nature for wellbeing.

This thesis contributes to advancing the knowledge of digital placemaking, promoting a consensual approach to this concept and its effects when applied to place marketing and branding. Theoretically, it is a starting point to explore place attachment processes, place branding and community identity development in hybrid environments, identifying unique dynamics. From a practical perspective, place attachment research from a branding perspective will offer insights into enhancing citizens' wellbeing when place attachment is promoted through digital placemaking in urban public spaces. Cultivating community place attachment through hybrid environment experiences created using digital placemaking practices has the potential to support behavioural sustainability goals, as well as provide an incentive for digital placemaking by illuminating the various benefits to both citizens and organizations.

4.8. Summary

This chapter presents the ontological and epistemological viewpoint of the researcher of this study. The methodology used has been provided in an attempt to address the research aim, goals and objectives. The case has been presented for a mixed method, abductive study, positioned under the remit of critical realism as argued by Bhaskar (1978) as it aims to go beyond mere causal relationships to understand how these are developed. Then, the discussion of data collection techniques, analysis, validity and reliability, and ethical considerations and limitations have been provided. In the next chapter, the results of the study are presented for all Delphi rounds of qualitative and quantitative data.

Chapter 5. The Hybrid Space Model of Social Identity and Digital Placemaking: Implications for Place Branding (Part A)

The following manuscript was incorporated into this chapter.

Fernandez-Osso Fuentes, M. J., Keegan, B. J., Jones, M. v., & MacIntyre, T. E. (X). The Hybrid Space Model of Social Identity and Digital Placemaking: Implications for Place Branding. *Journal of Interactive Marketing* (submitted).

Maria Fernandez-Osso Fuentes: Conceptualisation, Analysis, Interpretation and Manuscript Drafting. **Brendan Keegan:** Review and Editing, Supervising. **Marc Jones:** Review. **Tadhg MacIntyre:** Review.

5.1. Preface

The systematic literature review and the conceptual model presented highlight the potential role of digital media in place experiences, specifically how digital placemaking and the dynamics involved are understudied. By providing valuable insight regarding the interconnections among dynamics in digital placemaking, the previous chapters informed the development of the subsequent chapters within this thesis, and in particular the design of the modified Delphi study results presented in the following chapter.

Based on the review of the literature and conceptual model, a modified Delphi method was selected to explore the phenomena. This chapter describes the results from the three-round modified Delphi study – round one of semi-structured interviews, round two of questionnaire for agreement, and round three to validate and achieve consensus. Due to the richness of the data collected and the valuable insights found in this programme of research, the results are divided into two sections: a manuscript submitted to the *Journal of Interactive Marketing* (Part A) in February 2025; and other relevant results referring to key dynamics in digital placemaking and its use in nature for wellbeing (Part B).

This chapter represents the third study in this PhD thesis and presents the main body of work included in this research programme. The article in Part A describes the primary contribution and result from the data collected and analysed, involving the study of identity mechanisms in digital placemaking. Part A first reports the identity mechanisms involved in the hybrid space created in digital placemaking, reporting the effects on physical and digital identity for place consumers. This study contributes to the overall aims of the thesis by providing novel data regarding the use of digital placemaking as a place branding strategy and understanding its use in promoting hybrid place attachment processes. Due to publication requirements, the main contribution of the thesis is

presented in Part A, while other key findings involving nature and wellbeing specifically are described in Part B. Part B presents complementary results involving digital placemaking as a concept, its place branding dimension, online place attachment, digital enhancement of nature connectedness and uses of digital placemaking in nature for wellbeing, and the final consensual statements from the three Delphi rounds of digital placemaking in nature for wellbeing.

5.2. Abstract

Customers social identity mechanisms and interactions are distinctly different in hybrid digital-physical spaces, where digital placemaking is used for place branding. We developed a consensual model illustrating how customer social identity mechanisms play a role in digital placemaking using a modified Delphi approach (semi-structured interviews and two rounds of questionnaires to gauge agreement) with 26 experts and expanded expert in the field. Using Social Identity Theory, we uncover the power of hybrid physical-digital spaces in developing a stronger sense of place attachment through unique identity mechanisms. In hybrid spaces, digital tools enhance customer interactions enabling diverse subgroup dynamics, while mitigating risks of identity homogenisation. Storytelling and community belonging are mediators in hybrid spaces, where shared narratives manifesting in-group connections, reducing bias and celebrating diversity. Theoretical contributions assert the pioneer transformative potential of hybrid spaces on customer identities. Managerial implications include strategies for leveraging digital placemaking to strengthen community cohesion, inclusivity, and place attachment for marketers seeking to respect and celebrate the diversity of community identities.

5.3. Introduction

Technology is embedded in our lives and shapes our identity development, from chatting with others, navigating a space or completing online purchases. The current digital era has emerged new arenas for consumer interaction and engagement (Abell & Biswas, 2023; Carrozzi et al., 2019; Šimůnková, 2019), integrating digital technologies in physical spaces to create hybrid physical-digital spaces. These hybrid spaces mediate the relationship between consumers and brands (Bartoli et al., 2023; Carrozzi et al., 2019), underscoring the growing interplay between the physical and digital place identity.

While extensive research has explored physical place identity (e.g., Hernández et al., 2007) and digital identity (e.g., Çöteli, 2019) distinctively, there remains a critical gap in understanding how they interact in hybrid physical-digital spaces. Specifically, digital placemaking can leverage digital tools to enhance the experience and meaning of places (Atteneder & Lohmeier, 2024), providing a unique context to examine identity mechanisms. This concept represents a natural progression of place branding, where digital technologies augment the identity of places and foster branding engagement (Razi & Ziminski, 2022). However, limited understanding of hybrid spaces for digital and physical identities is shown.

Our study extends interactive marketing scholarship in three innovative ways. First, we aim to understand consumers' social identity mechanisms in hybrid physical-digital spaces through expert knowledge. Second, we conceptualise digital placemaking and hybrid spaces as a place branding strategy. Third, digital placemaking and identity mechanisms in hybrid physical-digital spaces contribute to broader studies of technology and interactive marketing (e.g., Abell & Biswas, 2023; Carrozzi et al., 2019; Stallone et al., 2024). We explain ways in which the hybrid space enhances and challenges consumers' identity mechanisms. We address the pivotal role that consumers' physical

place identity and digital identity mechanisms play in hybrid digital-physical experiences and provide practical insights for placemakers, place branding and management experts to foster social identity in hybrid spaces.

5.4. Digital Placemaking and Place Branding

Digital placemaking derives from placemaking, which foster innovation to enhance public spaces (Chen et al., 2022). It is a multidisciplinary concept understood as a process that uses digital media to foster individual and communal sense of place attachment (Halegoua & Polson, 2021). It has evolved over the years regarding its technology use and purposes (Chen et al., 2022). From social media (Soedarsono et al., 2021) to augmented reality with Pokémon Go (Clowater, 2021), combining digital and physical spaces.

Digital placemaking is found to have four basic characteristics (Fernandez-Osso Fuentes et al., 2023b): it is a community engagement experience (Shih et al., 2021), with inclusion potential (Szaszák & Kecskés, 2020), which fosters sense of place attachment (Halegoua & Polson, 2021), through a hybrid space (Hespanhol, 2022). The sense of place attachment is commonly related to identity processes, whether is place identity (e.g., Razi & Ziminski, 2022) or individual identity (e.g., Chen et al., 2022). However, the key to its ‘digital’ denomination is the creation of a hybrid space, where a digital layer overlays the physical space to add meaning (De Souza E Silva, 2006; Hespanhol, 2022). Hybrid spaces bring social networks into physical spaces reconfiguring them (De Souza E Silva, 2006). The hybrid space can enhance the experience on different levels, shaping the overall community identity of the place. The opportunities and potential are broad. However, challenges and risks should also be considered, such as homogenising the identity (Maciej, 2024; Özkul, 2021), and excluding marginalised groups (Peacock et al., 2021), among others.

As a place branding strategy, it mainly focused on tourism (e.g., Sugangga et al., 2021; Törnberg, 2022). However, scholars have described its potential use in creating authentic experiences to empower collective identities (Evans, 2015), as part of place management and branding (Keegan, 2021). Its application as a place branding strategy can help enact identification processes and foster civic pride (Mommaas, 2002), where placemaking is one of the roots of place branding Ashworth et al. (2015)

Place branding applies branding principles to places (Reitsamer & Brunner-Sperdin, 2021) to create, influence and reinforce the image and associations of a place (Warnaby & Medway, 2015; Zenker & Braun, 2010). Different categorisations can be found in place branding, from country level (Aronczyk, 2020), to destination and tourism (Chan & Marafa, 2013) or smaller dimensions (Fernandez-Osso Fuentes et al., 2024b). The place brand identity is developed by brand managers, which is communicated to influence the image of the audience (Skinner, 2021; Zenker & Martin, 2011). Brand-community practices foster ownership through place branding co-creation, enhancing identity and local culture with memorable experiences (Aitken & Campelo, 2011; Kavaratzis & Florek, 2021; Wang, 2019).

One strategy used in place branding to empower communities through co-creation is storytelling. Storytelling is used in interactive marketing and branding to expose appealing narratives conveying the brand values (Crespo et al., 2023; Hudak, 2019; Stoica et al., 2022), also considering its negative effects in the discipline (Grigsby & Mellema, 2020). The evolution of digital media has also affected place branding, with the introduction of online place branding (Florek, 2011). However, a limited number of studies explore its effects in communities, referring to online and offline (hybrid) actions (Graziano & Albanese, 2020), and the recent denomination of phygital (physical and digital) consumer-brand relationships (Bartoli et al., 2023). Recently, scholars have also

called to guide the future of place branding involving digital media (de San Eugenio-Vela et al., 2023; Kavaratzis & Florek, 2021). Thus, a gap in the implications of hybrid physical-digital spaces in place branding is also found in literature. We move from the phygital environment to a hybrid space where the physical-digital spaces create a unique experience to benefit the place brand and image.

5.5. Social Identity Theory

Social Identity Theory enable us to explore digital placemaking's dynamics by offering a deep understanding on group processes (Hornsey, 2008). This focus aligns with our study objective of investigation of identity mechanisms in hybrid place experiences. Social Identity Theory refers to a sense of belonging and identification to a social group (Makri et al., 2021; Tajfel & Turner, 1986). Social Identity Theory suggests individuals internalise group membership to become part of one's self-concept (Heath et al., 2017; Tajfel, 1978). Tajfel (1978) identifies three components associated with social identification: the cognitive component for awareness, the emotional for affective identification, and the evaluative component, alluding to the value connotations associated with the identification. This social identification can enhance the self-esteem, self-concept (Haslam et al., 2009), and improve wellbeing and health (Bowe et al., 2020). Members of a group develop in-group and outgroup attitudes (Tajfel & Turner, 1986). In-group favouritism is a preferential treatment of people perceived to belong to the same in-group, differentiated from outgroups (Makri et al., 2021; Terry, 2003). Terry (2003) describes the existence of subgroup identities in pluralistic environments to respect the diversity of an organisation, and the use of recategorization of the social identity to reduce in-group bias among subgroups. Scholars describe the social identity complexity to avoid the reductionist approach of focusing on one singular social identity (Crisp, 2010; Roccas & Brewer, 2002). Social identity complexity discusses having multiple group

membership and its potential to reduce single in-group-outgroup distinction. This construct is specifically applied in multicultural societies, where social identity complexity could be associated with tolerance for diversity and acceptance of outgroups (Crisp, 2010; Roccas & Brewer, 2002).

Regarding the current digital era, digital identity is mainly explored from managerial approaches connected with identity data consent, control and access (Camp, 2004; Masiero & Bailur, 2021). In the context of social identity, this theory has helped understand consumer engagement on social media and virtual communities (Abell & Biswas, 2023; Bradford et al., 2017) and ownership feelings using augmented reality holograms (Carrozzi et al., 2019). Bouncken and Barwinski (2021) introduce the concept of shared digital identity, which is described as the collective self-concept of an in-group towards the use of digital technology that creates feelings of belonging, community and enthusiasm. Recent digital placemaking studies adopt social identity but on analogue ways (Kotus et al., 2022; Sacramento et al., 2022), or refer to feelings of displacement and erasure of long-term communities using digital platforms (Törnberg, 2022). We identify a lack of understanding of social identity formation in physical-digital spaces.

Involving branding and Social Identity Theory, scholars have explored brand identification in storytelling (Crespo et al., 2023) and social media and online brand communities (Kuo & Hou, 2017). In tourism and branding, this theory has informed the impact of technology (Çöteli, 2019), loyalty and place attachment (Dandotiya & Aggarwal, 2023). Place attachment is part of place identity, a substructure of social identity (Qazimi, 2014). Place attachment and place identity have been strongly related to placemaking practices (e.g., Moodley & Marks, 2023). Place identity describes the individual's incorporation of a place into the concept of self (Hernández et al., 2007; Proshansky et al., 1983). It has been criticized for neglecting the social dimension of

identity (Hauge, 2007). Incorporating technology, studies allude to online place attachment (Huang et al., 2022; Schwartz, 2015), digital use in place attachment (Birnbaum et al., 2021; Rutha & Abbas, 2021), place identity and digital technology (Geng et al., 2023; Harner et al., 2017; Skinner, 2008) and even a digital sense of place (Dai & Liu, 2024). The meaning of a place is constantly renegotiated and so its contribution to identity is never the same (Hauge, 2007). Thus, Social Identity Theory can shed light on the relationship between place and identity where digital media in place experiences could help communities renegotiate meaning and identity, enacting and enhancing mechanisms in the hybrid space.

5.6. Method

We aim to understand consumers' social identity mechanisms in hybrid environments through digital placemaking as a place branding initiative. We rely upon the opinions and interpretations of key informants in digital placemaking with in-depth knowledge of the concept to establish claims about its potential use. We collect qualitative and quantitative data to advance knowledge on the phenomena.

5.6.1. Data Collection

The Delphi method was first used by the RAND Corporation to refine group judgement (Grime & Wright, 2016) and has been used in marketing (Singh et al., 2022), digital advertising (Stallone et al., 2024), and place brand research (de San Eugenio Vela et al., 2013). Its main principles are anonymity, repetition, controlled feedback and group response (Egffjord & Sund, 2020). We follow two modifications of the Delphi method. First, we included expanded experts as well as experts (Ketwaroo et al., 2019), due to the interdisciplinary nature of the concept (Amirzadeh & Sharifi, 2024; Basaraba, 2021). This expert-based study assumes that industry and academy experts with the appropriate

background can help discerning identity mechanisms in hybrid places. We considered experts those who are specialists in the concept, have published about it, and also hold a position in an institution or programme. Expanded experts include individuals for whom technology and public spaces are central to their work, as well as placemaking practitioners. The second modification is the initial qualitative round through semi-structured interviews (Avella, 2016; Hasson et al., 2000). This provides deep knowledge about the phenomena and more specific items in the quantitative follow-up phase (Harrison, 2013). The Delphi round one consisted of 45–60-minute semi-structured interviews, following an interview protocol tested through three pilots. By adopting a three-round modified Delphi method, common in these studies (Singh et al., 2022), we investigate the social identity mechanisms of consumers within hybrid digital-physical spaces in digital placemaking. Questionnaire rounds use a 5-point Likert scale (von der Gracht, 2012) in Qualtrics.com from ‘strongly agree to ‘strongly disagree (Avella, 2016). We tested the questionnaires with pilot participants to reduce participant fatigue (Singh et al., 2022). We combined open-ended questions and rating scales, and data was checked for errors (Saunders et al., 2007). Only agreed items were carried over (Miller et al., 2020) to reduce completion time. Data collection occurred between March 2023 and March 2024 (see Table 5.1).

Delphi Round	Type of Round	N° of Participants	Timeframe	Purpose
Round One	Semi-Structured Interviews (Qualitative)	26	1/3/2023 – 30/6/2023	Gather information about the topic explored. Identification of dynamics and themes
Round Two	Questionnaire (Quantitative)	23	29/11/2023 – 19/1/2024	Confirmation of findings and determination of level of agreement
Round Three	Questionnaire (Quantitative)	19	12/2/2024 – 5/3/2024	Confirmation of agreement levels to ascertain panel consensus

Table 5.1: Modified Delphi study rounds' description based on Singh et al. (2022).

We confirmed the face validity and reliability of each instrument via expert review and pilot tests (Miller et al., 2020), successive rounds and participant expertise (Hasson et al., 2000). The anonymous nature of the study increases participants freedom (Egffjord & Sund, 2020), and participants data review increases rigour control (Brady, 2015).

5.6.2. Data Interpretation

Interviews were recorded and transcribed, and qualitative data was analysed following the Gioia Method (Magnani & Gioia, 2023). An independent researcher with expertise in interview data analysis re-coded and checked the results to ensure external validity (Sandelowski, 2004). We went through hermeneutical cycles of analysis to identify patterns and relationships, which led us to assign second order themes and high-level aggregations (Figure 5.1). The initial coding was revised amongst the findings. For the questionnaires, we use descriptive statistics to provide information about the distribution of variables, central tendency, and dispersion (de Vaus, 2002) and additional metrics used in Delphi studies (e.g., Chamorro et al., 2012; Schmalz et al., 2021). Across rounds we measured consensus, strength and convergence of opinions (von der Gracht, 2012). We defined agreement as $\geq 70\%$ concurrence among participants (Avella, 2016), combining ratings for agreement (4 = agree and 5 = strongly agree). We calculated the coefficient of variation (CV) (Giannarou & Zervas, 2014) and the stability of response (von der Gracht, 2012), defined as $\leq 15\%$ change as our stopping criteria (von der Gracht, 2012).

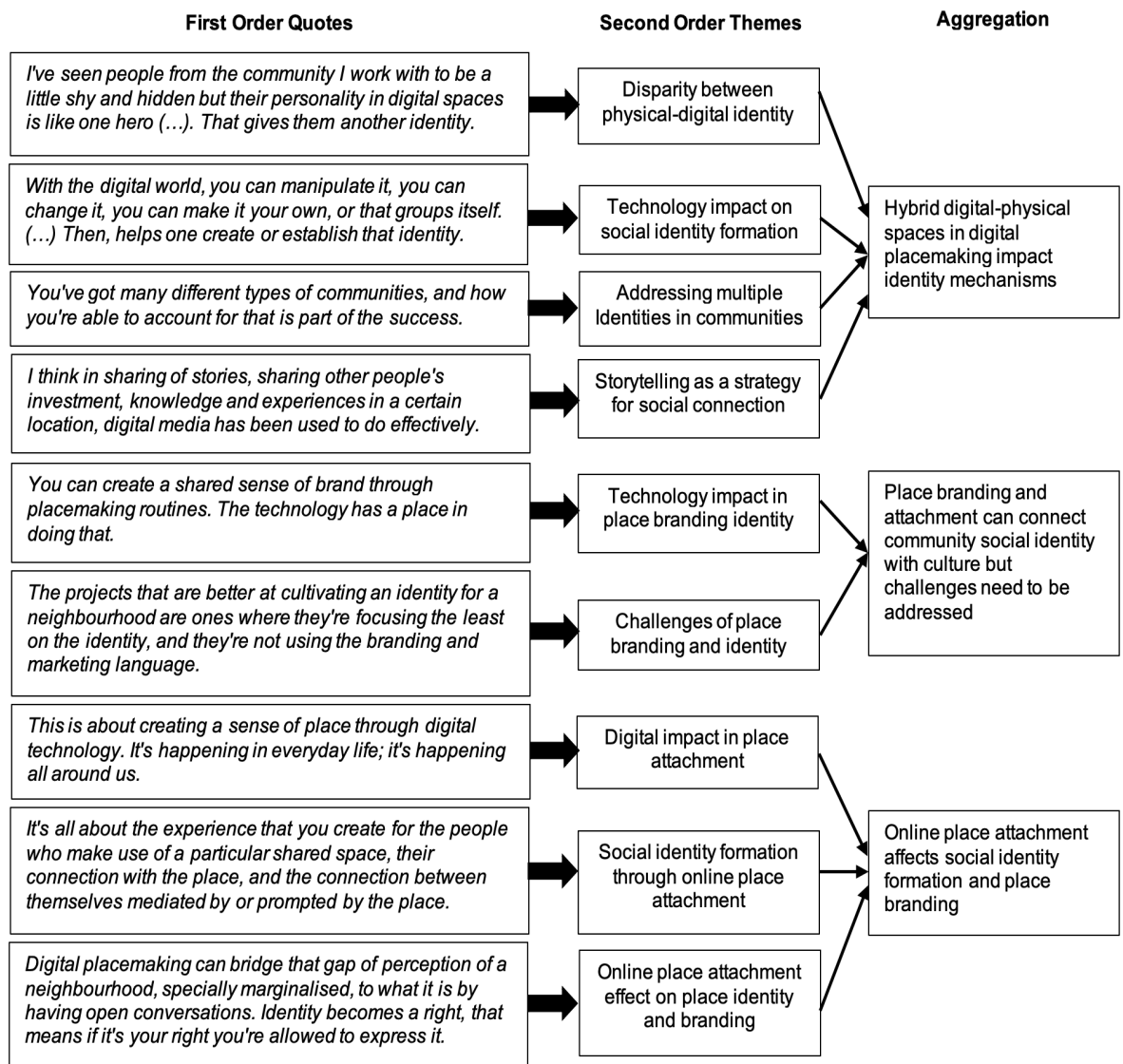


Figure 5.1: Data coding structure following the Gioia Method (Magnani & Gioia, 2023).

5.7. Hybrid Spaces in Digital Placemaking for Social Identity and Place Branding

A total of 26 participants took part in the modified Delphi study, with equal distribution between females (50%) and males (50%). The study aimed to understand consumers' social identity mechanisms in hybrid digital-physical spaces, as enacted in the context of exposure to digital placemaking experiences.

5.7.1. Results of Round One: Semi-Structured Interviews

The aim of this round was to identify the mechanisms involved in digital placemaking on a consumer's identity level, extracting themes related to digital identity, social identity, and digital placemaking. Digital technology was found to be a key element in the development of group identity processes in a community using digital placemaking.

The most important element that permeated all the basic characteristics of digital placemaking was social identity. The analysis of the semi-structured interviews revealed that identity creation was a key aspect of digital placemaking experiences, specifically on a social level. Social identity mechanisms and in-group belonging feelings (Makri et al., 2021; Tajfel & Turner, 1986) were described in different dynamics in digital placemaking during the interviews, demonstrating its role as a binding actor among dynamics and its positive effect. The analysis led to the generation of initial relationships between the hybrid space, social identity formation and place branding (Table 5.2).

	Social Identity Theory	Digital Placemaking	Place Branding	Place Attachment
Hybrid digital-physical spaces in digital placemaking impact identity mechanisms.	<ul style="list-style-type: none"> - Digital interactions affect identity formation. - Shared digital identity is extended to broad communities. - In-group processes can enhance social identity. - Complex social identity is developed to include diversity. - Storytelling helps recategorizing social identity groups and subgroups. 	<ul style="list-style-type: none"> - Disparity between digital and physical identity but no disconnection. - Positive social identity is fostered in hybrid spaces. - Technology in placemaking promotes inclusion of multiple identities. - Storytelling affects identity formation and promotes inclusion. 	<ul style="list-style-type: none"> - Storytelling facilitates community development and branding. 	<ul style="list-style-type: none"> - Storytelling can promote place attachment processes.
Place branding and attachment can connect community social identity with culture, but challenges need to be addressed.	<ul style="list-style-type: none"> - Social groups foster belonging feelings and place brand identity feelings. - Social identity complexity avoids identity reductionism. 	<ul style="list-style-type: none"> - Shift of focus from tourism to local communities in digital placemaking as place branding. 	<ul style="list-style-type: none"> - Memorable hybrid experiences enhance local place brand identity. - Unified/mainstream identities are a risk. 	<ul style="list-style-type: none"> - Shift from analogue tourism to technological implementation in place attachment linked to place branding.
Online place attachment affects social identity formation and place branding.	<ul style="list-style-type: none"> - Social identity acts as a binding agent enhancing belonging processes in hybrid places. 	<ul style="list-style-type: none"> - Community engagement is essential to foster belonging feelings. - Digital placemaking is a medium to foster connections. - Ownership feelings develop through place attachment and branding in digital placemaking. 	<ul style="list-style-type: none"> - Place branding consumers are co-creators. 	<ul style="list-style-type: none"> - Online place attachment needs to consider the significant role of local identities. - The social aspect of place attachment is crucial for its success. - Place attachment and branding help are connecting on a social level to express a community identity, image and brand.

Table 5.2: Round one code analysis.

5.7.1.1. Identity Processes in Hybrid Digital-Physical Spaces in Digital Placemaking

Digital placemaking offers a platform for consumers to interact with hybrid spaces that extend the physical place experience with a digital layer that adds meaning. We reveal hybrid physical-digital spaces, one of the basic characteristics of digital placemaking (Fernandez-Osso Fuentes et al., 2023b), enhance opportunities for community engagement experiences, inclusive practices and fostering place attachment. The hybrid space enact mechanisms that develop the social identity and enhance the other characteristics.

When exploring identity processes involving technological experiences, a common fragmentation of physical and digital identities appears. We found a disparity between the physical and the digital identity when a digital element is introduced in the place experience.

We are sharing, not only physical spaces, but also digital spaces, we are intermingling digital spheres with physical spheres, and those can change very quickly and can be different from person to person. We have this fragmentation of potential physical-digital identities that can be applicable to places but at the same time are detached from it. (Expert 5).

I've seen people from the community I work with to be a little shy and hidden but their personality in digital spaces is like one hero, making reels and claiming that, so they are willing to connect. Because that gives them another identity. (Expanded Expert 9).

Digital identity has commonly been understood as the adaptation of a person's identity into machine-readable data (Camp, 2004; Masiero & Bailur, 2021). Contrary to Masiero and Bailur (2021), we find digital interactions to affect identity formation beyond mere adaptations of physical identity into technological data. A certain level of disparity between the physical identity and the digital identity is found. The digital identity is not a captured in a static process making it immutable (Masiero & Bailur, 2021) but it is a

fluid identity that creates a level of disparity between the physical and the digital identity. They are yet correlated and interconnected. The disparity of identities due to the digital realm (Törnberg, 2022) does not equals to a disconnection. We find the digital to lower barriers for consumers to express freely and show their personalities and identities, advancing previous managerial approaches to digital identity data (Camp, 2004; Masiero & Bailur, 2021).

The identity formation and process enacted through digital placemaking is socially focused. Scholars approach identity in placemaking from a place identity angle (e.g., Hespanhol, 2022) with a focus on the individual effects. Recent studies have referred to building social identity (Kotus et al., 2022; Sacramento et al., 2022; Törnberg, 2022). We found the basic characteristic of community engagement highly linked to the social identity process in digital placemaking. The communal identity process is digitally expanded and enhanced. Place consumers can develop their digital identity, affecting the social identity too.

I think we have the opportunity to expand that identity or mutual identity, from the actual physical place that prompts it to other locations. To allow people to carry their identity with them, virtually, for example, or through technology and continue to be connected to the place even though they're no longer physically there. (Expert 5)

Some things happened and this WhatsApp group has been able to really galvanise them and coalesce them together. Their individual identities have now become, in this particular slice of their life, this group identity (...). They will anchor to that community garden and people know to go to them as well. It's just a WhatsApp group, but that WhatsApp group was really key to identity. (Expanded Expert 4).

When you use, for example, social media to describe your life, (...) you are identifying or you are creating an identity of yourself, but also your circle of people, in which you are interacting with because that's the important part. Social media is not an act of saying something. There is the community around it because you can comment, you can retweet, you can have in exchange information. It's not an individual process. It's a social process. This is also something that helps people to identify themselves as a part of a group. (Expanded Expert 16).

Digital placemaking can enhance and reframe a community's social identity concerning the place through a hybrid experience, which affects the place identity and the community digital identity. As predicted by Bouncken and Barwinski (2021), the shared digital identity concept that applies Social Identity Theory (Tajfel & Turner, 1986), technology usage can be a marker to foster group processes and in-group belonging. We extend their contribution shifting the role of technology from an audience identifier to a hybrid space for a broad community. These digital identity mechanisms allow consumers to modify, create and adapt their identity in the place and the digital world (Carrozzi et al., 2019; Çöteli, 2019; Hauge, 2007). We support the theoretical proposition that technology can foster place identity and act as a community builder (Harner et al., 2017), cultivating sense of group belonging identity (Makri et al., 2021; Tajfel & Turner, 1986). Scant studies allude to social identity in analogue placemaking (Kotus et al., 2022; Sacramento et al., 2022) and the negative effect of technology (Törnberg, 2022). We diverge from these studies to describe the key role of digital placemaking in the formation of the social identity in a place. The group membership developed through digital placemaking is internalised generating a social identity where the place consumers' self-concept is part of it (Heath et al., 2017; Tajfel, 1978). The identity mechanisms enacted through digital placemaking are social, where technology in the place experiences is key.

One of the key challenges when fostering the social identity of a community and a place resides in the inclusion of all identities that form them. Inclusion is a basic characteristic of digital placemaking (Fernandez-Osso Fuentes et al., 2023b). We describe how multiple identities being addressed in digital placemaking is a success factor.

You have clashes between age groups and ethnic groups, (...) you've got many different types of communities, and how you're able to account for that, I think, is part of the success. (Expert 9).

One of the big ones, which isn't a surprise, place is polysemic. People use and think about place as serving different functions in their lives, they imagine it to be

in certain ways. (...) I think one of the challenges is understanding what those different visions, different needs, different desires and different histories are of a given place and trying to do something that celebrates all of them if that's your goal. (Expert 1).

Often in placemaking, there is this notion that is community-driven and is for the community, but actually, to add these inclusive lenses is a question of, who is the community? The community is not a homogeneous group. (...) Always in this space, there are people, it's not that there is no one, but who are the people? Maybe drug addicts, alcoholics, poor people, homeless... These are also citizens for whom we are working. We need as well to always counterbalance these inclusionary and exclusionary effects that are produced and reproduced. (Expanded Expert 2)

A key success factor for the digital placemaking experience and the social identity mechanisms enacted is the consideration of the diversity in the community. The novelty of this approach to inclusion in digital placemaking resides in the need to account for the multitude of identities in a community. The social identity fostered is not homogenous but diverse. Following Social Identity Theory in-group and out-group processes (Terry, 2003), counternarratives and underrepresented groups of the community can benefit from placemaking experiences involving some level of technology (e.g., Gonsalves et al., 2024). Digital technology can adapt to different inclusion and diversity needs of the space and the community (Szaszák & Kecskés, 2020) and should face the problem of developing only one cohesive identity through digital placemaking (Maciej, 2024). The exploration of digital placemaking celebrating diverse identities has been overlooked. The social identity that respect the diverse identities in a group does not aim to drastically change the identity status of group members to meet the dominant group but to enhance it through subgroup dynamics (Terry, 2003). The dynamics of subgroups in the social identity means they will find a space to express themselves and take ownership of their narrative. Thus, our understanding of social identity in digital placemaking is considered 'complex' as it is associated with tolerance and diversity (Crisp, 2010). We emphasise

the unique development of a social identity through digital placemaking that can be diverse and inclusive to all members to succeed.

In this context, the implementation of storytelling as a strategy in digital placemaking can benefit the formation of a social identity, acting as a mediator that clarifies the process of digital placemaking connecting it to the place and the community since it fosters inclusion and ownership between the place and the community through community experiences.

I think in sharing of stories, sharing other people's investment, knowledge and experiences in a certain location, digital media has been used to do effectively. People could point to certain social media, almost like hashtag activism projects, to also say "Oh, look, this created a sense a feeling of belonging for me, here to see other people who looked like me interact with this space in a way, similar way as me" or this idea of the ritualised, iconic landmarks that I see on social media, and I can say 'Oh, I've been there, and I take a picture of myself there, I feel maybe a sense of belonging, because I'm tapping into this ritual of travel to certain locations'. (Expert 1).

The things that happen, either in digital or physical are always human things. Because you must live those things. People need to relate either to digital or physical in the same way, at the end. They live experience and then they share the experience. Once they share this experience, in my case the trip, then the place has an identity. It's built from the memories of people. (Expert 2).

We found community storytelling to be a mediator that can help build a social identity in a place. Sharing place experiences through digital storytelling facilitates community development (Hudak, 2019), fostering belonging with others and with the place (Gonsalves et al., 2024; Hurley, 2023; Naji & Rzeszewski, 2022). Sharing group narratives of the place can help individuals identify themselves with the group they are members, where both storytelling and community belonging act as mediators, fostering social identity mechanisms (Makri et al., 2021; Tajfel & Turner, 1986). Alluding to the concept of categorization in relation to social identity by Terry (2003), storytelling and community belonging mediate recategorizations to reduce in-group bias among

subgroups. We indicate that storytelling can address and highlight the multiple identities of a community, forming a collective feeling of belonging with the group and with the place through interactions with the narratives that arise within the community.

5.7.1.2. *Place Branding approach to Social Identity in Digital Placemaking*

Despite its main tourism focus when combining digital placemaking (Sugangga et al., 2021) and place management and branding (Keegan, 2021), our analysis of results found a clear connection through the role of digital technology in place branding and social identity.

You can create a shared sense of brand through placemaking routines. The technology has a place in doing that. That's the whole other side of technology too, which is all of the sharing and social media and Facebook groups where you can be sharing info about that stuff. (Expanded Expert 14).

If we want to talk about brands, at the moment that we live now, no brand can be developed and promoted without the digital means and digital platforms and media. Towards the goal of brand identity and brand creation of a place, if digital means and media could be integrated from the very, very beginning, so they are part of the brand creation, and not just tools that they promote the brand, this brand will be stronger. (Expanded Expert 8).

Digital placemaking can create a shared sense of brand in a place in the current digital landscape. The hybrid space should be a key part in place branding to ensure the place brand identity process is strengthened and connected with the community. Our results are consistent with Social Identity Theory, which emphasises the role of social groups fostering consumers' sense of belonging to them (Makri et al., 2021; Tajfel & Turner, 1986). The digital dimension is important in developing this social brand identity in the place, with group belonging feelings as a mediator. Prior studies exploring attachment feelings in place branding and tourism (e.g., Dandotiya & Aggarwal, 2023) have not accounted for the role of technology. We reveal the bond between place branding and digital placemaking to enhance the place brand identity and formation through

memorable experiences (Kavaratzis & Florek, 2021) to enrich the identity and local culture of a place (Aitken & Campelo, 2011).

When combining place branding with social identity, negative views and critics on the use of marketing to foster identity can be found, as one of our experts points out:

Place branding is not the same thing as identity. Because so many Western cultures in particular are so dominated by marketing. It's very much about the image. And centralised media, like Instagram, and TikTok have kind of made it worse the whole idea of a personal brand. It's so reductionary, because a brand is not culture. Culture is so much deeper and more than the image (...) I've haven't seen a lot of good things come out of place branding. And I feel that the projects that are better at cultivating an identity for a neighbourhood are ones where they're focusing the least on the identity, and they're not using the branding and marketing language. (Expert 6).

The consideration of the risks and challenges of place branding is essential in any project. Despite known benefits such as community empowerment or community wellbeing improvement from participatory place branding and digital technology (Hudak, 2019), the social identity should address multiple group membership in a community. We advance Hudak's investigation by presenting the community belonging to subgroups as a mediator for social identity in digital placemaking. Alluding to Crips (2010) social identity complexity and Terry (2003) multiple in-group and subgroup membership, digital placemaking hybris space can avoid the reductionist approach to one social identity, advancing place branding outcomes.

5.7.1.3. Online Place Attachment effects on Social Identity through Digital

Placemaking

Since sense of place attachment is a core characteristic of digital placemaking, we describe three inherent connections. First, the value of digital and online tools to foster place attachment. Online place attachment is a consequence of the current technological

evolution in cities, and the concept needs to consider the evolution of technology usage in consumers nowadays. The impact of technology use to explore and engage with the environments affects the process of place attachment connected with others in the place.

Well, actually, this is about creating a sense of place through digital technology. It's happening in everyday life, it's happening all around us, in cities around the world and places around the world, and how there's differential power structures that intervene in the making of place, and we really have to pay attention to that. (Expert 1).

I always think about that as a digital placemaking, how we learn to connect to our environment, by seeing what others have seen, and also being able to give information about what we have seen. (Expert 4).

Limited research has deepened the understanding of online place attachment, describing its significant role in local identity (Schwartz, 2015), societal wellbeing (Huang et al., 2022), community cohesion (Harner et al., 2017), and the role of digital technology in place attachment (Birnbaum et al., 2021; Rutha & Abbas, 2021). Despite the principal role that technology plays in daily interactions with the space, studies have overlooked this concept. We suggest considering digital technology when aiming to foster place attachment in a community, as this tool is already part of consumers' daily interactions with the place and others. The role of other consumers foster place attachment and belonging (Scannell & Gifford, 2017).

Second, when looking at the effects of online place attachment, we describe the promotion of group belonging feelings and place attachment processes in the hybrid space. This new hybrid environment, which combines online and offline elements, provides new opportunities to broaden the impact of place attachment on a social level.

I think there's a lot of opportunities, when you think about how digital media can help people feel like they belong, and they feel safe versus emotional belonging, but also physical and emotional safety. (Expert 4).

When you have the freedom of yourself changing where you are, and your digital environment, and everyone has the possibility of changing it. Then they can change collectively, and this can be transformed into a place of belonging and

ownership. It's a lot about democracy. It's a lot about getting the correct tools to transform and to change yourself by changing where you are. If there's that capacity of changing where you are from everyone, then there is this capacity of also create collectiveness, community belonging, ownership. I think we are far away from this. (Expanded Expert 7).

I think you can't escape the fact that whatever you do, it's not really about the technology, it's really about the connection between people in place, I think that's the essential aspect (...). It's all about the experience that you create for the people who make use of a particular shared space, their connection with the place, and the connection between themselves mediated by or prompted by the place. In order to make any new effort successful, that has to stay as a core. (Expert 5).

Place attachment is formed by individual and collective elements (e.g., Scannell & Gifford, 2010a), but we reveal how digital mediation of place attachment fosters community belonging and sense of place. A focus on the social aspect of identity is clear, beyond mere individual identity effects. This advances the traditional individual focus on place attachment (Lewicka, 2011), by shifting the interest to the social dimension of the identity mechanisms. Digital placemaking technology is a medium to achieve a goal, to foster connections with others and with the place. Previous studies have implemented social identity to advance online consumers' identification with a social media influencer (Abell & Biswas, 2023). However, the community engagement basic characteristic of digital placemaking speaks directly to the social aspect of place attachment, ensuring the experience fosters connection with the place and with the people in the place as a whole. The community belonging feeling acts as a mediator to explain the social identity enacted in digital placemaking. Scholars explored the digital impact in place attachment and social needs and wellbeing benefit (Birnbaum et al., 2021; Huang et al., 2022; Rutha & Abbas, 2021). We advance Dai and Liu (2024) digital sense of place, which cultivates identity and belonging, by focusing on the application of Social Identity Theory to understand how the communal identity acts as a binding agent that enhances place attachment processes in hybrid physical-digital spaces. Social identity enacts mechanisms that

facilitate social processes, emphasising the interactions between people, technology and place.

Third, online place attachment through digital placemaking can affect the community identity development. The online element brought by digital placemaking affects the representation of the community and its members, their culture, and their place. We confirm online place attachment's impact on the place identity, image, and brand through the use of digital technology by the consumer, who has an active role.

Your address is such a big part of your identity at that point. (...) When I engaged with the youth, they were openly talking about how they want to change it [their place identity], this identity is a perceived identity. There is an identity of what they think they are, and what the city thinks they are. I feel digital placemaking can bridge that gap of perception of a neighbourhood, specially marginalised, to what it is by having open conversations. Identity becomes a right, that means if it's your right you're allowed to express it, it's your fundamental citizens freedom to talk about it. If digital placemaking can look at it like that, more collective voices can be heard. (Expanded Expert 9).

People were using digital technologies to celebrate their sense of place, to make their community sense of place more visible to the world, to say "this place matters, it doesn't just matter to us, but it should matter to you, and you don't have to come in and change it, there's certain things that we're doing and we can change ourselves". It's very much like right to the city in digital placemaking. (Expert 1).

The identity of a place that exists can be modified by the locals through digital placemaking. We find online place attachment strongly linked to place branding as a way of expressing a community view and identity, sharing the place image and building a place brand. This can create feelings of belonging between the community and the place (Reitsamer & Brunner-Sperdin, 2021). The hybrid space in digital placemaking can help the community to take ownership of their place identity and develop a stronger place attachment. It mediates communities interacting and sharing their identity. The place consumer role in the experience is shifted to a proactive and co-creative role, where they

are producers of the place identity and brand (Aitken & Campelo, 2011; Kavaratzis & Florek, 2021), which is highly linked to the development of online place attachment and belonging feelings with the place. Huang et al. (2022) describe the managerial implications of the online engagement of students that can influence place attachment, social interactions, place bonding, and belonging to the brand of the place. We extend their work by connecting online place attachment and place branding to a social scale in digital placemaking. The social identity fostered in the digital placemaking experience can enhance the self-esteem of group members (Haslam et al., 2009) while connecting culture and digital media (Çöteli, 2019).

This connection between place attachment and place branding is crucial in digital placemaking. Communities can claim the place image, identity, and brand, modify them, and communicate them in a way that feels truthful and personal through digital tools. Shih et al. (2021) defend the involvement of the local community in digital placemaking processes that affect identity formation, which is essential for belonging with the place. We advance this by exploring the social identity mechanism in digital placemaking, finding interlinks between place attachment, place branding and social identity. Drawing on Social Identity Theory group belonging and identity mechanisms (Hornsey, 2008; Makri et al., 2021; Tajfel & Turner, 1986), we find digital placemaking to act as an enhancer of these dynamics by incorporating digital media as a tool to enhance identity processes linked to the place, to oneself and to the community.

5.7.2. Results of Round Two and Three: Questionnaires

Round one was analysed and informed the creation of the following rounds. The analysis of the round two questionnaire informed the creation of the round three questionnaire, where only agreed items were carried over (Miller et al., 2020). Questionnaires were sent to all participants of the first round (n = 26) asking them to only fill it in if they had

participated in the previous round. Round two registered twenty-three responses (88.46%) and round three registered nineteen responses (73.08%). For this study, only items related to the research question explored in this investigation are considered (Table 5.3). Means were shared for each item in round three to inform about the group response, including a 'N/A' option next to the Likert scale following some of the participants' comments from round two.

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Round Two (n=23)						Round Three (n=19)					
Item Category	Item	Mean	SD	Median	IQR	Agreement %	Mean	SD	Median	IQR	Agreement %
Characteristics of digital placemaking	Digital placemaking creates a place for people to connect with each other	3.43	0.77	3.00	1.00	43.50	0	0	0	0	0
Characteristics of digital placemaking	Creating a sense of identity in the group is a key characteristic of digital placemaking	3.57	0.77	4.00	1.00	56.50	0	0	0	0	0
Challenges of digital placemaking	How to address multiple identity communities is a challenge to digital placemaking	3.96	0.751	4.00	0.00	78.20*	3.79	1.004	4	2.50	68.40
Place Attachment	A place's identity is built through shared experiences and the digital can help with it	4.13	0.536	4.00	0.00	91.30*	4.11	0.852	4	3.00	89.50*
Place Attachment	Communities have multiple identities	4.65	0.476	5.00	1.00	100.00*	4.79	0.521	5	2.00	94.70*
Place Attachment	Digital placemaking allows people to carry their identity even though they are no longer physically there	3.96	0.624	4.00	0.00	78.30*	3.84	1.182	4	4.00	68.40
Place Branding	Digital placemaking creates a shared sense of place image and brand	3.65	0.633	4.00	1.00	56.50	0	0	0	0	0
Place Branding	Place branding can use digital placemaking to communicate stories of a place	4.13	0.612	4.00	0.50	87.00*	4.37	0.482	4	1.00	100.00*
St Place Branding	Social media creates a space for people to share and build a place brand image	3.91	0.717	4.00	1.00	69.50	0	0	0	0	0
Place Branding	Digital placemaking can have a negative impact in perpetuating the image of a place	3.43	0.77	4.00	1.00	52.10	0	0	0	0	0

Table 5.3: Modified Delphi round two and three results.

Notes: * indicates the $\geq 70\%$ agreement among participants is achieved (Avella, 2016).

Round two included ten items related to identity, from which five achieved a agreement (Avella, 2016). The multiple identities found in the previous round can face the risk of exclusion in the experience (78,2%). This item met our agreement criteria despite resulting in a mean of 3.96, which presents a slight dispersion of responses. Similarly, digital placemaking is agreed to allow people to carry their identity with no physical barriers (78.3%) while presenting a mean of 3.96. Participants agreed place identity is built through shared experiences (91.3%) and for communities to have multiple identities (100%). Exploring place branding, only one item achieved over 70% agreement, in which it can communicate stories about a place (87%). Regarding the analysis of the free-form comment sections in the questionnaire, no comments related to items on identity since they confirmed participant's choice.

Round three included the five agreed items, from which three achieved consensus. Participants consider a place identity built through shared experiences with the help of digital tools (89.5%) and communities to have multiple identities. In this round, this item only achieved 94.7% agreement compared to 100% in the previous round. Participants achieved consensus on the consideration of place branding to use digital placemaking to communicate stories of a place (100%). Free-form comments analysis presented no notable aspects.

5.7.2.1. Consensus Agreement (Rounds One, Two and Three).

Regarding the stability of response, items present a low variation of stability (Table 5.4), which is aligned with the consensual agreement found and described and with the dispersion of responses. Stability of response criteria is met we stopped after the third round of the study.

Item Category	Item	CV	Frequency Variance
Challenges of digital placemaking	How to address multiple identity communities is a challenge to digital placemaking (mean=3,96)	0.08	-9,80
Place Attachment	A place's identity is built through shared experiences and the digital can help with it (mean=4,13)	0.08	-1,80
Place Attachment	Communities have multiple identities (mean=4,65)	0.01	-5,30
Place Attachment	Digital placemaking allows people to carry their identity even though they are no longer physically there (mean=3,96)	0.15	-9,90
Place Branding	Place branding can use digital placemaking to communicate stories of a place (mean=4,13)	-0.04	13,00

Table 5.4: Comparative analysis of the stability of variation of the modified Delphi items.

Therefore, consensus was achieved in three items (Table 5.5):

Item Category	Item
Place Attachment	A place's identity is built through shared experiences and the digital can help with it
Place Attachment	Communities have multiple identities
Place Branding	Place branding can use digital placemaking to communicate stories of a place

Table 5.5: Final consensus items from all modified Delphi rounds.

5.8. Discussion

5.8.1. Summary of Key Findings

Our modified Delphi study offers the first consensual approach to the concept of digital placemaking involving customer identity dynamics. Digital placemaking is a significant driver for enacting unique identity mechanisms in hybrid physical-digital spaces. Through a Social Identity Theory lens, interactions of place consumers in the hybrid space experience build a stronger attachment to place, evoking feelings of belonging to a community, also considering different subgroups to reflect their diversity. Thus, storytelling and community belonging act as mediators explaining the social identity

mechanisms activated and reinforcing them reducing in-group bias towards diversity. Our results advance knowledge on place branding uses of digital placemaking by examining social identity processes, achieving consensus on three statements: a place's identity is built through shared experiences and the digital can help with it, communities have multiple identities, and place branding can use digital placemaking to communicate stories of a place. In addition, we reveal that digital placemaking as a place branding strategy can enact identity mechanisms to develop the social identity of a community. Our results inform the 'hybrid space model of digital placemaking and social identity in place branding', which extend existing theories by demonstrating that digital placemaking helps build social identity in a place using place branding strategies such as storytelling.

5.8.2. The Hybrid Space Model of Social Identity in Digital Placemaking and Place Branding

Identifying the different identity mechanisms enacted through digital placemaking enables us to explain why the incorporation of digital tools in place experiences can strengthen the dynamics involved, enhancing place branding and attachment, and fostering social identity in the community. These mechanisms are explained in the proposed hybrid space model of digital placemaking and social identity in place branding (Figure 5.2).

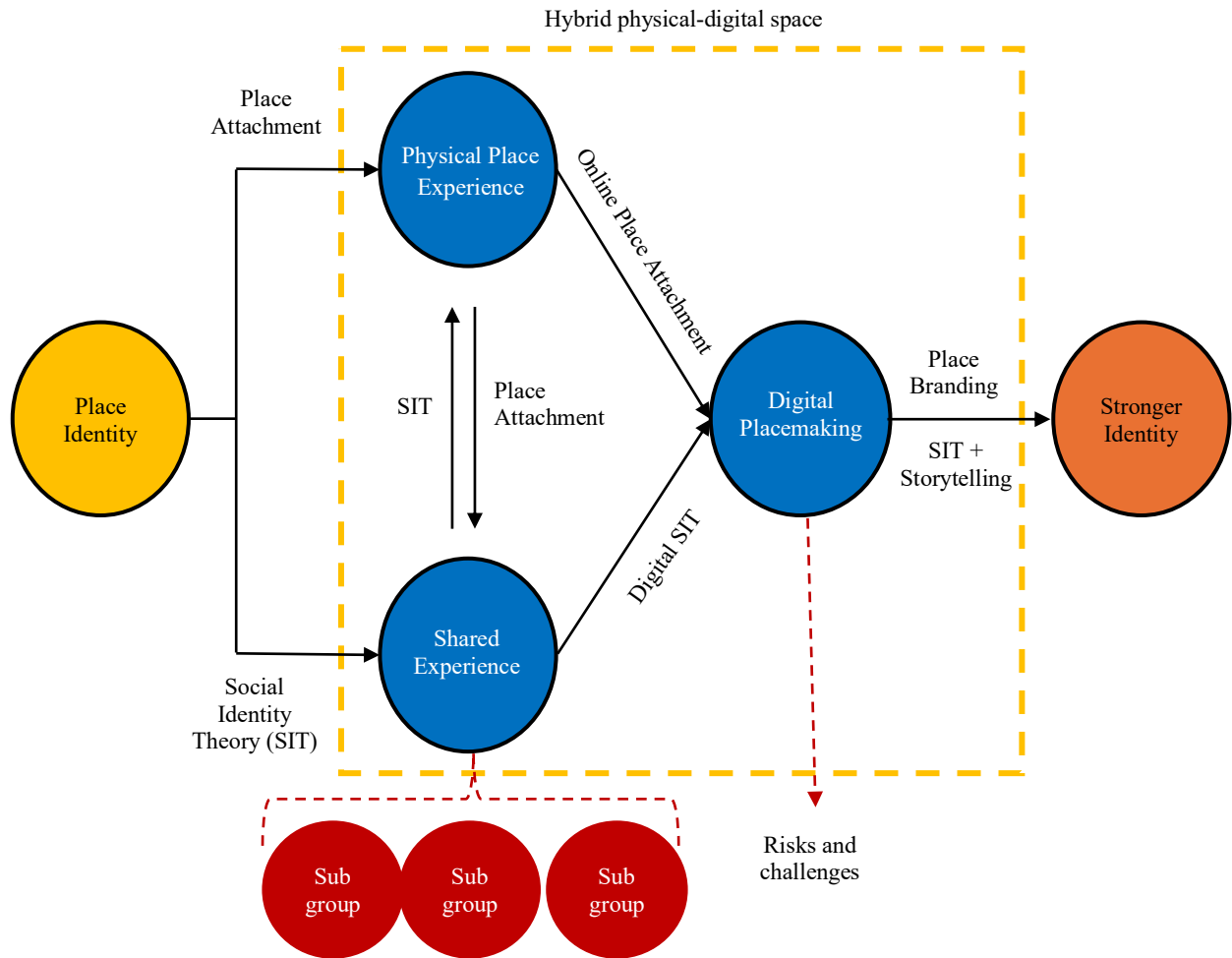


Figure 5.2: Hybrid Space Model of Social Identity in Digital Placemaking and Place Branding.

5.8.2.1. The Place Identity Formation

Place identity is understood as a process of interactions with places that develops feelings of belonging to a specific place (Hernández et al., 2007), which leads to incorporating the place into an individual self-concept (Hauge, 2007; Proshansky, 1978). In this process, we differentiate the physical place experience, through which the place identity is developed, and the shared experience in the place. The physical place experience fosters place attachment processes, considered a part of place identity (Hauge, 2007). Moreover, Hauge (2007) understands the influence of place on identity as a reciprocal process

between people and the physical environment, which leads us to ensure the social aspect is not overlooked. On the contrary, people develop a social identity that refers to belonging to certain social groups along with the emotions and values this conveys in them (Tajfel, 1978). Social Identity Theory also provides information on in-group dynamics with people we feel similar to, and outgroup alluding to dissimilarities (Tajfel, 1978; Tajfel & Turner, 1986). In the context of place identity, a place is also understood as a social identity (Hauge, 2007), and the interactions among people in the place influence the formation of the social and the place identity. Both the physical experience and the shared experience influence each other's identity formation.

5.8.2.2. Hybrid Physical-Digital Space Impact on Identity Mechanisms

Our participants described how the current digital landscape has an impact on the process of the identity of a place, which we advance in our model by the incorporation of a hybrid physical-digital space created through digital placemaking. The digital layer of meaning (Hespanhol, 2022) enhances the current mechanism described in a place identity formation (Çöteli, 2019; Harner et al., 2017). Digital placemaking creates a unique environment where physical and digital spaces collide and contribute, in hybrid spaces. The hybrid space is formed through digital placemaking by the physical place experience and the shared experience, fostering online place attachment (Halegoua & Polson, 2021; Harner et al., 2017) and social identity processes (Kotus et al., 2022; Sacramento et al., 2022; Törnberg, 2022) respectively.

Online place attachment is fostered through digital placemaking as the experience should promote a sense of place attachment (Halegoua & Polson, 2021). The digital layer of meaning can enhance belonging feelings with the place, which we find to act as a mediator in identity interactions for community cohesion (Harner et al., 2017; Schwartz, 2015). Digital media promote identity mechanisms when is employed to enhance

attachment feeling with the place and with others creating a hybrid sense of place (Dai & Liu, 2024).

We found the identity formation and process fostered in digital placemaking are socially focused due to the community engagement characteristic of the concept. The digital media employed in digital placemaking can enhance and reframe a community's social identity concerning the place, affecting the place identity but also their digital social identity (Çöteli, 2019). A shared digital identity (Bouncken & Barwinski, 2021) is fostered in digital placemaking to broad communities in a place. This is due to the interconnection between the physical and the digital identity, which are not autonomous but related through the hybrid space and should not exclude community members. Therefore, the positive effects of hybrid physical-digital spaces can foster in-group mechanisms and generate a social identity where the place is part of the consumers' self-concept (Heath et al., 2017; Makri et al., 2021; Tajfel, 1978).

However, to ensure that digital placemaking complies with its basic characteristic of inclusion, the multitude of identities that formed the place community should be accounted for, avoiding one cohesive identity through the concept (Maciej, 2024). To do so, drawing on Social Identity Theory, in-group and out-group processes should be considered, and the digital social identity should be enhanced through subgroup dynamics (Terry, 2003) empowering tolerance and diversity (Crisp, 2010).

The potential effects of the digital evolution of place attachment in the physical place experience are enhanced by digital placemaking's hybrid physical-digital space (Rutha & Abbas, 2021). Similarly, the shared experience developed in the hybrid place experience is understood through the lens of Social Identity Theory, which posits the influence of group dynamics in identity processes (Makri et al., 2021; Tajfel, 1978). Our study advances the extensive research on physical place identity (e.g., Hernández et al., 2007)

and the managerial approach to digital identity (e.g., Masiero & Bailur, 2021) by addressing the remaining critical gap in understanding how these identities interact in hybrid spaces. We extend the concept of shared digital identity (Bouncken & Barwinski, 2021) by describing how digital placemaking can enhance and reframe a community's social identity.

5.8.2.3. Strength of Identity through Digital Placemaking Place Branding Strategies

The creation of a hybrid physical-digital space acts as an enhancer of the identity mechanisms, where social identity is found as a binding actor in both the physical place experience and the shared experience. The hybrid space, created through digital placemaking, is addressed from place branding as it can enhance the place branding identity creation process connected with the community. Attachment feelings in branding explored from Social Identity Theory are shown to affect the place identity, dependence and social bonding (Dandotiya & Aggarwal, 2023), promoting psychological ownership (Carrozzi et al., 2019). In our model, the hybrid space in digital placemaking opens new possibilities for enhancing the place brand identity and creation focusing on memorable experiences (Kavaratzis & Florek, 2021) and strengthening the identity and local culture of a place (Aitken & Campelo, 2011) due to the community engagement, inclusion and sense of place fostered (Fernandez-Osso Fuentes et al., 2023b).

We found online place attachment fostered through digital placemaking to be strongly linked to place branding as a way to share the community of a place's identity, image and brand. The experience brought by digital placemaking can help the community take ownership of their place identity and develop stronger place attachments. Online engagement of community members of a place can influence place attachment and foster social interactions and belonging to the place brand (Huang et al., 2022). This interconnection between online place attachment and place branding through digital

placemaking can enhance the self-esteem of group members (Haslam et al., 2009) connecting the community social identity in the place with culture and digital media (Çöteli, 2019).

In our model, storytelling is a mediator employed as a place branding strategy in digital placemaking, which is a common strategy in interactive marketing and branding (Grigsby & Mellema, 2020; Stoica et al., 2022). Community storytelling through digital placemaking can enhance different Social Identity Theory components (Crespo et al., 2023), enacting a communal sense of identity in place branding and community development (Hudak, 2019), while fostering belonging feelings with others in the place (Gonsalves et al., 2024). Specifically, storytelling in digital placemaking promotes sharing narratives of the place that can help individuals' identity to develop in-group identification and social identity (Makri et al., 2021; Tajfel & Turner, 1986), while reducing in-group bias among subgroups (Terry, 2003). This is due to the role of inclusion in digital placemaking but different challenges and risks of this implementation needs addressing.

Therefore, the overall impact of digital placemaking as a place branding strategy in identity mechanism resides in the enhancement of social dynamics that affect the development of the community social identity and their attachment feelings to the place. The patterns found in our study align with the core tenets of Social Identity Theory group belonging and identity mechanisms (Makri et al., 2021; Tajfel & Turner, 1986), where digital placemaking act as an enhancer of these dynamics by incorporating digital media as a tool to foster identity processes linked to the place, to oneself and to the community. Our findings describing positive effects of hybrid spaces in community social identity mechanisms challenges previous studies on digital placemaking's social identity (Kotus et al., 2022; Törnberg, 2022).

5.8.3. Theoretical Contributions and Future Research Directions

Digital technology is a key element in the development of group identity processes in hybrid spaces. Prior frameworks on digital placemaking have not addressed the generation of a social identity fostered through the hybrid physical-digital space. We have developed a pioneer model that is premised on the role of hybrid spaces through digital placemaking in place branding. Using Social Identity Theory as a framework to understand the role of group belonging and identity mechanisms (Crisp, 2010; Makri et al., 2021; Tajfel & Turner, 1986) in digital placemaking and place branding, we propose a model to explain the significant role of hybrid physical-digital spaces in consumers' physical place identity and digital identity mechanisms. The model advocates for a unique set of relationships fostered in the hybrid space that helps consumers develop online place attachment and digital social identity through digital placemaking's place branding strategies. This unique theoretical contribution advanced knowledge on digital placemaking and place branding by connecting the community identity created with Social Identity Theory.

While previous studies have explored place identity in placemaking (e.g., Soedarsono et al., 2021), and place culture and identity development through branding (Wang, 2019), only recently social identity has been explored in placemaking processes (Kotus et al., 2022; Sacramento et al., 2022; Törnberg, 2022). However, these social identity processes are mainly described in analogue experiences and only describing negative effects when involving digital media. The understanding of how this social identity developed through digital placemaking is fostered in the hybrid spaces is still unknown. Our investigation challenges previous studies through an innovative understanding of how digital placemaking develops social identity, which acts as a binding agent among place attachment and place branding. Our model represents a unique contribution since no

studies to date have produced an overarching framework that combines digital placemaking and Social Identity Theory to permeate the dynamics involved in the experience, with storytelling and community belonging as mediators. Specifically, we broaden studies of technology and interactive marketing (Abell & Biswas, 2023; Ashworth et al., 2015; Carrozzi et al., 2019) by advancing knowledge in terms of an in-depth understanding of belonging processes in digital placemaking, asserting the importance of social identity. We describe a digital dimension of social identity where the hybrid environment affects the creation and modification of the social identity in place and digitally. The Social Identity Theory lens to digital placemaking is an pioneer angle that acts as a binding agent enhancing place attachment and branding.

Studies have explored the development of social identity in analogue contexts (e.g., Mackay et al., 2021). Only Çöteli (2019) describes the transformation of an individual to a digital social identity thanks to the new types of social relationships created in social media, which allows the individual to reconstruct their real-life identity by adding new qualities. Similarly, Bouncken and Barwinski (2021) introduce the concept of shared digital identity as the collective self-concept of an in-group towards the use of digital technology and how this use creates feelings of community belonging. In this case, Social Identity Theory is addressed to understand group membership dynamics and how social identification works in family firms with technology users. We extend these studies by bringing social identification processes outside of technology-only groups and social media platforms to a broader community through hybrid environments. We are the first to apply Social Identity Theory to hybrid physical-digital spaces, where technology is used as a tool to create social identification in diverse groups and storytelling and community belonging are mediators in these relationships.

One of the principal problems regarding digital tools and identity mechanisms is the development of individual and collective identities and placemaking practices that are homogenised (Özkul, 2021). Maciej (2024) states the problem of developing one cohesive identity through digital placemaking practices. Extending Szaszák and Kecskés (2020) study encouraging the use of digital technologies for accessibility and inclusion needs of the space and the community to support placemaking and strengthen identity, we suggest the innovative role of storytelling and community belonging as mediators for place branding and digital placemaking. These mediators create boundary conditions that question the traditional views of social identity as one cohesive identity (Maciej, 2024; Özkul, 2021). We extend this by addressing the social identity complexity and inclusion of multiple in-group memberships via subgroups (Crisp, 2010; Terry, 2003), explaining why diversity has positive effects on tolerance (Crisp, 2010; Roccas & Brewer, 2002). Our study and model specifically address diverse identities in a group from a Social Identity Theory perspective, where the identities are not aimed to drastically change their social identity status, but to enhance the social identity through subgroup dynamics (Terry, 2003). The development of social identity in digital placemaking should be diverse, heterogeneous and inclusive.

Future research could explore the implications of digital placemaking as a place branding strategy in diverse cultural and geographical contexts in specific case studies, where the conceptual model presented can be further tested with place consumers. Specific investigation of the metrics and analysis involved in the impact of digital placemaking and its place branding outcomes could be investigated in future studies. Finally, subgroup dynamics could be explored in future research investigating inclusivity and in-group biases to celebrate community diversity in different hybrid scenarios.

5.8.4. Practical Implications

The practical implications of our study reside in the unique contributions of the proposed hybrid model, which provides a foundation for strategy and analysis of digital placemaking's hybrid physical-digital spaces and social identity development. Marketers and practitioners in digital placemaking, place branding and management experts can benefit from our findings in various ways. Our research offers an interdisciplinary model valuable for interactive marketing, technology and urban design studies. The insights we share in this investigation are relevant to professionals seeking to integrate the physical-digital realms to enhance social identity, cohesion and branding effectiveness.

First, the results of the modified Delphi method conclude in three consensual items among all participants, which demonstrates the potential implementation of digital placemaking to foster social identity in hybrid spaces, the importance of respecting and considering the multiple identities in a community, and the use of place branding storytelling through digital placemaking. These three consensual items are key aspects that will help to ensure the success of the experience. Placemakers, interactive marketing strategists, place managers and place branding experts can rely on our results to implement storytelling to help build the social identity of a place through technology while celebrating multiple identities in the space.

Second, our results help address potential challenges and curate a set of simple guidelines for mitigating risks in digital placemaking experiences. Preventing homogenisation of the social identity is essential to ensure communities' multiple identities are considered and respected. This can be implemented by monitoring the digital placemaking experience ensuring it celebrates diversity of identities and subgroups, providing them a platform for representation while fostering tolerance and understanding. Finally, other negative

impacts need regular assessment to mitigate the potential harms of digital tools in place experience for communities.

Third, the model presents a framework to enhance social identity mechanisms in hybrid physical-digital spaces as a place branding strategy. It provides key elements to take into account while showcasing the mechanisms' potential effects. The model can act as a blueprint for managers and practitioners in related fields to enhance the social identity, cohesion and empowerment of a community using digital placemaking.

5.9. Conclusion

This chapter presents key contributions to place branding and digital placemaking research. First, it has challenged the fragmented understanding of digital identities with the description of hybrid physical-digital spaces in place branding. Second, it has offered a hybrid model where Social Identity Theory is drawn to elucidate the complex nature of identity mechanisms in hybrid spaces through digital placemaking. The important role social identity plays binding the different dynamics in digital placemaking is one of the key contributions of the study. Third, it has addressed both theoretical and practical implications. In closing, the article opens up several new avenues for future research in these fields, as well as limitations: the specific demographic and cultural contexts of the participants involved in the modified Delphi study, where further research is needed to validate the hybrid space model across diverse populations; the own biases of the experts and expanded experts involved in our study; the rapid evolution of digital technologies which may affect some aspect of the proposed model to be obsolete or less relevant; and the highlight of benefits from hybrid spaces, where deeper explorations of negative impacts should be further analysed. We hope this article inspires place branding and digital placemaking researchers to keep exploring the different mechanisms enacted in these experiences in contemporary initiatives.

Chapter 5. Digital Placemaking in Nature for Wellbeing: maturity of the concept, dynamics and forecasting its value in nature for wellbeing. (Part B)

5.10. Preface

Chapter 5 Part B complements the previous study resulted from the analysis of the modified Delphi method, advancing the knowledge on digital placemaking dynamics in nature for wellbeing, specifically extending the concept of digital placemaking, its use as a place branding strategy, the place attachment mechanisms and nature connectedness, to finally forecast the use of digital placemaking in nature for wellbeing.

The first section in Part B describes the demographic data collected from the experts and expanded experts who took part in the study. This is followed by a presentation of the results from each of the three rounds. The chapter concludes by identifying different areas in digital placemaking in nature for wellbeing that achieved consensus agreement and stability.

5.11. Introduction

The modified Delphi method developed achieve an optimus response rate among participants in all rounds. 84 experts and expanded experts were initially contacted via email, 26 of whom agreed to an interview (31% response rate). Of the 26 participants who agreed to participate in round one, 23 completed the round two questionnaire and 19 completed round three. Therefore, a response rate of over 70% was achieved, which is

crucial for data validity (Hasson et al., 2000). The response rate is satisfactory as even in the third round most experts and expanded experts completed the questionnaire.

5.11.1. Demographic Data of Participants

The 26 participants were comprised of 10 digital placemaking experts, and 16 expanded experts in related fields of the study aim (Table 4.7), with an equal distribution of males and females (Figure 5.4) and most of them located in the United Kingdom, United States and Australia (Figure 5.3). This presents the international application and growth of digital placemaking as a concept, with experts around the globe.

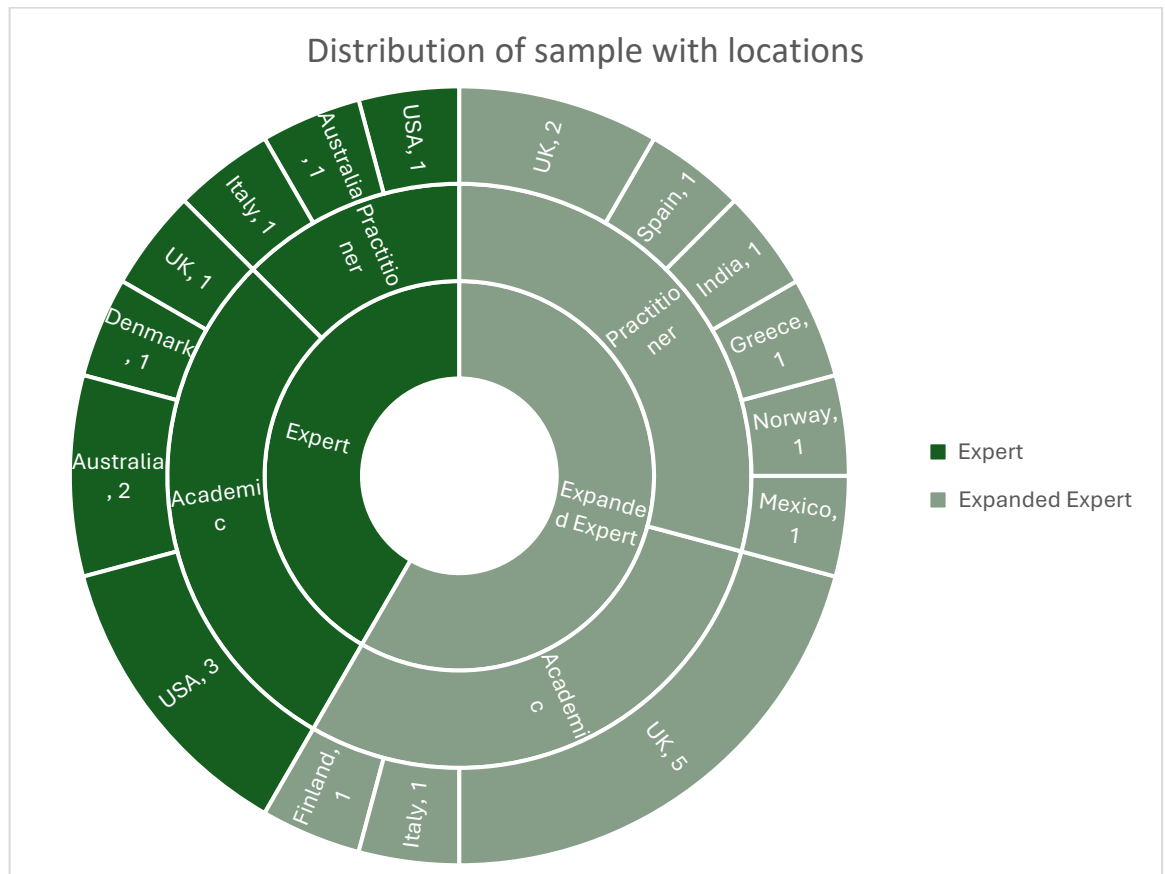


Figure 5.3: Distribution of sample with locations.

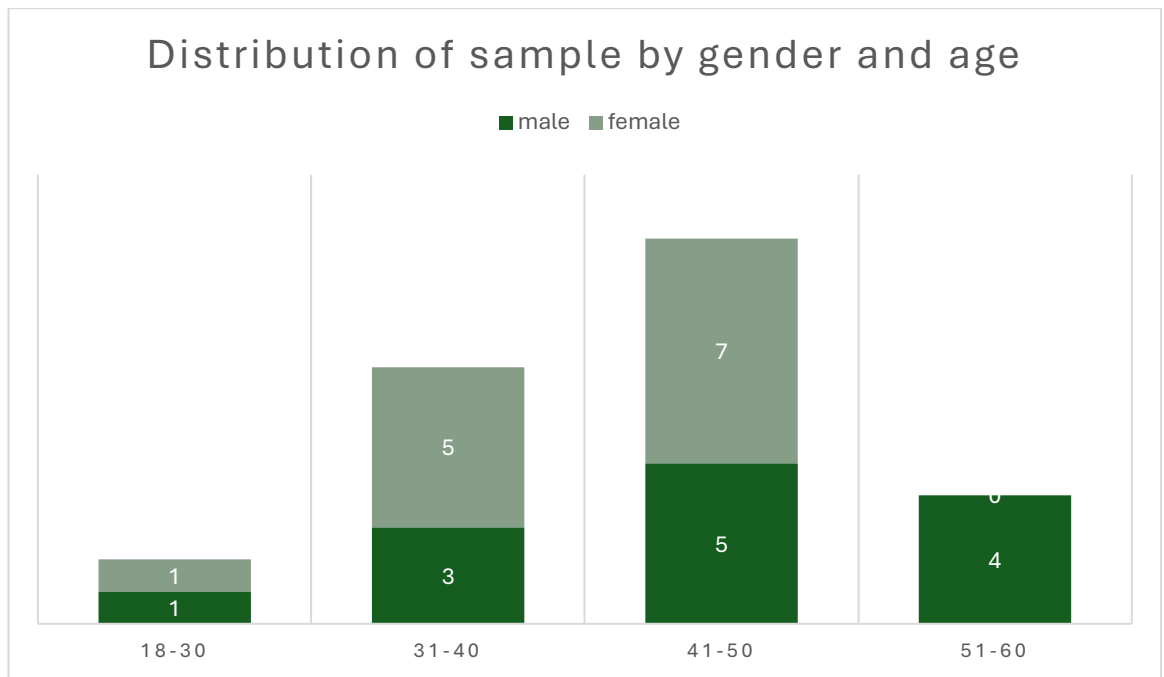


Figure 5.4: Distribution of sample by gender and age.

5.12. Round One: Semi-structured interviews

Besides the results presented in Chapter 5 Part A, complementary results from the data analysis were found and are pertinent for this programme of research aim and objectives. The interview data was analysed following thematic analysis (Braun & Clarke, 2012; 2021), producing six main themes, divided into codes and subcodes (Table 5.6). Due to the complexity of digital placemaking as a term, and the characteristics of the participants in the Delphi panel, analysis of results also provided themes regarding technology applications to places, place attachment and place branding in this context, and nature and wellbeing applications and outcomes. Thematic analysis presents a broad comprehension of digital placemaking as a concept, and its relationship with place attachment, place branding, nature connectedness and Social Identity Theory.

Theme	TID	Code	TID	Subcode	TID
Digital placemaking	645	Characteristics	255	Hybrid Place	36
				Co-Creation	30
				Storytelling	30
				Inclusion and Accessibility	29
				Community Connection	27
				Place Characteristics	21
				Sense of Place Attachment	19
				Sense of Identity	14
				Duration	11
				Democratisation	10
				Behaviour Change	9
				Enhancer	7
				Gamification	5
				Call to Action	4
				Enact Senses	3
		Challenges	162	Privacy-Online Safety	31
				Inclusion and Accessibility	27
				Digital Equity	24
				Top-Down	19
				Cost	15
				Ethics	12
				Digital Stickiness	11
				Addiction/Tech Reliance	8
				Motivation	6
				Interdisciplinary Team	5
				Gentrification	3

				Exclusion	1
		Measurement/Evaluation	105	Quantitative	29
				Others	25
				Challenges	17
				Qualitative	15
				For Nature	7
				For Wellbeing	6
				No measure	6
		Definition	39		
		Confusion	32		
		Audience	24		
		Success Factors	24	Pros and Cons	19
				Iterative Process	5
		Social Media	4	Human-Nature Interaction	4
Technology	236	Tech + Nature	111	Tech Wayfinding Nature	22
				Exposure to Nature	17
				Virtual Nature	16
				Take Notice	15
				Dichotomy	8
				Awareness	7
				Education	7
				Climate Change	6
				Animals	5
				Imagine Futures	3
				Management	3
				Shared Experience	2

		Tech + Nature + Wellbeing	51	Tech Enhancer Wellbeing	21
				Relationship	18
				Safety	5
				Data Collection	4
				Education	3
		Tech to promote place	22		
		Tech as process-medium	21		
		Teh for data collection	14		
		Challenges	10		
		Tech promote conversations	7		
Place Branding	95	Challenges	27		
		Identity	13		
		Participatory	13		
		Tourism	10		
		Uniqueness	9		
		Image	8		
		Place Management	7		
		Place Branding - Nature	3		
		Rebranding	3		
		Hybrid Events	2		
Place Attachment	65	Place Attachment	21		
		Identity	15		

		Community Relationships	8		
		Emotional Stories	8		
		Memories	5		
		Ownership	4		
		Challenges	3		
		Wellbeing	1		
Nature	26	Nature Connectedness	22		
		Nature Connectedness + Tech	46		
		Circular Economy	4		
Wellbeing	5				

Table 5.6: Thematic analysis codes from the Delphi Round One.

5.12.1. Findings I: Digital placemaking as a concept

The aim of this exploratory study is to understand the dynamics involved in digital placemaking in nature for wellbeing, testing the presented conceptual model and advancing theory and practice. The first finding presents digital placemaking as a concept, investigating its definition and maturity to then describe its characteristics. The confusion and definitional dilemmas found in literature in Chapter 2 are addressed through this finding. Moreover, in order to understand the impact on nature and wellbeing outcomes, the evaluation of digital placemaking is also described in this section (Figure 5.5). Thus, the first finding explains the current state of digital placemaking as a concept, what is needed for it to reach a maturity state, the characteristics that define a digital placemaking experience and its assessment methods.

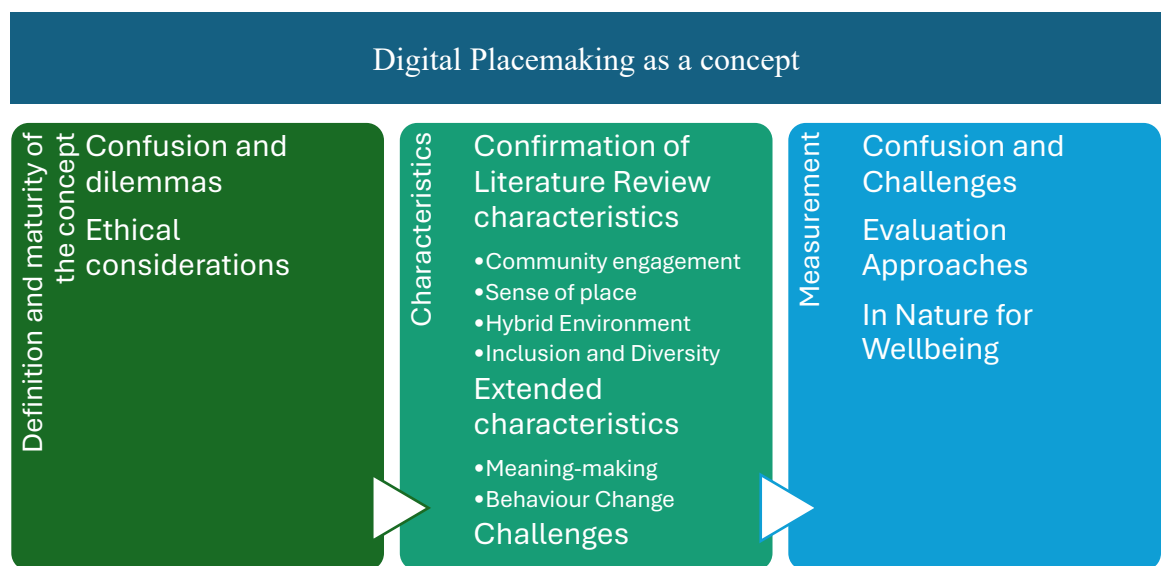


Figure 5.5: Summary of Findings of Digital Placemaking as a concept

5.12.1.1. Definition and maturity of the concept

The analysis of results present an exploration of the concept of digital placemaking aiming to understand how participants envisioned the concept as experts or their

involvement in digital placemaking if they were expanded experts, and to find common elements of their description that would help create a consensual definition of digital placemaking. Findings also help to understand why confusion is generated around it. Fifteen participants described in their interview this definitional dilemma, which was explained as an intrinsic characteristic of the concept (Fernandez-Osso Fuentes et al., 2023b). There is no previous empirical evidence of the evolution of digital placemaking as a concept from experts in the field, its interdisciplinary nature and the lack of agreement among experts and expanded experts.

There's not a nice, nifty clean definition of it (...) I don't know if it will become a whole research area in itself or become more solidified as a specific thing. I think it might be one of those things adopted by different disciplines and in different use cases and scenarios. At this stage, I think it's quite early days to see where it could develop. (Expert 8)

There is no single definition of placemaking (...) Placemaking is awesome because it's meant to be anything to anyone, it's not clearly defined purposely, I've been told, and I think it makes a lot of sense (...) And actually placemaking is something that can connect many disciplines. (Expanded Expert 7).

This extends the definitional dilemma of digital placemaking (Amirzadeh & Sharifi, 2024; Basaraba, 2021; Chen et al., 2024; Głowczyński, 2022; Keegan, 2021; Sanaeipoor & Emami, 2020b). Amirzadeh and Sharifi (2024) studied the evolutionary path of placemaking, where despite the wide recognition of the concept, confusion is still surrounding it, from spelling ways to objectives, meanings and scales. Focusing on digital placemaking, the uncertainty on its definition was either found through systematic literature reviews or scholars introducing the concept as complex and not having a consensual definition. Participants confirmed the definitional dilemma of digital placemaking, with some of them being hesitant to provide a definition due to the complexity of the concept. This lack of a consensual definition of digital placemaking negatively affects how the concept evolves and is able to find a maturing ground.

Furthermore, the broad understanding of digital placemaking presented in the analysis confirms its interdisciplinary nature, with participants from different backgrounds understanding the concept differently.

It's been said to me, that people have had some different understandings of what it is. So that would make me very hesitant to describe myself what digital placemaking is. (Expanded Expert 4)

I wanted to use that term (...) but also developers and other people use that term to mean something totally different. We really wanted to set a definition. (Expert 1).

This interdisciplinary nature was key in the participant recruitment process and the exploratory modification of the Delphi study to include expanded experts. Depending on their expertise and background discipline, participants understood the concept from different lenses. Only in Basaraba's (2021) review across disciplines, digital and creative placemaking evolved from place-making practices, where digital placemaking appeared in media studies.

Regarding the evolution of the concept of digital placemaking, experts started using digital placemaking to later find they were applying the concept. Similarly, the expanded experts who were placemaking practitioners or scholars – who did not consider themselves using digital placemaking – were actually applying this concept without knowing it was digital placemaking. The uncertainty and novelty of the concept are found to have affected the approach of the participants. It is important to understand the complexity of the concept which leads participants to identify themselves as digital placemakers after analysing their practice.

I didn't even know that this part of the project was related to placemaking. But when I had to frame it, I discovered that it was really about placemaking. (Expert 2)

Originally, I was not focused on digital placemaking, I was focused on places and GIS, audio maps. I wasn't using the term digital placemaking, that was a theoretical rationale later on. (Expert 3).

We probably touched some of these elements before, without knowing it. Because at the end of what we do, we try through social media, in this case, to characterize places (...) I think it's something of a digital placemaking initiative that they didn't know is called digital placemaking. (Expanded Expert 16).

The emergence of the concept of digital placemaking and the reality of its broad application and presence beyond initial knowledge is shown in this data analysis. This confirms the importance of having a consensual definition of the concept which helps to orientate and guide its application as well as consolidate its maturity. Therefore, the existence of a theoretical rationale that helps guide and explain the dynamics involved in a digital placemaking experience is crucial to categorise their work and further explore digital placemaking in practice.

The ethical approach to digital placemaking is found crucial for discussion, understanding that digital placemaking is currently under a maturing moment. Participants continued mentioning the importance of considering the ethical effects of digital placemaking, since it affects individuals' and communities' use of public spaces, their attachment, identity and connection with others. Therefore, reflections on the need for ethical considerations of the practice seem relevant for the maturity of the concept.

It also does have ramifications for the ethics of our practice (...) I think that the placemaking sector, as a whole, has to have a sustained and meaningful reflective moment where it looks at its practices, its ethics, and its intentions. (...) As a maturing sector, placemaking is at quite a pivotal time. (Expanded Expert 4)

I think the challenge there is understanding the pre-existing meanings of a certain place, really being thorough and ethical, and as accurate as you can be. (Expert 1).

Due to the evolution of the concept and the initial variety of projects that have claimed to be digital placemaking, participants call for a reflection on the ethics of digital placemaking in order to ensure it is applied for the benefit of the community in the place. This call for a reflective moment extends Amirzadeh and Sharifi's (2024) transition of placemaking towards community-based participation, and social and environmental elements to an ethical assessment of the practice. The revaluation of the main purpose of digital placemaking is crucial to ensure it evolves into a mature concept. The ethical dimension of placemaking, which has been approached from an ecological conception linked to governance (Eckenwiler, 2021) in analogue ways, has been recently mentioned as a call to critic and rethink the ethics of engagement in placemaking practices and the hybrid environments (Gonsalves et al., 2023; Hespanhol, 2022; Klein, 2022; Najafi & Mohammadi, 2024; Petrovski et al., 2024). Thus, these ethical calls and understanding of placemaking is extended to include the digital dimension. Ethical considerations are even more present in the digital evolution of digital placemaking due to the number of risks that technology may bring to the experience.

When participants shared their definitions of digital placemaking (Table 5.7), a number of common characteristics were found through thematic analysis. Codes were grouped into themes. The identified themes are found as essential aspects when defining digital placemaking: community engagement/sense of community, hybrid environment, to take place (which is understood as placemaking), sense of place, enhancement, accessibility/inclusion, to create meaning, identity, virtual place and community-driven/lead (Table 5.8). Based on the data from the interviews, digital placemaking can be understood as the creation of places from spaces, fostering place attachment or sense of place, sense of community and community engagement, and meaning-making using hybrid environments where technology enhances the physical experience.

Analysis of results presents the key themes among the definitions collected of digital placemaking among participants which indicates the main common aspects of digital placemaking from an interdisciplinary approach. This is the first time a number of experts and expanded experts have shared their definition of digital placemaking in a study, providing different views and focusing on different elements. These characteristics will be part of the consequent Delphi rounds of questionnaires to gauge agreement.

Participant Definition

Expert 1	It's a good overall umbrella thing, is how people use all forms of digital media, to create a sense of place for themselves and others, but also really prioritising this idea that creation of place is not always positive, and it's uneven, it's unequal, it's exploitive in a lot of cases. Two things I really wanted to push back on. One was that place is always poetic, place is always home, or that place is always positive, and that we're always trying to get to a sense of place. And that when we do it's like this utopian, maybe not utopian, but it's a positive thing. But then I really wanted to think about (...) how place isn't necessarily always a ground-up production, and it's not always possible, it's not always equitable. Thinking about how we use digital media to those ends as well. But then also pushing back on this other emerging definition of digital placemaking (...) One thing that was being established in industry press, and popular press, and among urban planners, or urban developers, was this idea of digital placemaking as using social media to listen to populations. It was a very practical instrumentalized form of digital media use.
Expert 2	Digital placemaking is a way to get people together through any kind of device that could be also digital. But the point is to get people's together, so it makes a place. (...) It becomes a place because there are some activities that happen there.
Expert 3	Digital placemaking is contributing a conception of a place that is plural, or that is, you might say individualised or subjective, using computers or using the internet, would be the digital part. (...) Digital placemaking is oftentimes individual, whereas placemaking, in general, is more collective or is more socially you might say. (...) I would imagine that digital placemaking is about places where you're not at or you're not geographically located at.
Expert 4	The way people use digital media to create emotional attachments to place, I think that's a really nice, quick way of describing it. But I would add to that, (...) If we can feel out of place we can feel in place, what is the thing that makes us feel in place? I think it's knowing how to behave, knowing how to act, knowing the routines, knowing how your body should move through space, how you should speak to people. I like thinking about how the digital environment might help us already know and feel like we have that belonging when we arrive to a new place.
Expert 5	It is definitely more than just a simplistic definition of using technology for placemaking. (...) it's the new behavioural and cultural dimensions that are brought by technology to the practice of placemaking (...) The normalisation of hybrid experiences across all the different domains of life, which wasn't really the case prior to 2020.
Expert 6	Digital placemaking is the appropriate use of technology for placemaking. The reason why I like that definition is because immediately makes people's ask 'well, what is placemaking?' That itself is a contested term, also misused.
Expert 7	Digital placemaking is essentially using digital technologies to create a sense of place. Whether that be using sensors, or whether they're using LED screens for information. That's essentially using technology to inform public space and create a good public space.

Expert 8	The use of digital technologies to create a virtual place, or you use digital technologies in a physical space to create it (...) There's not like a nice, nifty clean definition of it, but I would consider digital placemaking in both of those scenarios.
Expert 9	Placemaking has to do with understanding a place, and not only understanding the diverse values associated with it, but who's potentially involved and what f stake they might have in that place. You're always going to have different opinions, and oftentimes contested ideas. Then how you facilitate those ideas over time can turn into placemaking, and how those practices extend to other aspects of the landscape and to social relations and so forth. Then when you talk about digital aspects of it.
Expert 10	It's about having the person or group of people, because with the digital environment you can have many in the setting, experience that sense of presence so that they're in the environment, they feel like they're a part of it. They're enabled to enact their senses, sight, hearing, touch to a setting so that again, they get that sense of presence. (...) Those elements really help create that digital placemaking. But again, it spins it to a sense of presents.
Expanded Expert 1	It's using kind of digital technology to help people to connect to place, an enhancement and augmentation of natural environment with technology to help you develop or foster or connect to people more to those places.
Expanded Expert 2	It is related to using digital technology to create space, to think about placemaking. I don't know if it's a combination of both, what I told you in which there is something happening at the end in the physical, but the technologies are used as the main vehicle to conduct or to produce that process? Or it's something more like Pokémon games, where everything happens in the digital, but you create meaning of the space anyways. Or maybe it's everything, maybe people talk about the different digital placemaking from different approaches.
Expanded Expert 3	Using some kind of digital platform or technology to enhance or in some way support people's experiences of place, thinking about whether a place has an identity of its own, whether that could support people's own place identity about themselves in relation to the place.
Expanded Expert 4	It's been in two camps, it's either to use digital as a means of having that conversation with people. Or it's been about putting digital assets into the infrastructure of place. Those two things aren't necessarily mutually exclusive, but they do speak to very different types of practices.
Expanded Expert 5	Some form of engaging people from the digital aspect, but also presenting them opportunities to create, to view a place, but also influence how this is saved digitally. But also, I always thought it was a different way as well, creating place in the digital matter. I don't know if it has to do with Facebook groups gathering, talking about nature in place, organising practices via the social media. I think it's probably a mixture of both, but this is kind of my knowledge of the field.

Expanded Expert 6	Something to be said around the representation of places through online multi-channel digital communications and how place is talked about.
Expanded Expert 7	How to give meaning, how to bring meaning by the users, the community to the space. How to transform this space into a place. This is by bringing meaning and bringing users, bringing activities and these activities when they are digital, they are not necessarily fully physical. This is for me, digital placemaking. It's also about the metaverse. (...) how to actually create meaning to the space, how to add meaning, also value and value can be environmental, or social, cultural, economic value to the space How to create this value? That's for me placemaking. When it's digital, it involves this connection between the physical, the digital space, but also it works a lot in metaversal way of thinking.
Expanded Expert 8	Digital placemaking has to do with anything that includes in the practice and in the process of placemaking, of place identifying, of place maintaining and of place creation, it is everything that uses technology, artificial intelligence, and digital means of that. So, I would say that anything, that it's not manual, on a traditional level, is digital placemaking.
Expanded Expert 9	Placemaking is a very organic process of connecting place to people. In short, turning spaces into places. (...) Digital, would be to also take it a notch up and have people who are not part of your neighbourhood to also know that they could be part of this. I feel like we're at a very neighbourhood level, digital placemaking makes it a very global thing. It lets you borrow from other cultures; it lets you learn from what's happening here. (...) Digital interventions are based on three principles of care of safety and freedom
Expanded Expert 10	My understanding, reading between the lines from what I've heard is sort of like the metaverse. It's related or linked to the metaverse as a broader concept. But digital placemaking can also be at a very simple level, some of the stuff that we're already doing, using Google Maps or even going back in the day to games like SimCity, where you're able to design structures and buildings and places.
Expanded Expert 11	Our ability now from space and through very sophisticated GIS systems to get a precise understanding of what elements are in what location.
Expanded Expert 12	It's when we use digital tools to enhance placemaking, like when you're doing observation and public spaces, and we can take our iPads.
Expanded Expert 13	Behaviour change is the first thing that comes to my mind. Where it's looking at using data to both inform what a space is from a point of view that is looking at various factors, such as human centred or environmental, and then looking at using that data to inform what it could be and to make smart decisions about what it could be.
Expanded Expert 14	Placemaking is transforming a place into something that feels more like home and all the elements that go with that like socialisation, comfort, safety, recreation, etc. I know it has a very particular use in planning, and there's placemaking wheels and things you can use. But in our terms, I just think of it as infusing place with layers of meaning that sort of socialised it from just being pure environmental, or bricks and mortar.

Expanded Expert 15	Use of different technologies, to strengthen peoples' feelings of connectedness with the place or to boost the experiences in places in different ways
Expanded Expert 16	Using digital tools and services to enhance the physical place, making a sense of community and so on.

Table 5.7: Digital placemaking definitions by the modified Delphi study participants.

Digital Placemaking Definitions Codes	N° Times
Community engagement/sense of community	12
Hybrid environment	10
To make place (placemaking)	8
Sense of place	6
Enhancement	5
Accessibility/inclusion	4
Create meaning	3
Identity	3
Virtual place	3
Community driven/lead	2
Behaviour cultural dimension	1
Behaviour change	1
Place comprehension	1
Enact senses	1
Good public space	1
Place maintaining	1

Table 5.8: Codes extracted from the digital placemaking definitions provided by the panel of participants

5.12.1.2. Digital Placemaking Characteristics

Understanding that making place or placemaking is an evident characteristic of digital placemaking practices, and therefore one most repeated aspect in the definitions provided by the participants, the four basic characteristics of digital placemaking described in the systematic literature review (Chapter 2) have been confirmed – community engagement, sense of place, hybrid reality and inclusion. Furthermore, during the conversations, participants explained key aspects of each of these characteristics and extended the review findings by providing other elements that are also important for digital placemaking.

5.12.1.2.1. Community engagement

Community engagement and creating a sense of community are presented in this data analysis as important repeated aspects of the definition of this concept. The community is a key part of digital placemaking, not only as participants but also in the way the digital

or hybrid environment allows them to interact with each other, create belongingness and feel connected with the place and with the community.

I always think about that as a digital placemaking, how we learn to connect to our environment, by seeing what others have seen, and also being able to give information about what we have seen. (Expert 4).

Digital placemaking is a way to get people together through any kind of device, that could be also digital. But the point is to get people together, so it makes a place. Maybe it could also be a place where people go by themselves, (...) it becomes a place because there are some activities that happen there. In my case, it was about making social activities, it was an encounter between two persons. But I also think that it's good to be alone and placemaking can also be useful to make a place where you go alone. (Expert 2).

The digital placemaking experience is described as allowing people to connect with others in place – either physical or digital/hybrid – and to learn to interact and connect with the place by seeing and interacting with others. Digital technologies have the potential to enhance and facilitate community engagement (Petrovski et al., 2024). The community engagement element in digital placemaking is therefore crucial for the development of feelings of belonging with others, explained through Social Identity Theory as individual group membership becomes part of their self-concept (Heath et al., 2017; Tajfel, 1978). Moreover, this element also promotes feelings of belonging to the place, understood from place attachment theory as the creation of an intimate relationship the environment that provides feelings of relief and belonging (which is explained in [Finding III](#)). This is significant as, in the digital placemaking in nature for wellbeing model, the connections between place attachment and Social Identity Theory explain the main dynamics that affect the wellbeing impact of digital placemaking.

The result of this involvement of the community is often connected to belonging feelings among individuals, ending up in a collective experience. The individual experience is

important, but digital placemaking is described as focused on community and collective dimensions in this data.

How to guarantee access and how to guarantee that it supports not an individual experience of space, but a collective experience? (Expanded Expert 2)

If you're feeling potentially disengaged from the community, but you see online that there are these other people, these other groups doing things, you think "Oh, I could do that too", or "here's something I could join in", and then that benefits the whole community further (...) it's also about enhancing visibility of things that are already going on. (Expanded Expert 3).

I don't see digital as a different tool than anything else that you might have in your suite of placemaking tools, whether you're using digital to collect data or have a conversation, whether you're using digital to show the end results or as an output or something. What I love about placemaking, and I think what makes it so different from other place-based designs, urban practices, or policy practices, is about those relationships. I think if you're using digital well, you can build that trust in those relationships and have those conversations. (Expanded Expert 4)

This importance of the collective group is supported by the work of Lewicka (2011) who claimed a lack of collective approaches to the person dimension in the place attachment tripartite (Scannell & Gifford, 2010a) in literature. Previously, the person element has received primary attention in research, without understanding the collective relationships created that are meaningful for place attachment. In the digital placemaking in nature for wellbeing conceptual model, the place attachment tripartite by Scannell and Gifford (2010a) is modified to emphasize the overlap between the community and the individual element in the community dimension by approaching them from a Social Identity Theory perspective. The understanding of the impact of feeling belonging to a group and the intergroup processes that affect people (Hornsey, 2008; Tajfel & Turner, 1986) is essential to clarify the dynamics involved and how to implement digital placemaking conceptual model.

Analysis of findings has revealed that community-driven activities are also crucial for digital placemaking. This is highly linked with community engagement and a sense of community but placing the community at the core of decision-making and ownership of the digital placemaking experience, which is identified to lead to a number of benefits. This approach has been found oftentimes connected to the idea of the democratization of processes in a community.

The ideas of community participation, that you own the technology, you've co-designed the technology, you've gained a sense of digital literacy and media literacy, you're recording your own stories, you're building an archive of your own stories about a place that then you can share and listen, that it becomes this infrastructure or a symbol of community strength, or an investment in community vibrancy and participation. It's a repurposing of a technology that's adding sort of new life to it. (Expert 1).

A lot of the work we do is in public space, around basically the democratisation of public space. So, allowing people to use public space to voice their opinions and have their point of view. A lot of the things that we do are digital based, because we've worked with big screens for local councils and stuff like that. (Expert 7).

Does this digital thing, whether it's on our phones or on our website or physically in a public space, make it easier for strangers to meet each other, and then become neighbours, for example? That's a huge part of the democratic or the human rights benefit. (Expert 6).

The sense of ownership developed in the community through the digital placemaking experience is categorised as a benefit (Kale, 2019), which increases not only the success of the project but also its potential lifespan, truly fulfilling the needs of the community. The sense of ownership and agency with the place can foster identity processes (Atteneder & Lohmeier, 2024; Razi & Ziminski, 2022). Furthermore, that collective sense of belonging and identification of 'neighbours' refers to the social identity formed through community interactions (Makri et al., 2021; Tajfel & Turner, 1986). The community perceived themselves as part of the place, which they feel ownership about, and that

develops their identification and membership with the physical space, enhanced through a digital medium.

This community-driven and co-creation approach can be understood as a bottom-up process. However, it contradicts the majority of digital placemaking projects that are developed in reality, which are top-down. Theoretically, digital placemaking experiences should be developed from the community and with the community, whereas real digital placemaking experiences tend to be developed from higher authorities that do not take the community fully under consideration. The participants described the importance of co-creation and community-led in the creation of valuable experiences and also belonging, whereas the power dynamics usually involved contradict this.

Often that's used in exploitative ways, like if you look at smart cities for example. The collection of sensor-based data is often just collected into a database and may be used against certain populations, but there might be some potential for belonging and the act of doing something collectively. (Expert 1).

To a large degree, it has been appropriated also by completely top-down development, which has been qualified as digital placemaking. Because they make places and literally build new places, but not necessarily the involvement of communities. (Expert 5).

Sometimes, in many processes that you come across, they call it participatory, but it's very top-down and the discussions are completely ignored. (...) They say, "but I did a workshop, I asked the questions of what people prefer", but still people do not have ownership about it, they do not attach to the place. (Expanded Expert 7).

Top-down projects with an objective other than the benefit of the community are commonly described as a challenge in digital placemaking (e.g., Foth, 2017a; Kamols et al., 2021). For a project to be considered digital placemaking as described by the panel, the community should be the central focus. However, scholars have reported a lack of community purpose and genuine engagement (Chen et al., 2024; Foth, 2017a) which should be considered a risk for digital placemaking, also when involving place attachment

processes. Being a community imperative activity (Courage, 2021) that enables authentic civic engagement and reboots the relationship between bottom-up efforts and top-down institutions (Latorre, 2011) is the base of placemaking. Participants emphasize the importance of being coherent with digital placemaking, as a placemaking practice, and ensuring the community participation is real beyond the top-down approach the experience has.

5.12.1.2.2. *Sense of place*

Sense of place, which refers to place attachment, is another essential aspect mentioned in many definitions given by the participants and also repeated during the conversations on digital placemaking to further understand the dynamics involved. Place attachment is another of the crucial dynamics developed in a digital placemaking experience.

Digital placemaking is essentially using digital technologies to create a sense of place. Whether that be using sensors, or whether they're using LED screens for information. That's essentially using technology to inform public space and create a good public space. (Expert 7).

it's using kind of digital technology to help people to connect to place, an enhancement and augmentation of natural environment with technology to help you develop or foster or connect to people more to those places. I suppose places that they live in. But I suppose they could be places that they visit as well. (Expanded Expert 1).

In the definition created by Halegoua and Polson (2021), sense of place attachment is key when defining digital placemaking. Analysis of results has found that many of the experts and expanded experts also include sense of place or place attachment in their definition. Place attachment is inherent in digital placemaking due to the relationship created between the place and the community.

Similar to community engagement, the development of place attachment through digital placemaking experiences also comes with challenges and risks that need to be taken into

consideration when creating the experience in order to ensure the main elements and values of digital placemaking are protected. The power dynamics involved in digital placemaking, and the commonly top-down approach have crucial effects on the community's place attachment.

I think generally placemaking is often encouraged from this point of view like creating and fostering attachment and belonging which I think can be also dangerous in the sense of producing meaning and what is the position of the practitioner encouraging the process to make people produce meaning. (Expanded Expert 2)

I think with any kind of technology, you have to look at who owns it, and who's driving it and who gets the benefit of it. That can happen at all sorts of different levels, (...) because they want to change the identity of their neighbourhood, or they want to strengthen it. (Expert 9).

The risks that need to be factored in any digital placemaking experience are as important as ensuring the digital placemaking experience complies with the main elements for it. Previous studies have mentioned challenges and risks from the digital implementation in placemaking when fostering place attachment and sense of place (e.g., Kotus et al., 2022; Törnberg, 2022). However, analysis of results describes the need to assess the challenges in this are to provide clarity on positive and negative dynamics that can be found in digital placemaking experiences when fostering place attachment.

5.12.1.2.3. Hybrid environment

Analysis of findings has revealed that digital placemaking is a combination of digital and physical experiences, online and offline, creating a hybrid environment. Despite being defined as hybrid reality in the results from the systematic literature review (Fernandez-Osso Fuentes et al., 2023b), the review update and assessment of Delphi results lead to change the name to hybrid environment. Hybrid reality leads to perceive the digital reality as a replacement of the physical experience, whereas hybrid environment combines both.

Participants described this combination as a crucial element in these experiences, where the connection to the physical place should be clear and coherent in the digital experience.

I asked people to select the place and then to go there physically and take a picture of it with a physical sign, and in the physical sign it was written 'co-drive stop'. There was a moment where they really bridged the physical and the digital because starting from the picture, they gave the picture to me and from that moment that place was also becoming digital. (...) I think it's really important that you have a clear and physical anchor to the placemaking. (Expert 2).

Some of the lessons of what I call like 'authentic digital placemaking' that is still about a holistic approach, where we're not separating cyberspace from offline space, we're looking at it all together (...) There's a better synthesis about this holistic thing on how the online and offline are constantly affecting each other. And you can't separate it. (Expert 6).

One of the key things that we found was that having some tangible, real-world sort of input is really important. Because where we lose people is where it's not tangible, where it's not rooted in 'oh, this is a real physical space that I can go and visit, and it's practical to me and helps me in my life'. (Expanded Expert 13).

There must be a clear connection to the physical place that you are targeting. Even if you have digital layers on top of it, it's still the need to address or to somehow relate to the physical location that must be something that (...) It must foster feelings and experiences that, as a consequence, become attached to that physical location. (Expert 5).

There are multiple conversations on the digital representation of place and the broad spectrum of the level of immersion you can achieve through digital placemaking (Chen et al., 2022; 2024). Technology alone cannot define digital placemaking but the use of technology to create this holistic approach, where online and offline are interconnected to foster place attachment and community engagement. The anchor or connection described as needed in digital placemaking is critical for the correct development of the experience.

Not only the digital place has to have an anchor in the physical, but the consideration of how the physical and the digital are connected and what is represented is crucial for a successful digital placemaking experience.

Careful consideration of what aspects of the place should be represented in the technology. Is it the physicality of the place, to do with the architecture or the landscape qualities? Is it supposed to represent things that people know there, but a kind of more intangible like air quality or things like that? (Expanded Expert 3).

I come back to the idea of experiences because this is really the core. It's what people would feel when they go to that space and experience what's on offer. While previously communicated through the built environment and physically situated interventions in the built environment, now gets augmented by the potential virtual experiences connected to that site. There must be a connection to the site, and the connection must be designed in a way that's coherent with the physical experience you are having there, or the personal experience that you have on-site. It should not be disruptive. (Expert 5).

But it needs to have these representations of space, which is quite important. And how this is mirroring, to the people who use the place more. (Expanded Expert 5).

The hybrid environment representation has not been fully approached in previous studies, as per the craft of the digital-physical anchor. Some digital placemaking studies include elements that consider the analysis of virtual attributes of the physical place with a strong gamified element (see Boffi, 2021; Chew et al., 2020; Pang et al., 2020b; Qabshoqa, 2018) or the sensorial aspect of virtual placemaking (Globa et al., 2019). Only a few studies describe the building process or elements considered to create hybrid environments. Costa et al. (2024) refer to the importance of measuring physical attributes of public spaces in participatory budgeting and placemaking to understand the effects in the community, Sanaeipoor and Emami (2020b) distinguish between a triggered augmentation and a view-based augmentation and Hespanhol (2022) provides a model for augmented placemaking, including the different digital infrastructures over the physical location (the superspace), and the different place modes layered over them (pluriplace). His model aims to help reflect about the relationships between technology, people, space and place. This finding expands this work by discussing the importance of placing special consideration into the creation of the hybrid environment, how the

physical is represented in the digital, why it is represented that way, and how the hybrid environment is designed beyond its interactivity but also its aesthetic. The thorough creation of the hybrid environment aligned with the community needs and purpose of the experience should be a basic element in the development of the digital placemaking experience.

However, there are risks involved in the hybrid environment created, specifically on the digital side as the participants discussed privacy and online safety concerns, digital literacy, digital stickiness or technology reliance.

Many people think there's online and offline, or cyberspace and real space. And now there's almost another confusion, there's digital public space, but what they're looking at is privately controlled digital space, and they're calling that public space, which to me is very dangerous. (Expert 6).

Now we can see in a post-privacy world, that there are a lot of concerns about sharing data because of privacy issues, or potential concerns about how your data might be used. That creates another digital divide. (...) I'm sure we would see some cut-off both in terms of age, but also in terms of socio-economic access. There's also a kind of digital literacy. (Expert 9).

There are a lot of challenges in terms of digital literacy. (...) Who has access to these digital technologies? Who do they serve? Are they accessible? Are they accessible to people with disabilities? Are they accessible to people without smartphones? Do people have those sorts of literacy to use these digital media? Do they have the desire to? Is there a purpose or point to incorporating it? Are you trying to solve a problem, that actually technology is not the answer to it's like a social or artistic or creative thing? Is it not really a problem at all? Who is that a problem for? (Expert 1).

These concerns derived from the hybrid environment experience, specifically the digital side, extend current studies on the topic (see Chen et al., 2024; Kostopoulou & Fatah gen Schieck, 2021; Y. Li & Alencar, 2022; Najafi et al., 2022). When creating and developing a digital placemaking experience, critical consideration of potential risks is crucial. Participants describe a number of risks. However, the continuous growth of digital

technology and new realms of hybrid environments make a risk assessment of the experience created crucial to any project.

Moreover, this hybrid environment where digital placemaking is developed is not new for first-world citizens, as people are constantly interacting with their environment through some kind of technological mediation. While conversations around the need for digital in placemaking may differ, the reality of technology being an inherent part of their daily routines is undoubted.

We increasingly use the digital as a way of processing our ideas at the moment. I rarely have a thought that I don't immediately Google (...) The kind of live nature of the digital has become really integrated into our own mental processes. And because of the mobility and the location-based nature of smartphones, that has then transferred into a more all-day long thing, every waking hour, you have that ability to think through digitally. When you leave the house, you have the ability to move your body through digital. So now you're thinking and you're moving with digital. (...) We're going to have to think through how the digital helps us discover place, interact with place, remember place, protect place, celebrate place. It just seems like a natural connection. (Expert 4).

The digital aspect of that is quite interesting because it happens simultaneously on different platforms and channels. I would call it maybe "multi-channel retailing", focusing on when you go to a shop but you will look at your phone at the same time. It feels similar, to how you can actually support this notion of people engaging with the place, people trying to make something different with what they have and understanding how how technology can help do that. (Expanded Expert 5).

Therefore, there is a need to fully understand how the digital, which is part of our everyday activities, also affects the way people connect with place and with others through place. Digital technologies have transformed people's interaction with the physical environment in digital placemaking (Petrovski et al., 2024). However, the way people interact with the digital depends on their characteristics as a group, which confirms the importance of assessing the risks involving digital equity or digital literacy. Findings corroborate the need to update place attachment and Social Identity Theory to the new

hybrid paradigm where the experiences of place and of interactions with others and with their own self-categorization are mediated and affected by the constant interaction with digital and technological devices.

Aligned with the hybrid aspect of digital placemaking, findings have revealed the enhancement of the physical experience as an important aspect. The enhancement created through digital placemaking is a distinctive element in order to get audiences and stakeholders to fully understand the purpose of this concept. The enhancement is interconnected with the hybrid environment created and emphasizes the idea of digital mediation as a booster of the goals of the experience.

You're using a digital media apparatus, like a soil sensor, to enhance a sense of place, because it's aimed at community gardening. Also, anything that brings people together to think collectively or work collectively around a given issue or a given problem. (Expert 1).

Using digital tools and services to enhance the physical place, making a sense of community and so on. I mean, this is probably the definition that is the standard definition, like a discipline. (Expanded Expert 16).

What do we need to plant the seed, so people understand that digital doesn't mean "let's go put everyone in virtual space". We want to actually counter this technocratic idea that we can replace humans, and we can replace human contact with algorithms. (Expert 6).

Despite being mentioned in some studies (Bilandzic & Johnson, 2013; Chew et al., 2020; Sepe, 2016), the enhancement aspect has been overlooked in digital placemaking studies. The dichotomised approach to digital vs physical in digital placemaking is a common misunderstanding, which is addressed by Atteneder and Lohmeier (2024). In their study, the digital and physical aspects have emerged and combined in the place experiences. However, their results demonstrate that place consumers present a black-and-white distinction on physical and online experiences. Therefore, scholars have called to enhance places through digital media in order to create meaningful experiences (Dai & Liu, 2024).

Special attention to the aspect that is enhanced in the experience is needed, while most digital placemaking projects focus on the technological approach to digital placemaking. The idea of creating virtual realities with no connection to the physical, or that try to replace the physical, is a decreased approach to how digital placemaking should be described.

The enhancement aspect was also defended by the concept of technology as a process or a medium, not a goal or a final product, among participants. This understanding of technology that is at the service of a bigger purpose is crucial in the understanding of digital placemaking as a concept.

I think digital technologies are a means to reaching a certain experience in the real world. Whereas some other people might think that actually you can replicate that in a digital way. My personal opinion is I want to use digital information to facilitate a physical experience, as opposed to I want to create a digital replacement of that physical experience that I think is valid and has the same health benefits. (Expanded Expert 13).

To use digital as a means of having that conversation with people. (Expanded Expert 4)

Digital is just a means to an end, it's another communication modality. If we went back whatever, three, four or 300-600 years, the same sorts of questions would have been asked about print, and books. (...) As a matter of fact, in some case it replaced nature and in some cases books augmented nature. I think it's sort of both. (Expanded Expert 10).

I want to stress that technology is not the solution at all. It's actually just a way, a mean, not the final goal. (Expanded Expert 16).

It is evident that the digital element of digital placemaking is aimed to be an enhancer and a medium to a solution or a goal (Shih et al., 2021), which has to be connected to fostering place attachment and community belonging to ensure its impact benefit communities. This finding is important to understand how digital placemaking can foster different dynamics in communities. They are aligned with Najafi et al. (2022) review where the

technological enhancement of placemaking helps understanding the relationships between people and place, increases participation and facilitates activities, which contributes towards creating a more collective approach.

Finally, the hybrid environment of digital placemaking also allows the creation of gamified experiences where the community interact with a digital layer that brings play into the experience.

I think that the most successful placemaking projects that we have done, are related to the screen, but using their technology to get people to interact with a screen or to interact with each other while using the screen. So that might be a game that they play, and they have to interact with the screen and with the people around them. (Expert 7).

There are also examples with children, in which they changed the appearance of a street through play, digital also enables playing and through play you feel more attached, or you create a new experience in your space. (Expanded Expert 2)

Gamification is presented as a strategy to engage with the community using a digital device to play in place, which helps achieve the success of the experience. Gamified examples of digital placemaking have been broadly used (see Clowater, 2021; Klein, 2022; Pang et al., 2020a), mostly focused on location-based games. However, the effect of this gamification beyond the interactivity element is what participants discussed in this Delphi round. Gamification can be understood as an instrument or strategy adapted to the community need that is addressed in the digital placemaking experience. This strategy can boost attachment feelings in the place, where the hybrid element of mixing the physical place engagement with the digital gamified layer is essential for its success. The community element in the gamified experience is also presented as important for the further impact of digital placemaking, as it helps members to connect with others through the gamified interaction. Therefore, the use of gamified hybrid experiences is key for the development of community belonging and place attachment.

5.12.1.2.4. Accessibility/Inclusion

The last characteristic found in the systematic literature review that has been tested in the modified Delphi study is inclusion. Findings have revealed that inclusion is highly important in digital placemaking as it is connected with place attachment, identity and community empowerment.

People might otherwise be very objectifying because this person is from a different culture, and they look and dress differently than me. Therefore, they're a stranger, they're another. But a good public space or good digital placemaking experience can help make people be less afraid of differences. (Expert 6).

They went online because of the pandemic, and then they reconnected afterwards. It's all about creating this community of people who would otherwise feel excluded but through those interventions, become able to find pathways back into the broader social life, and conversely, raising awareness with everyone else, increasing the likelihood of them being more easily adopted as part of the broader community. (Expert 5).

Inclusion is found as a beneficial characteristic of digital placemaking that makes individuals feel connected to the community, included and accepted, which extends the work that identifies inclusion as crucial for placemaking (Foth, 2017b; Szaszák & Kecskés, 2020) to the digital realm of the concept (Najafi & Mohammadi, 2024). Hespanhol (2022) describes the importance of inclusive digital placemaking experiences to those who had been excluded and the potential impact on the sense of community and social impact, which he declares has been overlooked. This work is extended by revealing how inclusion has social benefits for the community and the accessibility potential of digital media is an important dimension, which needs to be addressed in all projects.

One of the ways of promoting inclusivity through digital placemaking was found to be storytelling. Sharing narratives that have been overlooked or dismissed in the past for everyone to discover and engage with helps developing inclusive experiences.

It was a digital storytelling project, I was commissioned by the local government in an area where there's a high proportion of refugees, (...) The project was to conduct a series of community engagement workshops where I sit with them and they told me their stories and we draw together their recollections from three phases of their lives: their lives on the original country, then their journey to this country; and their lives now here. (...) Just revealing those stories to the broader population was something that was very important to them, important to the local government and with the potential of rearranging the relationships, increasing mutual awareness, but also mutual care. (Expert 5).

Asking students to articulate a counter-narrative that the general public might not be closely familiar with. Because sometimes there are uncomfortable truths about the university, about our place that are oftentimes either omitted, or if they are included in a dominant history, a primary history, they oftentimes come secondary, they oftentimes could be segmented off perhaps. (...) We established a dominant narrative, and I saw digital placemaking as a way to create a counter-narrative. (Expert 3).

What the group did was, they partnered with local community leaders, and they repurposed pay phones to make them a creative digital placemaking project. You could pick up the phone and hear recorded stories about what it feels like to live in that neighbourhood or watch documentary films that were made by local artists, you could record your own story about living in the neighbourhood and what you valued, and things of that nature, the local history, what people should think about in terms of cultural landmarks. (Expert 1).

Digital storytelling is described as a strategy to bring inclusion into digital placemaking. Storytelling has been explored in the literature (see Breek et al., 2021; Stokes et al., 2018), specifically in potentially bringing voices and narratives that have been socially excluded (Gonsalves et al., 2021; 2024). Results advance these approaches by identifying inclusion as a basic characteristic of the panel interviews, whose importance resides in regard to the multiple identities that form the community. Connected with community engagement, the use of storytelling could promote social identity processes that will establish group membership feelings (Heath et al., 2017; Tajfel & Turner, 1986) and the place image (Zins & Abbas Adamu, 2024). These multiple identities can form a collective feeling of belonging with the group and with the place through sharing and interacting with the narratives that arise within the community.

Inclusion and accessibility are potential benefits from the lower or barrier-free experiences created in digital placemaking. However, challenges to digital literacy from the digital placemaking target participants are important to address as well as digital equity or other potential exclusionary risks.

To be successful, everybody has access. That's another problem that I find with digital (...) But I work in international countries a lot, and not everybody has access. In many cases that [digital] wasn't going to work as an approach. (...) I also think everybody has to have access to it and be familiar with how to use that digital piece, to comfortably use it. (Expanded Expert 12).

Understanding the cultural significance of what you're doing, the potential harm or risks and forms of exclusion that you're creating with the intention of creating inclusion. (Expert 1).

But there should also be this eye towards inclusion. That's why inclusion and openness really matter. Otherwise, it leads to provincialism, and exclusionary separatist mentalities that are very othering, in a negative way. (Expert 6).

Digital equity I think, is one of the key things. Digital equity can be bifurcated into multiple dimensions. One dimension of digital equity, for example, is, (...) if they don't have the equipment, if they don't have a smartphone, if they don't have a tablet, or even if they have that equipment but they don't have a sufficient signal, then they're not going to be able to access any of these elements. Another angle of digital equity or the consideration of digital equity is, though they have a device, they have a connection, do they know how to use their digital devices to actually explore this type of function? (Expanded Expert 10).

The accessibility potentials of digital placemaking have been presented in previous studies (see Clarke, 2021; Szaszák & Kecskés, 2020). However, as described in previous findings, there is a need to also address risks and challenges such as excluding community groups or the community being unable to engage with the digital placemaking experience (see Table 5.9). A complete assessment of these risks is important to understand the dynamics involved in digital placemaking.

Challenge / Risk from Digital Placemaking	Connected to	Found in	Key studies
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Top-down	Community engagement – community-driven and co-creation	Round 1 Interview and Chapter 2	Latorre (2011)
Lack of community purpose	Round 1 Interview	Chapter 2	Chen et al. (2022), Foth (2017a)
Lack of genuine engagement		Chapter 2	Chen et al. (2022), Foth (2017a)
Power dynamics	Sense of place	Round 1 interview	
Privacy and online safety	Hybrid environment	Round1 interview and Chapter 2	Hurley, (2023, Kostopoulou and Fatah gen Schieck (2021), Li and Alencar, 2022, Najafi et al., 2021, Yang, 2023)
Digital stickiness	Hybrid environment	Round 1 interview	
Technological reliance	Hybrid environment	Round 1 interview and Chapter 2	Hespanhol (2022)
Digital literacy	Inclusion and Accessibility	Round 1 interview and Chapter 2	Clarke (2021), Klein (2022), Kolotouchkina et al. (2022), Maciej (2024), Najafi et al. (2021), Szaszák and Kecskés (2020)

Table 5.9: Challenges and Risks derived from Digital Placemaking's main characteristics.

5.12.1.2.5. Other aspects

This stage of the study has revealed a number of other important aspects that are part of digital placemaking as a concept, beyond the confirmed findings from the systematic review. Specifically, aspects involving meaning-making and behaviour change are found as additional elements to consider when creating and analysing a digital placemaking experience.

5.12.1.2.5.1. Meaning-making

Analysis of results has discovered digital placemaking to create meaningful experiences that promote place changes in the participant's mind and their use of the space. Beyond attractive experiences or appealing experiences, the key aspect of a successful digital

placemaking experience resides in the meaning created through it. This meaning is both individual and collective.

I just think of it as infusing place with layers of meaning that sort of socialised it from just being pure environmental, or bricks and mortar. (Expanded Expert 14).

It would be how to give meaning, and how to bring meaning by the users, and the community to the space. How to transform this space into a place (...) bringing activities and these activities when they are digital, they are not necessarily fully physical. This is for me, digital placemaking. (Expanded Expert 7).

You can bring things to a particular location, which maybe wouldn't naturally fit in there so you can play with different temporal dimensions, reconstruct the past in particular spaces, or reconstruct a potential future so you can play with dystopian futures, and therefore, raise awareness about it. (...) That increases the likelihood of you eventually getting a good solution that would have addressed a number of people meaningfully. (Expert 5).

There is no recipe for technology, it's always about the meaning that you manage to convey, is the discussion you manage to trigger among people. (Expert 2).

The role of meaning-making in placemaking is identified by Brunnberg & Frigo (2012), focusing on social encounters as important factors. Hespanhol (2018) explores its use in public spaces through co-design in digital placemaking initiatives. Individual and collective meaning-making are found to be important aspects of digital placemaking that also affect the other dynamics involved in the experience, such as place attachment. Recent studies allude to meaning-making through different placemaking typologies combined with digital technology (Atteneder & Lohmeier, 2024; Naji & Rzeszewski, 2022; Ouda, 2022). Ebaid (2023) call to combine place branding and meaning-making in placemaking strategies for the inclusion of all community members. Meaning-making is found to bring individuals together, and it is adapted to the place and the community in order to be effective. The value and meaning of public spaces are important, and the hybrid environment is crucial for them in digital placemaking (Chen et al., 2022). Through meaning-making, the digital placemaking experience allows consumers to

connect with the place and to connect with others in that place, developing belonging feelings that can have further effects, such as feelings of safety or comfort, supporting their wellbeing.

5.12.1.2.5.2. Behaviour Change

To affect behaviour change in the community has also been found as a characteristic of digital placemaking that has appeared during the evolution of the concept.

It's the new behavioural and cultural dimensions that are brought by technology to the practice of placemaking. (Expert 5).

It also makes me think, again, of that call to action (...) How does that change their relationship to that place? And how does it make me want to be a different kind of citizen within that place as well? (Expanded Expert 4)

It's probably this technological acceptance and familiarity with these aspects of technology that can be used for mobilising some sort of action. I think that placemaking always has been directed with some sort of action, something needs to happen. (Expanded Expert 5).

This behaviour change approach to the concept is linked to the connection created with the place but also with the ownership of the community towards the experience. Chen et al. (2022) include a behaviour path as one of the six design elements of digital placemaking, to which this work contributes by connecting behaviour change with meaning-making and having a call to action in the experience. When reflecting on the dynamics involved in digital placemaking that promote place attachment and community connectedness, the behaviour involved and the call to action that the experience has must be incorporated as elements to consider.

5.12.1.2.5.3. Challenges

However, linked to these characteristics, there is the challenge of motivating the community to participate and take part in the digital placemaking experience. Community

participation and involvement are basic in digital placemaking, but the ways to motivate them are a key challenge found in this analysis.

Because most people don't have the time, patience, or consciousness to appreciate a complex human being, especially in this sort of hyper-capitalist world that we live in, where attention is constantly being divided, and so much of the media is designed for us to get you to purchase something. (Expert 6).

And how do you motivate those people to then bring more people into the thing that helped them change? (Expert 4).

When you think about motivations, that's something that we're struggling with. I think it's probably quite different depending on the population you're addressing. (Expanded Expert 11).

Motivation in the digital placemaking experience is presented as a challenge, and participants do not have a clear blueprint on how to overcome it. However, if all the characteristics described earlier of digital placemaking – including meaning-making, place enhancement, storytelling, or gamification, as strategies to engage the community – were combined with the purpose of the experience being tied to the community's needs and they are co-creators, the assumption of the demotivation risk can decrease.

Finally, the analysis of the data suggested different approaches to the duration of the experience. The duration of digital placemaking varies among participants, which can be explained by the interdisciplinary approach to the term.

Digital placemaking is just a way to bring people together or bring the person to reflect, you shouldn't last too long. If in the real world, you have signs that last long, in digital placemaking, I think it's the opposite or the signs may fail if they are seen as stickers. (Expert 2).

They started as a temporary, one-off intervention, which again, is one of the characteristics of good placemaking. (Expert 5).

Part of placemaking it's a community-led process in perpetuity, forever. Digital by its very definition, might have a deadline or an expiration date. One question would be if it's successful, the digital placemaking approach, I would think it has to have a continuing ability for the community itself to drive that process of transformation in their own neighbourhood. (Expanded Expert 12).

The variety of duration examples and concepts for digital placemaking is aligned with the complexity of the concept and its interdisciplinary nature. Amirzadeh and Sharifi (2024) describe a shift from short-term to long-term placemaking. Participants also connect the duration of the experience with the assessment, its cost, and the lack of funds for long-term evaluation, which is a crucial challenge of digital placemaking. A summary of challenges from this section is presented in Table 5.10. Through this modified Delphi study, the aim is to shed some clarity on what duration to achieve in a consensual stage, if any.

Challenge / Risk from Digital Placemaking	Connected to	Found in
Motivation & Participation	Other characteristic	Round 1 Interview
Duration	Other characteristic	Round 1 interview

Table 5.10: Other Challenges and Risks of Digital Placemaking

5.12.1.3. The Pivotal Role of Analytics in Understanding Digital Placemaking

The aim of the thesis is to understand how digital placemaking as a place branding strategy can foster place attachment processes to promote community nature connectedness to support wellbeing. The assessment of the digital placemaking experience was important to comprehend how these dynamics have an actual effect on consumers. A key finding from the interview process has been the variety of evaluation or assessment methods described in digital placemaking and their challenges.

5.12.1.3.1. Confusion and challenges

How to measure the impact or success of a digital placemaking experience is also a confusing area, as there is no agreed procedure to employ. This is important as it presents

the complexity of the concept and the novelty of its nature, where aspects such as assessment are still an area to develop and find consensus.

I think coming up with those measures of success around placemaking, in general, via digital or otherwise, is very difficult. Because you're ultimately creating hierarchies of value among certain desires, and amongst certain relationships to place, which I feel an emotional effect on that. (Expert 1).

That's a huge new market, to be honest, about the return of investment on social return of investment, but also the common return of investment. We need to measure everything we do, and we need to learn from our mistakes as well. I think it's crucial to learn and to measure what we do all the time. (Expanded Expert 7).

It's always difficult, especially when you're trying to measure social and cultural outcomes, like when you're talking about social inclusion, identity construction, empowerment, public space appropriation... Big words, but very difficult to measure. Because of my approach is seeking those benefits and maybe not seeking economic ones, because the economic ones are always easier. (Expanded Expert 2).

Several challenges related to the assessment of the digital placemaking experiences are expressed during the interviews. However, measuring and assessing the experience is important to understand its effect and impact on the place consumers who are involved. Despite the importance of the assessment of digital placemaking, this topic has not been explored in the literature. To understand how digital placemaking fosters different dynamics and benefits, an assessment of the experience is needed, despite its difficulty.

Furthermore, a number of participants described an absence of assessment of the digital placemaking project they have been part of. This lack of real assessment of the projects beyond anecdotal evidence is very concerning, as digital placemaking projects involve communities for their benefit, but this benefit is, in the end, not the subject of evaluation.

I didn't really do an assessment of the project. The project was not about the assessment of placemaking, that was just a little part of it, and I was not even focusing on it. (Expert 2).

It's hard to talk about benefits because most of it hasn't necessarily been tried and evaluated, it's all very new. (Expert 5).

I don't think we've ever done any really drill-down assessment of any of the projects, that's really just sort of anecdotal evidence. (Expert 7).

I've never directly undertaken an evaluation of the success of digital placemaking, I've typically been kind of dealing with it more theoretically and how it's working. I don't think I would answer that from the perspective of having actually done a formal evaluation. (Expert 4).

Experts in digital placemaking identified a lack of assessment of digital placemaking in the real world due to their academic approach to the concept and their theoretical perspective. However, expanded experts are also identifying a lack of assessment of their practice. A gap in the literature is found in the assessment of digital placemaking. This could be explained by the complexity of the concept, which makes it difficult for the participants to fully understand its nuances, and other challenges.

Another reason for this is found to be related to project costs and funds, which do not last or cover the post-assessment of the digital placemaking experience. This problem resides in the value of creating short-term solutions that do not aim to assess long-term effects.

So many community projects, civic projects, they get funded to set up and start and then there's no funding to continue. And some of these things require public funding in one form or another, in order for their full impact or their full benefit to be realised. (Expert 6).

But that is something we did not do, and most of the time we do not do it because it is not accounted for inside the project's budgets. Two weeks after we had to return to Argentina. Of course, we were associated with local organisations, but still. I think the assessment is a huge topic and there is not so much critical inquiry on the matter. (Expanded Expert 2).

Funding challenges and constraints are described as crucial for the ability to measure the impact of digital placemaking. However, economic goals in placemaking and place activation have blurred the real aim and soul of the concept (Foth, 2017a; 2017b). This is contradictory to the aim of digital placemaking to create or foster a sense of place

attachment, inclusion, and community engagement dynamics, as there is not a process in place to ensure these dimensions have been measured or captured.

In line with the challenge of funding and evaluation, analysis presents the importance of tangible impact metrics and results to demonstrate the real effect of digital placemaking, which can influence the policy context.

What you can do with these digital tools is you can start to understand, collect and document these more personal perspectives on a larger scale. If it's on the map it counts, but also if you can show impact or indicators or something that translates into a policy context, based on these very subjective perspectives, then you actually can have an impact on that policy context. (Expert 9).

We gave also a template for how to assess it from a point of view that the council can then say, "We should fund the massive project of this because this meets our goals that we're targeting from the policy point of view, but also from the wider global sustainable development goals point of view". (Expanded Expert 13).

Since digital placemaking is focused on communities and fostering a sense of belonging and attachment, it is important to ensure the effects of this experience can influence policy for the good of the community and the environment. In order to promote the growth of digital placemaking as a concept, formal assessment of its impact is crucial to provide arguments to prove its value. To ensure how the different dynamics involve in digital placemaking influence consumers, assessment methods have to be in place.

5.12.1.3.2. Evaluation approaches

When exploring how to measure a digital placemaking experience, analysis has revealed the importance of defining success for each project. Again, there is not a single tool to use but an adaptation of the assessment method to what is considered success for the specific project.

When we consider what we've done a success, we need to measure that success, and if we don't measure their success, then you've just done something, it could be great, it could be whatever. When we've measured it, it's made a big difference

in terms of how we've been able to communicate and ultimately gain more attraction. A normal assessment method is important but knowing what you're trying to do first, being clear on what the goal is, what your objectives are, what the actual aim is. (Expanded Expert 13).

First, you have to define success. One thing that we've started to hone in on with our Nature Score (...) If your term of success is to make the population live longer, meaning they're just broadly healthier, then that's really what we're doing with Nature Score. (Expanded Expert 14).

We have some tools for specific KPIs indicators for measuring our success, we use a lot of place diagrams from PPS, as attributes, but also as tangible and intangible indicators for measuring our success. We use this, and we have worked on this in our projects in a very analogue way. But there is a huge potential for measurements on data, especially now that everything is more open, getting to a faster way of measuring what we do. (Expanded Expert 7).

In addition to the need to detangle the nuances of digital placemaking for achieving a mature state in the current paradigm, participants describe the importance of understanding the goal and aim of the project in order to define success and thus be able to assess the impact of the project. Purpose focused experiences are shown to be critical for the success definition of a project. Each project needs to have clear goals, aims and strategize its assessment against them to ensure 'success' is achieved. Success changes from one project to another, and with the digital realm that digital placemaking opens, participants described the potential for measuring. This can facilitate the assessment of digital placemaking, as digital tools can automate and collect a variety of data. But also, open new dimensions for assessment, such as specific digital measurements.

Specifically enquiring about methods, analysis has found a variety of approaches to evaluating digital placemaking. A number of participants described qualitative approaches to their practice, which reside on being present and involved in the place. This insider comprehension of the place and its dynamics is important to understand how to best assess the impact of digital placemaking.

The way in which we assessed the results was through several observations looking at how the space was functioning afterwards and also conducting interviews with people who were daily users of the space. (Expanded Expert 2).

For example, this digital tool can be used to engage people in activities that are real, I mean that happens for real, so the activity itself is a result. (...) Here we go in the realm of more qualitative approaches, more small data and not big data, actually tiny data, but very meaningful, because they're the subject is more, I will say it's deeper than just to study this proxy, that coming from the digital world. (Expanded Expert 16).

A range of different evaluation approaches are used to evaluate digital placemaking. Participants describe the implementation of a qualitative approach due to its richness and adaptability to the experience goal. This extends the work of Basaraba (2021), whose review found a primary use of ethnographic methods combined with observation and interviews. Participants shared different approaches to understanding the place, the community, and the project, based on conversations, relationships, and reflection. The digital dimension of digital placemaking is shown as an addition that can enhance the physical or analogue collection.

On the other hand, analysis also revealed the use of quantitative approaches. These are focused on the digital side of the experience and how that can track and measure the involvement and engagement of the participants. This opens up the realm of impact assessment in digital placemaking thanks to its digital enhancement of the physical experience.

In terms of digital placemaking, I will try to use the normal KPIs that you use in terms of measuring website rates, number of visitors, tribe engagement, and how long people spend concerned with these things. These will be typical measures that I would use in the first place. (Expanded Expert 5).

We use Nest Forms, an app where you can collect if you want data about religion, age, all of it from like 1900 people. There's just one app where you make your own form, and have it, so we do that for mapping. (Expanded Expert 15).

We use footfall, people will question that, but we think it's a very good measure, in the sense, that the data set we use is 97%, reliable. And it is actually a measure of a person in a place, it doesn't capture anything else and tell you how rich or poor they are, or whatever (...) There are others. There's place sentiment data, which we can quickly do. But also, the other measure is economic around business investment, new firm formation, the vacancy rates are a good one as well, how many active units either in a town centre or we can measure change over time. These are important KPIs for local stakeholders because they are quite easy things to measure or understand. That also gives us a universal measure, so we count the same things the same way across all locations, or we can make comparatives, or we can aggregate the data into something more meaningful, so we could then produce reports. (Expanded Expert 6).

I would like to see (...) a randomised controlled trial and grab to that level now but wearing wearable technology like Fitbit and Garmin watches so that we can actually get some biometric measures of heart rate and heart rate variability. When you get into that kind of neurofeedback, where people can see live what effect it's happening on them, we're going to have a lot more confidence in it. (Expanded Expert 14).

Participants described how digital can also support a quantitative approach to experience assessment by analysing data collected through the digital instrument in digital placemaking. A quantitative approach aims to quantify a problem to understand its dimension involving consumer behaviour (Cunha & Valente, 2019). Depending on the goal of the digital placemaking experience, the quantification of different aspects, such as digital users or health indicators, can help demonstrate its dimension and value. A variety of approaches are shared, which again confirms the interdisciplinary nature of digital placemaking and its adaptability to the project and the community. Furthermore, there is complexity in following a quantitative approach since digital placemaking is mainly used from a constructivist perspective that uses qualitative methods.

Finally, analysis also revealed the importance of combining mixed methods assessment in digital placemaking. The combination qualitative and quantitative methods aims to gain a more holistic understanding of the digital placemaking experience.

If you want to evaluate, you should use a combination of tools, both qualitative, if you want to go more on the effect of an initiative in the real world, on a small scale at the community level. And then also quantitative and data-driven in the technological sense, studying the data that you collected from the digital interfaces and platforms that you're using. (Expanded Expert 16).

It's not only about the stats, but I would also try to figure out how to help people based on this assessment. I'll go back to the apps, for example, what the visitation from the app is based on the visitation of the actual place that we're going, maybe there is a gap, a disparity there. I will try to have some focus groups, how I can make things better, or how I can make things more seamless, more hybrid, if you prefer so. (...) I would try to figure out ways to measure these ideas and based on that I would probably have different tools or techniques to use. (Expanded Expert 5).

We do questionnaires, surveys, and discussions with them through life-chat discussions to understand how their honest involvement, not with our activity, but with the practices that they learn from our activity, and how intense this involvement is. (Expanded Expert 8).

However, the importance of mixing both qualitative and quantitative analysis resides in the holistic assessment of the digital placemaking experience. Participants described the benefits of combining quantitative data, such as digital users quantification, surveys, etc., to deepen their understanding of digital placemaking through qualitative methods such as interviews or focus groups to understand the processes and dynamics involved. Recently, scholars called future studies to combine qualitative and quantitative methods exploring human-nature relationship (Barragan-Jason et al., 2024). Therefore, a mixed method approach assists to demonstrate the broad influence and effect of digital placemaking in the community and the environment. The potential described in mixed methods by participants could help in understanding digital placemaking dynamics when these involve a variety of variables, such as nature connectedness or wellbeing outcomes.

5.12.1.3.3. Assessing nature and wellbeing

Findings present the assessment of human health such as psychological tests or self-reported wellbeing questionnaires as the main way to evaluate wellbeing. The assessment

of the wellbeing impact of digital placemaking is important, as the different dynamics involved in digital placemaking described earlier could have a number of effects on the wellbeing of participants. Understanding how experts and expanded experts have addressed this is crucial for its evolution and refinement.

The main way we do it at the moment is in our research lab at the uni. We have a trail on the University that does six stations and takes about 20 minutes to complete. They do one walk, and then they just do one walk doing the six routines, and then we run their experience with about six different psychological tests. That's the main sort of really thorough way that we're measuring impact. (Expanded Expert 14).

We quantified it in terms of their self-reported wellbeing, what they see, and what they experience, giving them data back on that. (Expanded Expert 13).

You may measure some indicators of health, that are typically associated depending if we're talking about something that increases psychological wellbeing so then, we would assess something in that direction, like satisfaction with life and mental wellbeing or if we're also interested like in the physical activity, we can just look at the levels of physical activity for example, or blood pressure or some of these indicators that we clearly want to increase their physical activity. (Expanded Expert 15).

The diverse approach to wellbeing assessment in digital placemaking is aligned with the findings above on the difficulty of measuring this concept and how it has to be tailored to the experience. When assessing the wellbeing of the participants, only some members of the panel either used psychological tests or self-assessment reports. As described in the quantitative approach to the concept, there is the intrinsic complexity of measuring health indicators, which tends to subscribe to a positivist approach of research based on quantitative methods, whereas digital placemaking has been mostly approached through qualitative methods. Therefore, a mixed methods approach seems to provide a complete and more accurate analysis.

Additionally, when nature is involved as an element for analysis in digital placemaking, different approaches have been found. This provides further understanding of the

behaviours in the space and their impact on the participants, with some participants specifically looking at nature connectedness assessments.

The technical side of that, for us, was around data monitoring, and we use footfall counters. We have access to a national network of across 700 centres, and we were able to monitor so we can tell you if you invest in green infrastructure that will make a place more attractive, and more people come and they will stay longer, they'll have a nicer time, a better experience, and hopefully spend a bit more money on local business. (Expanded Expert 6).

In both of those studies, one of the things we've been interested in is not just whether can we get people's nature connectedness scores to change, but do people feel more connected. But actually, can we ensure that they stay changed as well? (Expanded Expert 1).

I also feel nature is a measurement for me. Because I know it naturally makes people happy, it actually makes people relax. Since we are adding components, it also should be something that's mandatory that every placemaker should think about nature. How many natural elements do you have to interact with? What are your activities like? Are all your activities demanding attention or are they demanding relaxation? Can you just have a serendipitous moment? (Expanded Expert 9).

Every budget has a forecast, it has impact metrics, and it's just hard to quantify nature and the impact it's having, because it's just a complicated web. (...). All those things historically have been hard to calculate because everyone had their own disparate approach, I think that creating a single unifying number, a Nature Score, hopefully, will allow politicians, cities, and researchers to just be able to start incorporating nature in their calculations. (Expanded Expert 11).

Nature can be measured in a number of ways, but an interest in the relationship between nature and participants and its effects was described. This is crucial for understanding digital placemaking dynamics involving nature and wellbeing and how these are interconnected. The way the panel connects human-nature relationships with the usage of space and the complexity of measuring this are found in this study. Nature connectedness is linked with behaviour change, which is also one of the characteristics of digital placemaking as found in the analysis. For one of the panel members (a placemaking practitioner), nature is a measurement itself, which means nature is undoubtedly linked

with wellbeing and is an aspect to take into account when designing the placemaking experience. In order to fully understand how digital placemaking in nature supports wellbeing, the assessment of both nature as an active element in the experience and wellbeing effects needs to be developed. This is aligned with the conceptual model, where nature is an intrinsic part of the physical place dimension. Nature has to be accounted for as an element that is connected with the online place and social place elements.

5.12.2. Findings II: Place Branding dimension of Digital Placemaking

Digital placemaking has been recently approached from a place marketing and branding perspective, through a tourism lens (Sugangga et al., 2021), and combined with place management (Keegan, 2021). Other studies might mention brand distribution in digital placemaking (Cameron, 2020) or places becoming added brands to cities in placemaking (Ouda, 2022), but without purposely diving into the place branding dimension of digital placemaking focused on local consumers. Findings on the place branding dimension of digital placemaking demonstrate the different connections between concepts, challenges, the participatory approach, and place branding in nature uses (Figure 5.6).

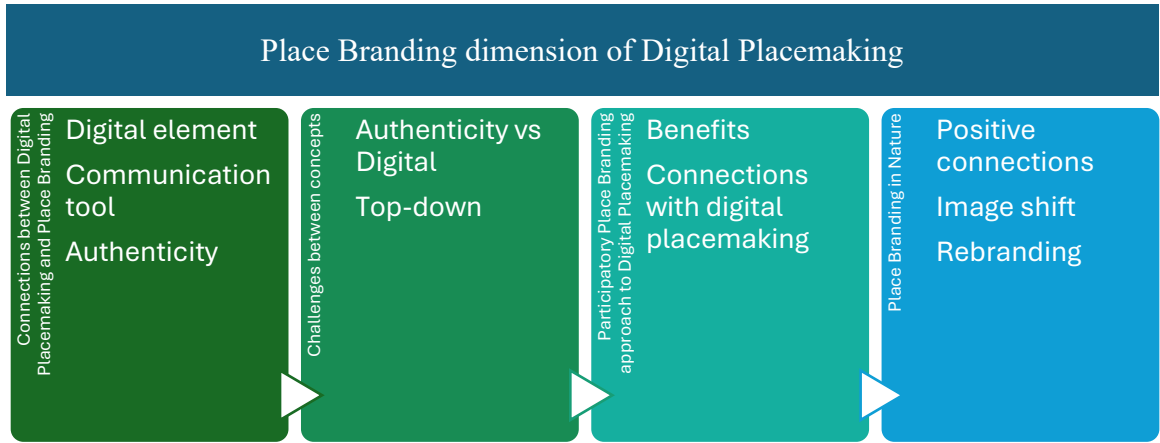


Figure 5.6: Summary of Findings of Place Branding dimension of Digital Placemaking.

5.12.2.1. *Connections between Digital Placemaking and Place Branding*

Analysis of the results shows clear associations between digital placemaking and place branding. The enhancement of the place brand through digital placemaking is the main connector found in this analysis. Place branding and digital placemaking work together in the place, enhancing the experience by allowing to digitally influence the impression and perception of the place.

I think digital placemaking could be used to enhance that in many, many aspects. It's just a matter of defining the place and how you're going to brand it and then what media and digital experience you create around that. I think it would be different for each kind of scenario. (Expert 8)

In terms of branding, I view that as an extra dimension that gets applied to all the other aesthetic and experiential design aspects that were already there, now we have this extra one. But it should still continue to work intendant, cohesively to communicate, to reinforce and to nurture that experience. (...) You can make use of that augmented dimension to also bring force to place branding, somehow. (Expert 5).

There are limits and perhaps possibly untapped potentialities around the digital technologies, how that might be used more creatively to enhance people's experience of place where they could share identity, or their perception of a place. That doesn't necessarily mean about driving visits or markets necessarily, I'm thinking very much about local attachment. (Expanded Expert 6).

Even if it's unconscious, it's a kind of place branding. You create a brand of community, a place, a neighbourhood, where you live, where you post a lot of pictures, your life is here, you're happy, your kids play in the park, you have a social life. (Expanded Expert 16).

The digital dimension of placemaking is the main connector found in this section between both concepts. Its digitality enhances the place experience, which is interrelated with the place brand. If the place branding process is taken into account in the digital placemaking experience, there are possibilities to enhance the brand formation or modification, strengthening it and allowing consumers to share their place identity and perception. Therefore, the place branding approach of digital placemaking resides in the enhancement

of the experience and the conscious branding of it to benefit consumers image and perception. Terms such as online place branding (Florek, 2011) or digital place brand management (Hanna & Rowley, 2015) have described the benefits of incorporating digital technologies in place branding processes. However, few studies specifically explore this dimension, while place branding has been called to be supported by online and offline actions (Graziano & Albanese, 2020). In this context, this study adds a digital dimension in place branding through digital placemaking, focusing on place experiences that can impact the brand of the place. The conceptual model created in this programme of research, which has been tested, confirms that digital placemaking has a place branding dimension that needs to be factored into the experiences.

Another aspect that connects digital placemaking and place branding is communication. As a communication tool, place branding can benefit digital placemaking through promoting and making conscious decisions on how to inform and share an experience. It also involves how that experience has an impact on the impressions of the consumers of the place, and how these consumers share their own stories of the place.

I always think of the branding and marketing in placemaking as is just the tip of the iceberg. Ideally it should make people realise that “oh, this is just the tip of the iceberg, that’s not the whole thing”. There’s so much more to this neighbourhood, or community, or place. (Expert 6).

That’s the thing, is that wisdom of the crowd, understand using social media channels to listen to what people already say about places through channels like Google reviews, TripAdvisor reviews, or whatever platform you want to look at. There are two elements there about communication and listening, and how that extend the place brand in a more democratic and inclusive way. That gets closer to what I understand digital placemaking. (Expanded Expert 6).

Oftentimes, that’s purely just through my mediated experiences of watching TikTok or Instagram or something like that. That’s something that, certainly in a marketing situation, should be taken advantage of. (...) I definitely see lots of utility. But it’s all about like showing off what makes your place unique, telling your place story. (Expert 3).

Place branding also helps communicate and position the digital placemaking experience in the head of the consumer and can leverage consumer interactions. Digital placemaking can better inform the place branding process through community engagement, which as described previously, also refers to community-driven activities. Moreover, the participants describe the rebranding possibilities of these experiences, which can modify the impression, image and perception of the place, also permeating their identity. The use of social media in digital placemaking have been explored to facilitate rebranding of places and raising awareness (Razi & Ziminski, 2022). This rebranding use in digital placemaking is extended to a deeper understanding of its use as a place branding strategy. These place branding dynamics through digital experiences can also enhance consumers' interactions and ownership of their place stories. The communication aspect of digital placemaking increased through place branding is relevant as it opens up a variety of strategies and potential benefits that will adapt to the place and community needs. The model outlined in Chapter 3 emphasises community participation and the value of the digital placemaking experience in enriching its positive outcomes. Therefore, digital placemaking as a place branding strategy can support identity processes in the community with the place.

One of the key aspects of place branding is authenticity. Examination of the results suggests authenticity is another element that connects place branding with digital placemaking. Authentic place experiences transform the ordinary into special moments or activities.

It is about creating some sense of specialness about that location, and what you define as a special would be aligned with the brand that you intend to create for that place, maybe a relaxing place, a place of for socialisation, a romantic place, sporting related place, luxurious, or accessible place. Whatever the intentions are

or the brand tagline you adopt, that should permeate all experiences that get designed. (Expert 5).

There's marketing done well, which is the stuff that you emotionally connect to. But especially in cities, where it has a wide group of people, there's things that everyone can relate to and it's finding those things that are unique to that space that don't feel generic. (Expanded Expert 13).

Authentic place experiences translate into meaningful encounters for the consumer, which enhance the place associations in their mind (Aitken & Campelo, 2011; Stoica et al., 2022). Panel members described how place branding brings specialness to the place experience, which can help to emotionally connect with the place. Meaning-making and gamification have been used in placemaking experiences (Klein, 2022), also to connect with nature spaces through augmented reality (Clowater, 2021). Meaningful digital placemaking experiences can be approached from a place branding perspective to ensure the authenticity of the place is aligned with the intention of the brand created through the experience. The conceptual model proposed and tested confirms that digital placemaking can promote a sense of belonging and authenticity, through meaningful experiences that impact the consumers' vision of a place and of their involvement within the place. This is supported by this finding, where authentic place experiences derived from meaningful place experiences are enhanced through place branding in digital placemaking.

5.12.2.2. Challenges between concepts

However, this authenticity that is promoted or boosted in the place experience seems contradictory. A close look at the findings indicates the digital tension between place branding and digital placemaking, as the uniqueness of a place is spread, which makes it common to others.

How do you create a sense of uniqueness around place that many people are going to experience? How do commonly make people feel that with branding they can still have some kind of experience that's different or unique to them. That's the

tension with digital placemaking and with place branding, because the more you digitise, the more it's going to become known and popular. (Expert 4).

To me place branding is critically important. And I think it's a great way to sell something. But it is so unique to that place that, I think the best way to use the digital technology is to use it to market why that place is unique, which is sort of stupid, because you're "this place is super unique" and then you're spreading it to the whole world to tell them why this place is unique. I do think sharing stories, sharing experiences, what is special and different about that place, and why that place is the only place in the world that has those characteristics. That's a really important message to spread. It's the stupidest way to use technology but I think you would want to market the unique special stories of people and places that's the way I would use the technology actually. (Expanded Expert 14).

The dichotomy of digital tools is present when discussing the authenticity and uniqueness of places that are promoted through place branding and digital placemaking. Despite being found as a connector, the digital dimension added through digital placemaking into place branding initially seems to be contradictory. Cameron (2020) criticises how placemaking uses media events as a spectacle of commodification spaces through digital technology. Digital placemaking distribution of the brand through global networks (e.g., social media) flattens and appropriates the social and cultural aspects of the community. However, this study challenges this view by proposing a participatory place branding approach to digital placemaking, where the local consumers are leading the process of creating the digital placemaking experience, where ethics and respect for social and cultural aspects are crucial for its success. The dimensions and characteristics found in digital placemaking in this study, with the importance of the ethical considerations, advance this approach to ensure the place experiences created enforce and benefit the community.

Other challenges have also been discovered during the assessment of the results. Primarily, a place branding approach to digital placemaking would create top-down place

experiences for a target audience, therefore excluding a percentage of the community, which leads to focusing on the economics of the place and ultimately to gentrification.

Branding is inherently focused on a specific demographic, a specific target market. Therefore, it's inherently not inclusive, in my view. It's very difficult to have a really great brand that's inclusive. I find this challenge interesting and an important one to consider. (Expanded Expert 13).

I think it's difficult to detach the branding of a place from the economic side. At some point, if you think "I want to upgrade the space, to make it more attractive" you always need to think, from which perspective? Clearly, you're not talking from the perspective of the poor women that are selling empanadas in the street, because that for you is not appealing. So attractive for whom? (Expanded Expert 2)

I must admit, there is a lot of place branding out there, which when it's top-down, feels so commercial, and kind of sanitised. All of those things which any discourse on gentrification and regeneration will point out to you. I've seen some of those digital assets, and they felt quite cold. It's felt of a commercial means of communication, marketing, advertising, branding. (Expanded Expert 4)

If you're trying to use branding and campaigns through social media, or anything else, you're going to need to be careful making that decision of who this is for and what you want it to say, and what effect you want that to have. (...) Something that has happened in places that I've lived at is, the celebration through social media, through branding campaigns, that were just signs or logos (...) it has no sense of place, and no sense of the reality of living in this place. And therefore, it didn't do anything for sense of belonging, that's just a marketing thing. That feels very separate from anything I know to be true. (Expert 1).

Scholars have criticised top-down place branding's processes as marginalising social groups, resulting in gentrified spaces (Lucarelli, 2018), with a strong focus on economic success (Govers, 2020). Gentrification is also a potential disadvantage from placemaking practices (e.g., Gonsalves et al., 2023). As with any other process that can affect consumers and residents, place branding and digital placemaking must address the risks and challenges involved in the experience. The place branding approach to digital placemaking should ensure the main characteristics of the latter are safeguarded. The community must stay at the core of the process, and ethical considerations are crucial.

Studies have explored the connections between place attachment and place branding, where co-creation of the place brand results in positive attachment feelings (Leal et al., 2022). The digital placemaking in nature for wellbeing conceptual model explores these dynamics along with nature connectedness and wellbeing outcomes to validate that digital placemaking from a place branding perspective can benefit communities and urban spaces, with attention to the place brand identity developed and the place brand image.

5.12.2.3. *Participatory Place Branding approach to Digital Placemaking*

Specifically, the participatory approach to place branding was found to provide a number of benefits to the concept, aligned with digital placemaking, as an answer to the evolution of the concepts and their challenges. Participatory place branding's success resides on communication and engagement of stakeholders, which empowers a place brand that resonates, and it is owned by the consumers and residents.

This is the problem with the place branding literature, there's not enough acknowledgement of participatory place branding. What we'd argue, 85% of top-down place branding strategies don't work, because they don't speak to the place and don't resonate locally. They've got to do it in partnership. (...) it could be transformative and visionary, but I think it's got to have that collective buying. It doesn't mean everyone; we never get everyone to subscribe to it but people see it and work towards it. (Expanded Expert 6).

I think branding is important, and participatory branding is a good idea, because it gives people a sense of agency and ownership of perhaps where that brand looks like, and it relates to them. (...) There's a really important point around branding, where we're at the moment, where it seems to be we acknowledge that branding is important, but to what extent do you go down? Because there's very different types of branding. I think the participatory element of it is important. I guess I would question about how that would look like. Because when you really think about urban areas, you can have a significantly wide variation of opinion, and views and aesthetics. (Expanded Expert 13).

I've seen some really great place branding out there, which has felt authentic, and having emerged organically out of that place, and always been created with a really deep listening, this place branding feels really real and not imposed. (Expanded Expert 4).

Panel members described the potential of implementing participatory place branding in cities due to its co-creative approach. Consumers are part of the process and are provided a sense of agency and ownership. Therefore, the place brand resonates with the community, as it feels authentic and real. Participatory place branding can provide pride and sense of belonging to the residents of the place (Zenker & Erfgen, 2014), and increase brand commitment (Hatch & Schultz, 2009). Results build upon these studies by including the sense of ownership and enhancing their benefits through digital placemaking. In the conceptual model, a participatory place branding approach to the concept is presented to ensure the place brand formed or modified is aligned with the community and that community feels connected to and responsible for it.

Furthermore, the study of data indicates a number of benefits from the inclusion of participants in the place branding process, whether this is an organic dynamic or facilitated by place branding experts. The participation of place consumers in the branding process is essential for its success and longevity.

It's interesting, because one of the ways you see places be branded that is really effectively is user created. If you Google "Pisa pushing", you know the leaning tower, people from all over the world do hashtag #PISAPushing, and you see them pushing the tower. That's a really good example of a user generated practice that has branded the place through. You're not trying to be unique, you're not the first person who did that, you're actually joining a group of people from all over the world who did the exact same thing. (Expert 4).

And they did so very successfully [X Market in the UK], but also it enables them to be mutable and sufficiently loose, so that people can pack into that brand. That's where good brands work, they don't complete the story, they are half finished frames that the consumer or the recipient of that message needs to fill in the gaps and imagine themselves in that landscape, in that place, or wherever it is. The modern market town did that very, very effectively. (Expanded Expert 6).

There's a bit of work done with informal settlements, and place branding, which is really, really interesting because these people themselves self-appropriate

spaces, they self-produced them to coproduction techniques. In that process, they create a brand. (Expert 10).

The inclusion of a participatory place branding approach to digital placemaking can empower the mentioned informal processes that develop group belonging and place ownership in the place brand (Chapter 3; Fernandez-Osso Fuentes et al., 2024a). This study suggests that consumer-created place brands are more effective due to the appropriation and production of the brand by the user. A participatory place branding approach to digital placemaking promotes place brand ownership and proactivity that will foster community belonging and identity, key dynamics in the model.

Thus, specifically analysing the place branding approach to digital placemaking, participants discussed the potential of participatory place branding. The role of consumers in the place branding process is aligned with the findings of digital placemaking characteristics.

The idea of trying to understand participatory place branding in the context of digital placemaking has to include this appreciation of how people are representing the place and how people are talking about the place, whether they think about the materiality of a place, but also when it comes to the digital, it becomes some sort of performative act, it is already, but the digital could probably hide and enhance that idea of performativity of who is doing a performance, of what the place means, or whatever. (...) There is potential, but I don't think it's quite clear how that work, because it's not even clear on the ground, it's usually top-down driven. (Expanded Expert 5).

For me, branding is not about objects, it's not about colour forms, sizes, shapes. It's about objectives, it's about sensations, it's about personal experiences towards the brand. It will make a difference about objects and objectives. And placemaking is about objectives. Making a participatory process about place branding, shouldn't be about which colour is your favourite. This is also very hegemonistic. (Expanded Expert 7).

The vision of a place is the product, not of consultants or academics, but on the people, the stakeholders who live there who mutually work together. I think that the digital communications give ordinary communities the power to do that, the tools and the mechanism, which previously wouldn't be impossible. A great

example of that is a town we've worked with in South Manchester, where there were 60 local traders, independent businesses, and they work together to collectively brand the location, which is "We are X". (...) Particularly useful during the pandemic as well, because they could advertise when shops were reopening, of what times and do more coordinated activity, setup home delivery systems and all that which is very useful. How you extend your experience of place online and reflect that through digital channels is perhaps not well understood, like the skills and capacities there locally, but can be very effective as a certain scale. (Expanded Expert 6).

Nowadays, place brands must have a strong component of participation since the place brand image and identity are created for and by the consumer. It was essential in the model to adopt a participatory place branding approach to digital placemaking due to the need to shift the focus from tourism and destination branding to local residents and consumers (Zenker & Erfgen, 2014). As shown earlier in this section, there are clear connections between these concepts, whose benefits and risks have been described. The potential of specifically approaching digital placemaking from a place branding perspective resides in the unique characteristics of the concept and its digital and hybrid dimensions (Chapter 3, Fernandez-Osso Fuentes et al., 2024a). The processes involved in digital placemaking, such as community engagement dynamics, meaning-making, and the hybrid environment, make a participatory place branding approach important for place brand identity and image formation and modification. Similar studies have explored digital storytelling in participatory place branding, proving the community wellbeing benefits of this strategy (Hudak, 2019). Their study is expanded by providing further strategies and tactics for digital mediation of place experiences, in nature for wellbeing.

Finally, participants called for the creation of specific guidelines to implement this participatory approach. The innovative aspect of implementing a participatory place branding approach to digital placemaking is found to potentially benefit consumers in a

number of areas. However, many times, panel members questioned how to achieve those outcomes as no clear instructions were available.

Especially talking about place branding, we have an opportunity to lead the way by providing guidelines that will allow people to get it right more than wrong. (Expert 5).

When I'm raising some of those concerns about how you address and make sure you're inclusive, it has to be an ongoing process. There's an agile type of approach to having a brand that usually a brand is defined, and then you stick with it, because then people remember it. (...) There's a point when it won't represent the community anymore. Or worse, it excludes people who don't relate to it. Therefore, it's so rigid, you can't go in and change it. It alienates people and excludes people, which is the complete opposite effect. I think that the key thing that you can only really do is just make sure that there's a process in which it can be adapted, and it can transform, and it can mould depending on who is participating. And that's a very challenging thing to do. (Expanded Expert 13).

The novelty of the digital placemaking in nature for wellbeing conceptual model, which is tested through this modified Delphi study, is the result of a number of consensus elements from the expert panel that will help guide facilitators and stakeholders that want to promote place attachment and community nature connectedness, supporting wellbeing using digital placemaking from a participatory place branding approach. Participants call for clear steps on how to implement participatory place branding in digital placemaking. The tested conceptual model will result in a set of statements that will fulfil this need in literature (e.g., Basaraba 2021; Kalandides et al., 2012) and practical contexts.

5.12.2.4. Place Branding for Nature

Finally, when exploring the connections between place branding and nature environments, the assessment of results indicated that branding has the potential to promote positive connections towards nature, which can also translate into pro-environmental behaviours.

But how are we going to do that unless everybody has positive, empathetic experiences with nature? There is a great paper called “less loss, more love branding biodiversity” from Futerra (2022). They make this really sensible argument that negative messaging about biodiversity in a psychological sense, in a marketing sense, doesn't work. If you scare people with dying polar bears and sea level rise, people turn off. But if you give people positive, empathetic connections with nature, essentially if they love it more, they're going to do more to look after it. When you're talking about branding, I guess that's what I'm thinking. (Expanded Expert 14).

Emotional and place attachment to natural settings through place branding can translate into nature connectedness and pro-environmental behaviours. Place branding can facilitate these processes thanks to the communication of a positive place image, identity, and brand, which is found to have greater effects on nature connectedness than negative messages. In this context, the spread of hopeful messages that connect optimistic feelings with nature through a place brand is found to be successful.

The evaluation of the findings implies the importance of branding for nature spaces as a way to attract consumers to natural settings and the value of technology to shift the image and experience of the place.

Branding is super important, and it seems like from our recent research, it's important for green spaces and trying to get people to them, and the same will happen, obviously, in other public spaces. But it's a challenge to get it right, to make sure it's inclusive. (Expanded Expert 13).

I think using technology to encourage people to experience specific places like for example, if it's a really remote place, it's difficult to get to, using digital media could help them navigate it or attract them there, in terms of a place branding perspective. I can think of a couple of examples from a tourism perspective (...) Having digital technology to help them get there to make it less of a struggle and reduce the barriers for them to access these kinds of remote nature places. Might be a couple of areas. (Expert 8)

In this sense, I think digital can have both a positive and negative impact on perpetuating the identity of green space. Or the place and nature. Sometimes it's done proactively, sometimes it's outside the control of the administrators of the green space. In the sense of the incivilities, that's outside their control, but they

could use that to modify the perception and address some of the concerns. (Expanded Expert 10).

As discussed in the Chapter 3, nature involvement in place branding studies is limited and focused on tourism (Graziano & Albanese, 2020). Results point to the need to advance in place branding involving digital technology for nature settings to create attractive and meaningful nature experiences that are adapted to the consumer's needs. The lack of participatory place branding examples involving technology and nature settings reveals the need to advance in this area as a way to address the current human-nature disconnection in cities.

Moreover, place branding has the potential to rebrand nature spaces as hybrid environments that open new accessibility possibilities to consumers. Digital placemaking and place branding can broaden the place opportunities for users and shift their perception of the place.

The main links will be the idea of creating hybrid places from the get-go, or places that have this aspect of openness, public green spaces, national parks, whatever. To treat them as hybrid spaces that are not only important for sustainability or to meet some sort of targets, the carbon zero net economy, whatever, but try to make them hybrid spaces that people can actually engage with in many aspects of their everyday life. Not everybody has the option to walk somewhere every day. (...) Flipping the narrative, not saying these things, it will be in the branding back there, branding these locations as hybrid spaces in the city that people can connect every day, but also from the comfort of their home, will be quite a beneficial story. (Expanded Expert 5).

Panel members described the need to include a digital enhancement to nature spaces to adapt them to the diverse needs of consumers and their lives. The digital element plays again a key role in creating bespoke experiences for place consumers that would help them create meaningful relationships with the place and augment the nature benefits. Nature can also benefit from a place branding approach to digital placemaking in the

communication of the possibilities of the space. In the conceptual model (Chapter 3, Fernandez-Osso Fuentes et al., 2024a), the participatory place branding approach to digital placemaking is crucial for the augmentation of the place experiences in nature, which is evident due to the place image, identity, and brand formation, modification, and communication.

5.12.3. Findings III: Online Place Attachment

Both digital placemaking and place branding are strongly connected with place attachment. The conceptual model of digital placemaking in nature for wellbeing is based on the modification of the place attachment tripartite by Scannell and Gifford (2010a), which includes the digital dimension in nature for wellbeing. Place attachment is a key process developed during digital placemaking and in any placemaking experience. However, its digital dimension has not been fully explored in literature. The conceptual model has been tested, and the data analysis has resulted in a deeper understanding of the digital dimension of place attachment, or online place attachment, as well as different strategies for its development (Figure 5.7)

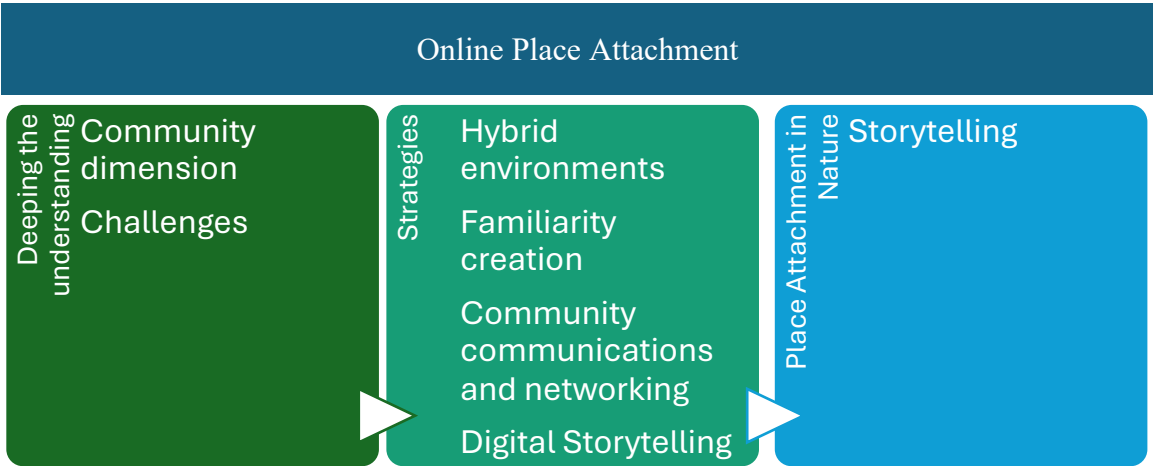


Figure 5.7: Summary of Findings of Online Place Attachment.

5.12.3.1. *Deepening the understanding on online place attachment*

The primary finding in this section is the value of digital and online tools to foster place attachment. Analysis of results shows that online place attachment developed through digital placemaking opens the concept to a community dimension, which has been overlooked in the literature (Lewicka, 2011). Digital placemaking is found to broaden place attachment on a community scale.

Maybe the social aspects, this is an interesting one to me, because quite often when I researched place attachment, and what I know of the literature, attachment is considered in a very individual way, my attachment to my favourite place. And then I think the possibility of digital placemaking opens that up to communities, how do how does this community feel attached this place? People can more easily communicate individual to individual about their different types of attachments, their different favourite memories and that kind of thing. It's broadening it to a different kind of scale, which is really interesting to me, and I think quite under researched. (Expanded Expert 3).

The community scale of online place attachment allows for deepening connections with the place and with others in the place, which has been mentioned in literature but tends to be overshadowed by the individual differences in place attachment (Lewicka, 2011). When exploring online place attachment, collective attachment is described as promoted through digital interactions where users can see other users' interactions in place virtually (Schwartz, 2015). Birnbaum et al. (2021) mention using digital tools to keep individuals connected to their original communities. However, no further analysis of the effect of this collective attachment in place attachment is studied in hybrid environments. Therefore, the model presents digital placemaking potential to broaden online place attachment's community dimension.

However, online place attachment also presents challenges for communities. Analysis of results determined the risks of technology use in place attachment, potentially being a

detriment for this process, as well as the challenge in the sensorial aspect of digital mediums for places.

I think that using a digital technology to augment real experiences, I don't think that helps with belonging, and with attachment to place. I actually think it takes away. (...) Sure, you can meet people in your little area online but it's not the same thing as meeting in your neighbourhood. (Expanded Expert 12).

I think we have a world have digital that's so visual and audio, oral I guess, but what we've seen is that we are missing that sensorial touch, that feeling of being together being in an environment where you smell where you feel, and even attempts to make you feel an emotion. I think the longer we live with the digital, the harder it is to feel the emotion from the digital that maybe we early on, we used to feel. (Expert 4).

Despite describing how digital placemaking faces different challenges that need to be considered, there is a gap in the literature on the challenges of online place attachment. The few studies that specifically explore this concept do not present any potential risks for communities. Therefore, this investigation advances the field of online place attachment by providing potential risks such as the limits of online belonging to physical places, the sensorial restrictions of technology for place experiences, and the contradictory nature of digital and physical encounters.

5.12.3.2. Strategies for online place attachment

In order to develop online place attachment, data results indicate that a hybrid environment is needed. The combination of physical and digital elements is essential for the creation of place attachment using digital media.

There must be a clear connection to the physical place that you are targeting. Even if you have digital layers on top of it, it's still the need to address or to somehow relate to the physical location must be something that, if experienced elsewhere is going to be a huge to different. It must foster feelings and experiences that, as a consequence, become attached to that physical location. (Expert 5).

A clear link to the targeted physical place is vital for the creation of online place attachment. As defined by Schwartz (2015), online place attachment refers to the online-offline personal connection to a physical space mediated by technology. The clear connection with a physical place is essential for user agency, meaning-making and sense of place in digital placemaking (Razi & Ziminski, 2022). Analysis of findings suggests that clear interconnected elements, both physical and digital, are needed to foster place attachment, where constant references to the physical place targeted are crucial for the creation of a sense of belonging to the place. In this sense, online place attachment introduces digital placemaking's hybrid environment as a way to facilitate the development of attachment feelings to the place. A clear connection to the physical place and considerations on how this connection is built are crucial. Therefore, the hybrid environment developed in the digital placemaking experience can foster online place attachment feelings among consumers.

When exploring uses or strategies for online place attachment, participants described the advantages of finding familiarity in unfamiliar places through digital technology. The analysis of the data presents how online place attachment can bring consumers closer to unknown places to develop belonging and community processes.

I kept thinking, "well, is that so bad? That you just want to get to your destination", because you've put all of this time and research into finding that destination and thinking that's where I'm going to belong in this unfamiliar space. If you're using some sort of aid to get you there, what else happens on the journey? And then what does that enable you to feel or to experience in terms of belonging, and community and things like that. (Expert 1).

Place attachment functions as a safe haven (Nisa et al., 2020), but online place attachment is described as reinforcing and maintaining the relationship with places (Schwartz, 2015). Therefore, this study broadens this field by providing a new way to foster online place

attachment to create familiarity with unknown places, which can develop into fostering place and community belonging. Online place attachment can act as a window into a new place, helping to discover its details and increasing place knowledge and awareness for future interactions.

Thanks to the community belonging created through online place attachment, the assessment of results presents the value of using digital technology to promote online place attachment through community communications and networking.

What digital media communications are enabled, which probably didn't happen previously as much, was for people to organise and create their own networks. I think that's where the place attachment stuff becomes important. Someone goes on at Facebook and goes "Oh, look at the state local park, I wish someone could clear the litter up, or I wonder if get some volunteers", and quickly you can do it. (Expanded Expert 6).

They can have that sense of familiarity and keeping connected and in the loop because of this digital access. (...) there's a place in Portugal that is very special to me. And on Facebook, I subscribed to the local council Facebook page so I get all these updates from the local council about like "oh, we opened this new cinema". "Oh, we're having a festival". It makes me feel like I'm in the loop about what is going on even though I'm here in the UK. It can be your way of maintaining that bond beyond physical experience or physical proximity. (Expanded Expert 3).

Online place attachment can provide information and familiarity with places the consumer has never visited, but they can also maintain the connection with a place over time. Specifically, the findings update Schwartz's (2015) study on online place attachment by providing ways to support place maintenance through digital communication channels beyond those that are location-based focused. The variety of technologies used in the concept is aligned with digital placemaking's definition (Chen et al., 2022). Consumers can interact with the place and with others in the place, allowing long-distance relationships to flourish.

Finally, online place attachment is found to be fostered through digital storytelling, where community members can share their stories of attachment with the place digitally. This not only acts as an archive of stories for the future but also opens up opportunities for stories to be shared.

People's stories as their journey to becoming attached to a place and the memories they have of that place, can then be conveyed in a digital way. That also means that they can be stored very well, because I think one of the challenges that can happen is people, if they just keep an oral or internal dialogue about their relationship with a place often that can get lost. (...) Having the digital archive of what a place is now, and then seeing how that changes over time as well, what are the different stories that starts to become important, I think that creates a lasting record of a place in an interactive way that supports place attachment. (Expanded Expert 3).

Although mentioned as one of the factors of online place attachment (Schwartz, 2015), digital storytelling has not been particularly studied in this realm. Heck and Tsai (2022) explore co-creative digital storytelling for place connections. Even though place attachment is not mentioned in their study, stories are found to create emotional connections and foster belonging with place. Involving digital placemaking, storytelling has been mentioned in several studies to help foster sense of place and attachment to place through digital narratives (e.g., Gonsalves et al., 2024; Hurley, 2023; Naji & Rzeszewski, 2022). The analysis of the results further develops the concept of storytelling through digital placemaking as a strategy to support place attachment, community belonging, and community heritage. Connected with previous findings, the role of meaning-making in digital placemaking (Low et al., 2022) to affect place attachment, storytelling could be employed as a strategy to boost these individual and collective processes. Storytelling can then enhance meaning-making and social identity – as described earlier – to support digital placemaking holistic dynamics.

5.12.3.3. *Place Attachment in Nature*

Exploring place attachment in nature, participants discussed the role of storytelling in fostering place attachment and belonging feelings with nature, linked to heritage and culture. The creation and spread of meaningful stories are important for the development of place attachment in natural settings.

You can also create belongingness with nature as well. For example, I am Greek, my idea of nature comes from what my grandfather, and his ancestors were actually talking about a piece of land that was belonging to that person, and this olive tree, that it's been here for 150 years, these stories. These little snippets of stories, or narratives can be very important in creating belonging. (Expanded Expert 5).

Storytelling can promote place attachment in natural settings by sharing narratives of the place as a way to foster belonging. Storytelling has been consistently present in these findings as a successful strategy to promote place attachment and place branding in digital placemaking. But when specifically analysing how to foster place attachment in nature, storytelling is found to enhance human-nature relationships. As a result, sharing stories of the belonging between people and nature can explain how digital placemaking can foster place attachment and community nature connectedness to support wellbeing.

Additionally, digital placemaking can also enhance place attachment processes in nature settings as a shortcut to increasing nature connectedness. Digital can open new possibilities and opportunities for nature engagement in cities, fostering feelings of belonging.

People like to be surrounded by nature, if it's too costly or too hard to replace a building with a natural space, or to create a new park or to regreen streets, then a shortcut is to promote that feeling associated to that place through digital means. It's not a solution, of course but if it's approached from your perspective like "this is helping to prove the point" (...) That would help them potentially to create a sense of place and longing for the physical transformation of that space

that is promoted through digital or digitally enhanced experiences. That's what comes to my mind immediately. (Expert 5).

Digital placemaking offers new opportunities to explore reconnections with nature by promoting place attachment processes that otherwise could take longer to develop. The digital advance can speed up attachment and belonging in nature spaces, as an enhancement for nature connectedness. In this sense, the model aims to serve as a framework to initiate nature interactions in cities that otherwise might be difficult, thanks to the number of benefits and unique characteristics of digital placemaking.

5.12.4. Findings IV: Digital Enhancement of Community Nature Connectedness

The novelty of the model resides in the focus on urban nature spaces to promote community nature connectedness. Specifically, the benefits of community nature connectedness and how it can be enhanced through digital technology are explored in this section (Figure 5.8).

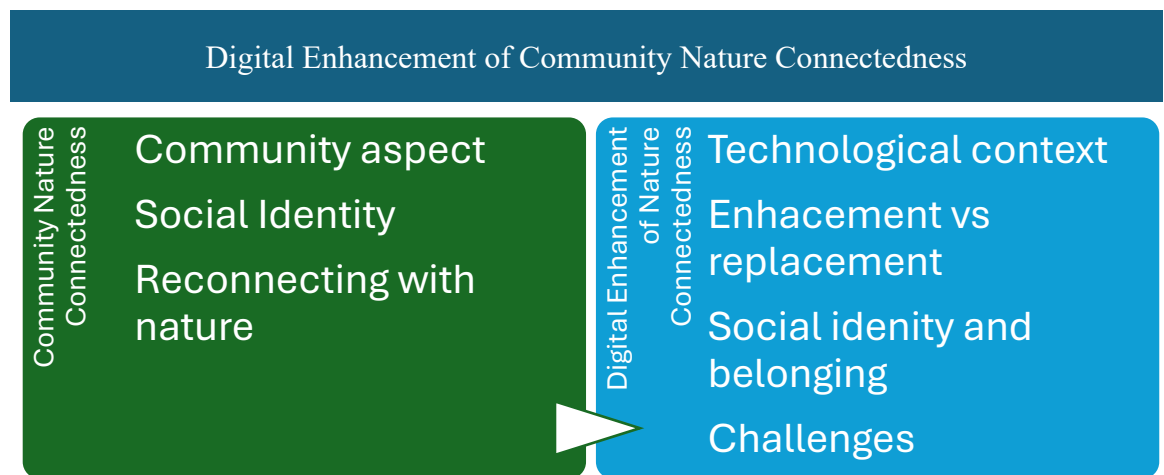


Figure 5.8: Summary of Findings of Digital Enhancement of Community Nature Connectedness.

5.12.4.1. Community nature connectedness

When exploring nature connectedness, the panel members described identity as a key element in the relationship with nature. Analysis of findings present how connecting with nature can affect people's identity, where nature is part of it. The connection and belonging feeling translate into identity formation or modification.

Then over time, that place becomes, literally like family. I couldn't think of a stronger sense of place than feeling like a piece of landscape was family. That word "home", I think is key. (...) I think it's the same with a place or what we're doing nature, you can't just look and go "a tree is a tree", but if you spend the time getting to know it, it becomes socialised and linked with your identity. It feels like home. And if you do that, for the birds, the cloud, the sky, or the rocks, the trees, the soil, the water, everything, then you have this incredible multi layered sensation of actually belonging. (Expanded Expert 14).

When you have this nature-based solutions, or an intervention that is newly made, the technology layer is one way to even just let citizens know that something's happening, to connect with them, to create a sense of unity. (Expanded Expert 16).

I guess that sense of belonging is also brought about through multiple users experiencing it. We only tested really one person at a time in the setting. But when you talk about belonging, it's also brought about through other creatures or things in that setting, other humans or animals or something like that, that helps with that. (Expert 10).

Nature connectedness refers to the relationship with nature, affecting how people see themselves as part of nature (Richardson et al., 2020). The socialised element described in the results refers to the broader relationship with nature and the elements within, which includes other people and living creatures. Group membership is internalised by individuals into their self-concept (Heath et al., 2017). Clayton and Opatow (2003) explore environmental identity framed in social identity to understand how experiences in nature impact the sense of self and pro-environmental behaviours, with different dimensions of social influence where animals are also included in the socialisation process. However, nature connectedness per se is not included in their study.

Furthermore, Mackay et al. (2021) mention nature connection as a form of collective identification from a social identity perspective, where recent studies describe a shift to group identification in human-nature connectedness (Lengieza & Aviste, 2024). Analysis demonstrates that this group membership can happen between humans and other living creatures and nature elements. Therefore, their work is advanced by including all actors in nature, animals and other living elements in the environment, which also play a role in socialisation and identity building with nature. This helps fill the gap between Social Identity Theory and nature connectedness, where the living actors in nature play a key role fostering connectedness and identity formation.

The study of the data indicates that the social aspect of nature is crucial for the development of nature connectedness. The community aspect that is created in and around nature plays a vital role in this relationship.

And I think there are two dimensions. Your contact with nature is one thing, how you feel is one point but also what you do. It's actually really interlinked. You do an action or an activity, (...) So you run in nature, how do you feel running in nature? But another action can be doing a picnic, for example, with your family. There is the activity part, there is the sentiment part. In all of these elements, the social component is also sometimes very prominent. Sometimes you do something in nature, with other people, with your friends, your family, with your kids. (Expanded Expert 16).

Everyone needs contact with nature. Everyone needs places to cool that they feel are part of their community and they can feel their selves out. From a population who will actually use the technology and benefit from it. (Expanded Expert 13).

The history or the heritage of a place, which I think is something you find in augmented reality apps already. And maybe an opportunity to share experiences about their visits to nature as well. Always they're a community around this green space, do I want to share photos of my visit? Or see what other people have been doing here? Maybe if it's a community garden, can I use this kind of digital tool to understand if I want to volunteer and join in myself? How could I do that? That's actually something I wonder when I go past a community garden, "oh, how do I get involved?" And often, it's not super easy to find that out. (Expanded Expert 3).

I guess the community element is also interesting. If there's some means by which the community could actually more formally engage with a green space or with the nature space, from a conservation perspective, I think that can be quite interesting. (Expanded Expert 10).

Group identification with a broader world is crucial to understanding nature connectedness (Mayer et al., 2009). However, the study of connections between Social Identity Theory and nature connectedness specifically are absent in literature. The analysis of results presents the important role of social identification and belonging in nature spaces to foster nature connectedness. Group activities in nature settings such as community gardens, or social gatherings can enhance engagement in nature spaces, where nature becomes another actor in the community, not only increasing nature connectedness but also pro-environmental behaviours. This shift from nature as a passive context as described in Chapter 2 Part A, to nature as an active actor is aligned with Boros et al. (2024) proposed change from nature-as-object to nature-as-subject in the more-than-human approach to planning and placemaking. This approach is extended in the presented results by adding a technological mediation to empower nature as an active subject. Social Identity Theory states how group identification affects pro-environmental attitudes (Maricchiolo et al., 2021) and focuses on the personal sense of belonging to a social group (Makri et al., 2021). The community dimension of nature connectedness found in the data analysis resides in the feeling of belonging to a group and to nature, where those dynamics interact, increasing nature connectedness. The model specifically combines Social Identity Theory in the community elements due to the high impact of community relationships in place attachment and also in nature connectedness, which can lead to wellbeing benefits (Leavell et al., 2019; Petersen et al., 2019; Richardson et al., 2020).

Furthermore, identity shifting is found as a strategy to help people reconnect with nature in the current urban environment. The idea of reframing the identity of a place, highly linked with place branding, is important to foster nature connectedness in cities.

There has been this initiative to make pocket parks out of parking spaces, starting in Hackney, in East London, I think it's kind of spread around. Now it's been managed by the local governments. Now you're not allowed to just turn your parking space into a little park, you have to get permission and it's a lot more complicated. But I thought that was quite interesting, because it was about the switching identity, the space is the same, it's not like they dug up the road or something, but just the identity of it changed because people put a little few plants on the bench in their parking space, which seemed like a very interesting twist to the sense of place and the identity of it. (Expanded Expert 3).

You see how the attach, how a new urbanistic endeavour actually, eventually, ended up reconnecting people with a piece of their natural environment, which is now at the centre of the identity of city. If you Google Drammen, and you see pictures of the river. (Expanded Expert 15).

A place identity can be changed for community purposes, and this is also applied to foster nature connectedness in urban environments. Involving place attachment and identity, nature connectedness can find ways to help consumers reconnect. Moreover, this can be a strategy to shift a place identity into nature spaces, from small actions such as pocket parks to larger-scale urban endeavours. The inclusion of nature elements in public spaces in cities, where there were none previously, can foster community nature connectedness and place attachment.

5.12.4.2. Digital enhancement of nature connectedness

Participants confirmed the importance of exploring digital mediations of nature experiences and nature connectedness due to the current technological environment in which communities live. Similarly to previous findings in place branding and place attachment, the role of technology in people's daily lives should update nature connectedness to the digital era.

Realistically, you have to meet people where they're at, I think that's a really key principle of nature connection mentoring, is meeting people where they're at. And where they're at is in the tech. In a way, meeting people there and coming through the technology into experiences with real live nature and real-life humans is going to be totally part of the future, I think, almost like an antidote within itself. (Expanded Expert 14).

There's a long history of nature and technology being at odds to a certain degree. But also, there is this indication that technology could be used to promote a reconnection with nature, by facilitating experiences that would, conduct people being in nature and bringing nature back to their lives. (Expert 5).

Findings present technology as an antidote to the over-digitalisation of consumers' lives. Despite sounding contradictory, technology is shown as a way to bring nature to consumers and help them connect with it, ultimately translating into experiencing non-digital nature. The value resides in the idea of reframing the human-nature relationship by shifting the use or purpose of technology in nature from replacing nature to enhancing the physical place experience.

Analysis of results points to the importance of clarifying that the digital placemaking experience is not a full replacement of the physical experience, which tends to be a misconception. On the contrary and aligned with the finding on digital placemaking's augmentation of place, the use of technology for nature connectedness resides in enhancing the nature experience instead.

Again, what we don't want to do is to replace nature but what we want to do is to try to use these digital modalities to enhance the experience of nature and actually increase nature connection for the children and young people. (...) Digital was always seen as a means to an end rather than an end in itself in terms of nature enhancement. And what they worked hard on was actually trying to ensure that it was designed in a way that the digital would not replace nature, but rather augment it. (Expanded Expert 10).

Challenging the digital approach to nature experiences, mostly focused on virtual or simulated nature (Brambilla et al., 2024; Litleskare et al., 2022), results suggest a shift to

augmentation and enhancement of nature experiences that combine digital and physical elements for nature connectedness. Less immersive technologies that focus on hybrid place experiences are proposed to combine physical nature with digital layers. Extending Livingston's (2022) study on the prospect of tour apps for biodiversity engagement, pro-environmental behaviours, and 'connection to nature' through place attachment, the hybrid environment approach enhances nature experiences, promoting a number of benefits for real nature connectedness and place attachment. Some of the benefits are outcomes of implementing digital placemaking, as described in previous sections, such as community ownership, and belonging and attachment feelings that support wellbeing. When interconnected to the finding of community nature connectedness, digital placemaking and technological mediations are found to foster social identity and belonging in nature connectedness. Aligned with the mentioned need to update nature connectedness in the current technological era, the benefits of community nature connectedness are explored by the participants.

I think digital placemaking or placemaking can be a vehicle for thinking about space differently in many senses. One can be in this sense in how to foster a connection with nature, at some point is a vehicle. Then is more thinking from the perspective of the citizens, what does it means for them to connect with nature? (...) You could use digital to make people connect with others and organise open gardens, they go together to upgrade and to make it greener. (Expanded Expert 2)

I think that example of digital placemaking campaigns, or digital placemaking practices, that listen to the ways that people are already practising stewardship, community gardening, things like that, and then coming up or designing digital or socio technical ways to enhance those activities, further encourage or expand those activities. (...) Anything that brings people together to think collectively or work collectively around a given issue or a given problem. (Expert 1).

The other big one, I think, to really successfully trigger connectedness, it's good to have an integration of the experience. If you have this amazing experience, it's a bit like taking a photo and never looking at it. But if you can share it with someone, that's great. It's hard to do that on the tech without resorting to

Facebook, which is what most online nature connection causes do. (Expanded Expert 14).

Maybe we are looking at ecological relationships. It's another lens. It's not only human lens, maybe the technology can give us the opportunity to look at it with another lens. (Expert 2).

Digital placemaking is found in this study to develop meaningful place experiences that foster community engagement and are community driven. When developed in a nature setting, the unique characteristics of digital placemaking can foster community nature connectedness. The social or community dimension augments nature connectedness and broadens its effect. The enhancement of social engagement in nature places through digital placemaking promotes place attachment in nature settings but also facilitates community-driven activities that will empower places. Moreover, it helps connect with other living actors in nature, such as animals. This finding supports the conceptual model, where digital placemaking is key to fostering place attachment and community nature connectedness for consumer wellbeing.

However, this approach to nature connectedness from a digital perspective is found to raise concerns due to the dichotomy of nature and technology. Technology tends to be demonised, and this is a challenge for digital placemaking for nature connectedness.

There's this dual conception of concepts in general. And it happened exactly the same with nature and digital. (...) How actually can digital benefit from nature? How can nature benefit from digital? Connecting these things, how to stop thinking always on black and white. (Expanded Expert 7).

There are a few dangers. First, the feeling that some of the people will always react saying "this is nature, digital, it's the antithesis". And try to let people know that the meaning of using digital tools is so they can coexist, it's not one or the other. So that's one danger. (Expanded Expert 16).

My only fear with saying that is that the people become reliant on the digital natural environment, and it is nice to get off your backside and go have a walk through the natural environment. Because again, it's the sound. It's the scent of the flowers, hearing the leaves rustle. It's all those sensory experiences that go

with it. Again, this is where you can start to build those things into the digital world. It gets back to that education dimension. (Expert 10).

The dichotomy of nature and digital is common in literature (e.g., Kesebir & Kesebir, 2017), fearing that digital nature replaces real experiences. However, the dual conception of technology should be overcome by understanding digital technology as a medium, not an end. Findings suggest this conception of technological use for nature has to be clearly stated to conquer this challenge. The fundamental characteristics of technological use in digital placemaking as a medium is aligned with this conception of nature and digital to help communities and environments grow.

Assessment of results provided further challenges in digital placemaking for nature, including ecosystem risks, the need for education and technological footprint. The assessment of risks in any practice that affects the environment and the living species within it is important to ensure the experience is ethical and safe.

Because if people do get to have those experiences [of nature and posting on social media], that can help them want to protect the places. I think there's like definitely a missing link in those kinds of conversations that I've seen on, which are like digital place-defending or guarding, or there's definitely a digital placemaking thing happening, but it's very contested in Instagram. (...) I think if there was just more education around how people could connect to nature with the digital versus going in and attacking people. (Expert 4).

The connection between digital placemaking and nature, it's less clear. In a way, any use of technology, particularly public use of technology and digital media has been for a long time criticised because of its environmental footprint. There have been efforts made to offset that footprint but that still remain, the potential consequences about lighting, or Wi-Fi and consequences to wildlife and so on. Not to mention the whole lifecycle of electronic components and the potential environmental damage that they promote. (Expert 5).

We are on cities that are in natural habitats. And a lot of the other animals that we share this planet with, are also now city or urban dwellers. We need to be so much more responsible for the way that we are sharing space with other forms of life. That's partly why I feel the park focus of placemaking and this challenge in all the major cities in the world of how we increase the ratio of residents per

square hectare of public space, and to increase that ratio so that there's more public space, park space, especially green space, available within a 10 minute. (Expert 6).

Linked with the detrimental effects of technology in communities, the results present a number of scenarios that need to be considered when developing nature experiences in a community. Aiming to understand how to use digital placemaking from a place branding perspective to foster place attachment and community nature connectedness to support wellbeing, key challenges and risks need to be accounted for to ensure the experience is safe for all users. Not only human risks, which have been considered in previous findings, but nature risks from the digital enhancement, such as the footprint of the technology implemented or the effect on other living creatures in the place, are crucial. The model not only focuses on consumer wellbeing, but findings suggest a broader perspective, including nature as a key actor as well as the different dynamics and living species involved in this habitat.

5.12.5. Findings V: Forecasting Digital Placemaking in Nature and Wellbeing

Finally, the assessment of results has provided a number of connectors, future uses, and strategies, as well as challenges to support wellbeing specifically. In the previous findings, digital placemaking, place branding, online place attachment, and community nature connectedness were explored, all interconnected and affecting each other. In this section, specific wellbeing outcomes from these dynamics are shown (Figure 5.9).

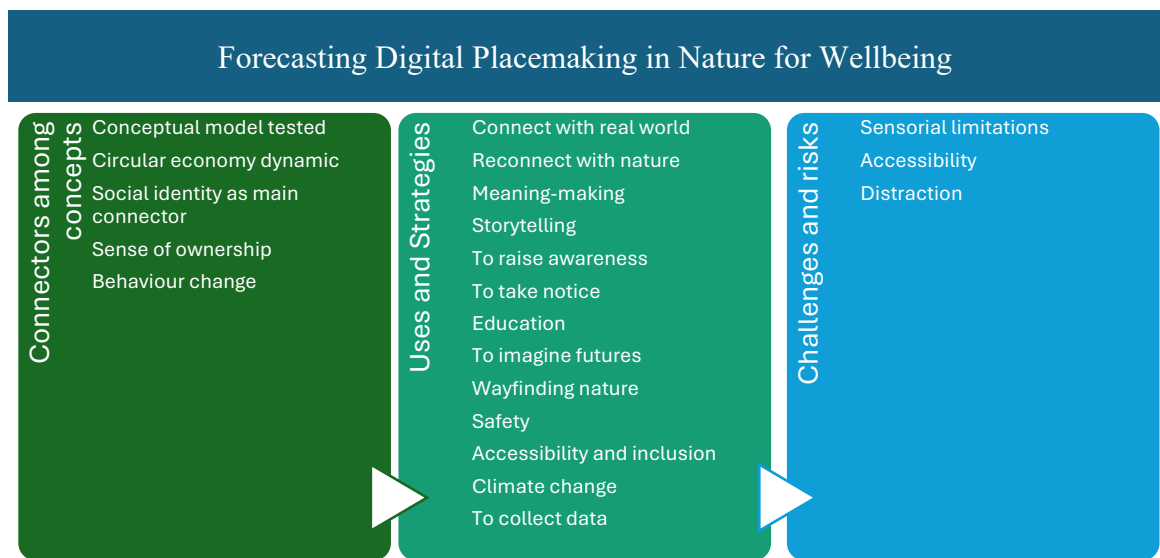


Figure 5.9: Summary of Findings of Forecasting Digital Placemaking in Nature and Wellbeing.

5.12.5.1. Connectors among concepts. Digital placemaking impact on nature for wellbeing

The connections among digital placemaking, nature and wellbeing are found to be part of a circular economy dynamic. The circular economy approach to digital placemaking, nature and wellbeing refers to the evident connection among these elements that cannot be autonomous but part of the same circular dynamic. Therefore, there is not an element that is prioritised over the others, but all of them interact and affect each other.

Digital placemaking, nature and wellbeing are part of the same circle. Nothing comes first, nothing comes second. This is important to understand and to ensure when we practice digital placemaking. These way of connections between themselves is ensured. At the same time, the circle goes in both directions. It does many loops, but on many different directions. None of them could be alone, autonomous. If they are connected, it should be connected through a circular way, on both directions of the circle. (Expanded Expert 8).

One of the things that I see in those kinds of different elements is their interrelatedness. We often focus on things, particularly if we're coming from a scientific background, we'll look at those, but actually we sometimes neglect to focus on the relationship between those things. (...) it's mostly about things that are most meaningful and potentially impact our wellbeing considerably as well, are about the relationships between things. And we're probably just starting to

understand some of those things in other dimensions as well. (Expanded Expert 1).

The circular approach to digital placemaking is novel in literature. The circular economy is a model that focuses on sharing, reusing, refurbishing and recycling existing materials and products to extend their life cycle, reduce waste to a minimum and create value (European Parliament, 2023). Scarce studies have incorporated a circular economy approach to analogue placemaking practices due to its benefit of developing resilience in communities (McKeown, 2021) and fostering regenerative processes involving tourism (Tomassini & Cavagnaro, 2022). Recently, scholars have called for future research to incorporate circular economy principles in digital placemaking methods (Petrovski et al., 2024). This PhD thesis found that the three main elements explored have been connected in past studies, where a hierarchy was understood due to the lack of depth in the nature and wellbeing elements (Fernandez-Osso Fuentes et al., 2023b). However, the digital placemaking in nature for wellbeing conceptual model (Chapter 3 Part B; Fernandez-Osso Fuentes et al., 2024a) presents an interdisciplinary and multidimensional approach that aligns with the network model of the circular economy, where all the different dynamics involved in the enhanced hybrid place experience have an effect on each other and on the consumer.

The analysis of the results demonstrates the connections among digital placemaking, nature and wellbeing, as well as its impact from an expert view. Participants described how digital mediations of place experiences can promote social identity and place attachment, positively impacting nature and people's connection with nature, which in the end supports their wellbeing.

This Facebook group I mentioned before that put everything together is social identity, or social interactions, and place attachment and restoration. But we're

looking at images of nature, and maybe even promotional visitation of places so that facilitate physical activity. I think that's a good example. (Expanded Expert 15).

The communal feeling of the people that are participating into our project, of course has to do with their wellbeing as well, because they are given a voice, they're given space to do or say something. And of course, they have as well a sense of belonging to somewhere with something very important. (Expanded Expert 14).

Social media platforms can act as a nexus that boosts social identity, place attachment, and pro-environmental behaviours in a nature space. The digital mediation is mentioned as a connector and enhancer that can facilitate physical connections with the place. El Khafif et al. (2021) describe how creative placemaking experiences based on connecting an online community with a person's physical community help improve community engagement and sense of local identity, positively affecting their physical, social and emotional wellbeing. Recently, Amirzadeh and Sharifi (2024) distinguished different placemaking paradigms such as sustainable placemaking and healthy placemaking, presenting several links to nature and its benefits. This PhD thesis builds upon this by clarifying how these benefits are found as outcomes of the different dynamics described in the model, where social identity enhances each process supporting wellbeing. Digital placemaking is a holistic concept that implements technology to inspire and augment real-world experiences and interactions, specifically promoting online communities to connect socially and with the environment. Chapter 2 presented three categories for understanding the wellbeing approach to digital placemaking, where health benefits were linked to nature and social resilience, to sense of place, or to psychological benefits from social relationships (Fernandez-Osso Fuentes et al., 2023b). In this chapter, digital placemaking is found to potentially benefit wellbeing due to nature connectedness, place attachment and social identity dynamics, which can promote pro-environmental behaviours. The

novelty is to combine all three elements in the model to propose an interdisciplinary approach to digital placemaking, where social identity acts as a binding agent that boosts all dynamics' benefits. Therefore, digital placemaking promotes place attachment and community nature connectedness through digitally mediating and acting as an amalgam that allows real and online interactions with others, with the place and with nature, which are demonstrated to support wellbeing.

As described throughout this chapter, social identity is the unifying force in the digital placemaking in nature for wellbeing model. The community identity and belonging created through digital means help enhance hybrid place experiences' effects on consumers. Not only can having a specific nature experience fosters place attachment and nature connectedness but involving other community members to interact foster a sense of identity and belonging that boosts these effects.

Using digital technology to boost the experience of the environment, so to make it easy for people to reach the environment and to enjoy it and maybe have a more meaningful experience there. And then creating a social relationship, because the environment is not just the physical environment, it's also the social environment. If technology can help creating or facilitating the access to both the social and physical environment, and therefore act as a facilitator in making people's holistic health better, that's an important thing. And I think technology has that potential. (Expanded Expert 15).

But I think even the app I-naturalist, for example, where you can go in and take a picture of a plant and then you can start to identify that. That and of itself is such a simple thing and it's so easy for us just to instal an app, and to take a picture of a plant and then you get information back about the species name, the genus, and then the popular name. (...) Then you see who else is taking pictures of it. You can see that there's a community of people who are actually following that. That's a very simple way of doing something that provides an act of awareness and then social learning associated with it, and ecological learning. It makes you feel connected to a group of people who are doing it together, and you could get really into it and start to catalogue and follow. (Expert 9).

Panel members indicated that the environment is formed by the physical attributes and the social relationships that are held there. This understanding of the meaningful place experiences built through the physical and social attributes of the place is aligned with the place elements in the original place attachment tripartite by Scannell and Gifford (2010a). However, members explained how technology can create or facilitate access to this approach to the environment, which is addressed in the modified place attachment tripartite (Chapter 3, Fernandez-Osso Fuentes et al., 2024a). The evidence points to hybrid environments in digital placemaking that allow the individual to have an enhanced place experience where relationships with others, with the place and with nature are formed. These results extend Boros et al. (2024) shift to nature-as-subject where technology represent nature and all its actors, and the important role of social relationships in nature connectedness supporting wellbeing (Leavell et al., 2019; Petersen et al., 2019; Richardson et al., 2020), by applying these understanding to a hybrid environment experience. The social relationship created through digital placemaking is vital in forming an identity and belonging feeling that boosts their attachment to place, their social membership and their nature connectedness.

Another connector found during the analysis is the sense of ownership through digital placemaking. As described in [Finding I](#), digital placemaking's community engagement, co-creation, and community-centred aspects of the concept are key in nature spaces to support wellbeing.

I think in digital placemaking, for nature, I guess the emphasis would need to be on making sure the user feels like they're in control, and they're getting what they want. Giving people control, giving people agency to have voice over their experiences to communicate that through this tool, this platform, whatever it is. Or to not share that if they want to, if they want to keep their experiences more personal and more private, then they can do that, too. It should offer the flexibility to do both. Centring the user and giving them control and agency would be my

most important connection between all the points [digital placemaking, nature and wellbeing]. (Expanded Expert 3).

The sense of ownership in nature experiences helps to support consumer wellbeing as the user feels in control of their place and its effect on their identity. Since nature connectedness refers to a subjective sense of connection with nature (Capaldi et al., 2015) and people's identities can be shared by the natural environment (Clayton & Opatow, 2003), data analysis demonstrates that this sense is linked to feeling responsible for the place experience, where the consumer acts beyond being a mere user but an active participant throughout the process. This approach to nature connectedness that emphasises the sense of ownership created through digital placemaking should be based on participatory place branding. This ensures the consumer is a co-creator of the place experience, fostering a specific place identity, image, and brand. In this context, the digital mediation of the place experience is essential to ensure consumers are connected with the place, with others, and with nature while giving them control in these interactions.

Beyond the specific impacts of the dynamics involved in digital placemaking in nature for wellbeing, most of the participants described the essential role of digital placemaking in promoting behaviour change towards nature connectedness and supporting wellbeing. As a way to reframe the human-nature relationship, digital placemaking is found to promote behaviour change as a way to ensure nature connectedness. Pro-environmental behaviours and wellbeing are long-lasting effects that help people reconnect with nature in cities.

I think the nature connection is obvious. I think everyone now understands that nature is good for us. But the difference is, so what? I know it's good, but I've got a busy day, (...) it's all behaviour change stuff. A digital placemaking intervention has to do with those two aspects, really. (...) The big connection [between nature,

wellbeing and digital placemaking], as I keep relating it back to our work, the important thread between it is that they're all trying to encourage behaviour change to a specific type of group of people who are willing to engage through that medium, which is digital interventions. (Expanded Expert 13).

Referring to the research problem described in this thesis, despite the proven benefits of nature experiences, urban consumers are experiencing a disconnection with nature due to a decrease in public space and an increase in the use of technology. However, data analysis describes how digital placemaking experiences should focus on promoting behaviour change towards nature connectedness, which can change the perception and behaviours in place (Maciej, 2024), develop pro-environmental behaviours (Richardson et al., 2020) and support wellbeing (Pritchard et al., 2020). The digital enhancement of place experiences can drive social behaviour change towards sustainability (Paraschivoiu & Layer-Wagner, 2021; Petrovski et al., 2024) and wellbeing (Clowater, 2021). We extend the domain of digital placemaking in nature for wellbeing by providing a number of dynamics that support wellbeing and nature connectedness through behaviour change. Social identity is found to bind place attachment and nature connectedness processes in hybrid place experiences created in digital placemaking. Group membership and identification can foster belonging with place and with nature, which can lead to pro-environmental behaviours that were not developed before joining the digital placemaking experience.

5.12.5.2. Uses and strategies.

When exploring specific uses or strategies to implement in digital placemaking in nature for wellbeing, data analysis presents a number of options that will be adapted to the place and community's needs, project limits, etc.

As described earlier, digital placemaking is approached as a medium and a strategy to enhance place experiences, not to replace them. The main use of digital placemaking in nature for wellbeing is to get consumers to interact with nature in the real world.

I do think it has potential to assist with one wellbeing or establish a strong connection with all three [digital placemaking, nature and wellbeing] if it's used as a complementary measure to get out there in in the real world. But, again, that depends on whether people have access, or the ability to gain access to those natural settings themselves. It can be used as way to support wellbeing, and I like just focusing on that term, but I think it really then needs to be supported by that real world contact. (Expert 10).

If we can use some of these tricks that engage people, to trick them into going in places that we know are good for the health and then in that way, all at the same time. If by being exposed to nature, then you also feel more connected to nature. And so maybe you also want to protect, maybe not become an environmentalist, but at least protect the natural environment that is around you. That's also integrated, then this reciprocal benefits between the environment and in people's heads as well. (Expanded Expert 15).

The iterative nature of placemaking and digital placemaking, that could be one potential strategy to use, reintroducing nature digitally to prove the points and then making the case for greening of certain areas of the city. That's a very good example of how that relationship can be enhanced. (Expert 5).

Digital placemaking is an enhancement of the place experience that creates a hybrid environment (Shih et al., 2021), which combines the physical-nature place setting with the online layer that provides extra meaning to the experience. Results demonstrate that the digital can be an invite to the physical to connect with nature in the real world, fostering place attachment and nature connectedness, which not only support wellbeing but also promote pro-environmental behaviours. The reciprocal relationships benefit the environment, the community, and the individual due to the circular economy dynamic described earlier. Furthermore, the digital adds an supplementary layer that creates meaning and enables connections among members and with the place.

Beyond connecting with nature in the physical space, digital placemaking is found to act as a mediator in prolonging the relationship in time and space, where the hybrid environment can act as a tool to enhance and extend the experience.

In the work that I've done with health and wellbeing has been about getting out there and that tangible way of being in nature. But if there's a way to keep that momentum going, to garner that interest to begin with, and then between visits keep that momentum happening. (Expanded Expert 4)

In terms of digital placemaking, whether it's something you're nostalgic for, that does or does not exist anymore, and you want to make a claim to how it was relevant to your identity, if it's something you aspire to, if it's just part of your everyday life already, I think that intersection of connectivity to others and location is a really important thing about what it is to be human. It used to be more organic when people lived in the same place for a long time but increasingly, people are much more mobile. We have more and more people who are not living in the place where they have their roots, so the digital is like this way of maybe putting down a temporary root more quickly and developing that sense of connection. (Expert 4).

Digital placemaking acts as an enhancer of the physical experience but also as a portal to maintain relationships even when the consumer is not physically in the place. The digital aspect can archive experiences, store memories, and lower physical barriers to ensure the consumer is connected with the place, with others, and with nature. This expression of their relationship beyond time and physical barriers has a significant effect on their identity, as they can resort to the hybrid place experience to manifest their identity.

Considering the challenge of urban nature spaces in the city, analysis of findings suggests that digital placemaking experiences that digitally augment versions of nature can help community members reconnect with nature when in urban environments. Usually perceived as a nature replacement, results support digitally rendered versions of nature in hybrid environments as a strategy to help consumers reconnect and experience nature environments.

Technology to create digitally rendered versions of nature, so that you increase feelings of wellbeing as if you were in nature where you're not. The reason why I bring that up, (...) it became a thing in certain places like in Seoul in South Korea. Actually, I interview the CEO of this museum in Seoul, literally to display digitally created natural landscapes, so that people could go there in the middle of the city and have some experience that would be akin to go into the mountains, for example. He kept saying that was his intention, I think he literally perceived that as potential, something that would help to reconnect people to nature. I would say that's probably not solving the problem but it's a fair point, as a strategy towards promoting or bringing nature back into the city. (Expert 5).

Digital nature experiences have been mainly approached using immersive technology (e.g., Brambilla et al., 2024; Litleskare et al., 2022). Other approaches to virtual nature that are less immersive can still promote wellbeing benefits (Sheffield et al., 2022) and act as a strategy to help communities reconnect with nature in urban environments. It can simulate nature experiences, enhancing wellbeing outcomes, but also encourage ecological restoration within the city. Augmentation of nature in place can support reframing the human-nature relationship by opening new ways to engage with and feel connected to nature.

Assessments of findings imply that meaning-making is crucial in enhancing nature connectedness for wellbeing through digital placemaking. Engagement in an experience that is important and meaningful to the consumer boosts their feelings of belonging with others, with place, and with nature.

We want to help people to meaningfully engage with nature, so they properly connect to it, recognising the emotions, they feel engaging their senses, tasting, touching kind of those sorts of things that feel like well, actually, we would tell our children and so as adults, we've almost forgotten that we can do those things as well. They are ways that enhance our lives in emotion types of dimensions, but probably beyond that, as well. (Expanded Expert 1).

The digital hybrid experience of nature adds a meaningful layer that aims to emotionally connect with the consumer of the place, enhancing the attachment created with the place,

with others, and with nature. Creating meaningful place experiences through digital placemaking is found to enhance emotional place attachment, fostering nature connectedness, which supports wellbeing. Despite meaning-making being explored in digital placemaking (e.g., Hespanhol, 2018; Ouda, 2022), its application to nature for wellbeing has not been accounted for. Specifically in nature for wellbeing, digital placemaking can enhance attachment and emotional connection with nature through experiences that are meaningful to the participant. The involvement of human senses and their expansion through digital play a critical role in this.

One of the strategies most mentioned for its success in digital placemaking during the analysis of results is storytelling. When specifically involving nature, storytelling is found as a characteristic of digital placemaking, place attachment, and its involvement in nature that can be used in place branding. Community nature connections in digital placemaking can be enhanced through storytelling strategies.

There's, there's so much utility, I mean, certainly I think digital placemaking could tell stories about climate change, about soil erosion, about wildfires in California. (Expert 3).

I do think that digital placemaking efforts that are about sharing feelings, sentiments, attachment, stories that already exist, are very, very powerful. (...) If we can think about other ways that people can either come together in physical space to physically talk about their investment in nature or show their investment or nature or other forms of digital media, other than social media smartphones (...) But that idea of sharing stories, sharing understanding, sharing value, sharing memories, I think all forms of digital media over the course of the past 20 years or more, has been about sharing memories. (Expert 1).

Sharing feelings, stories, and emotions regarding the attachment to place and to nature can increase not only individual wellbeing but also social belonging and community wellbeing. Previously, a narrative approach to place attachment for sustainable futures has called for including stories of place to depend on the understanding of community

needs (Goudriaan et al., 2023). Extending this work, community nature connectedness, and online place attachment developed through digital placemaking can support consumer wellbeing. Sharing nature and place stories that are augmented digitally can raise awareness of the value of nature, the benefits of nature connectedness, and foster belonging with place and with others, leading to support wellbeing.

Digital placemaking in nature for wellbeing can aim to raise awareness about the importance of nature and its effects on the consumer. Analysis of findings suggests it can raise awareness about biodiversity, nature places' uses that were not common before, and consciousness of nature's wellbeing effects.

The activities that have been put in place to help children and others raise awareness about biodiversity. I think there's many other ways in which you could do it as well. I mean, tree species identification, sharing experiences that you've had with nature, through apps, and so forth. (Expert 9).

Certainly, like Pokémon GO and other location-based games are a way that people get outside into the cemetery, which has a tonne of trees and is fully outside and you park and then you walk a couple miles. It brings people out who I would imagine wouldn't be out or wouldn't just walk on their own. That's good to see. (Expert 3).

That collective sense of accounting for place, the sensing of the environment, or the sensing of nature, on the part of citizens through these creative apparatuses, that then force you to have an awareness and consciousness of nature through a technology. But then the idea also being that the data produced will help you build a different sense of wellbeing or might, in some cases, encourage you to do some sort of physical activity, or engage further in a physical activity that you're already doing in order to create a sense of wellbeing in physical health mental health. (Expert 1).

Digital placemaking could help people on the earlier stages understanding and seeing the nature. (Expanded Expert 8).

Sanaeipoor and Emami (2020a) define digital placemaking to enhance public awareness about the place and facilitate urban regeneration. Data analysis presents raising awareness as a strategy used in digital placemaking for nature spaces in urban environments, which

can increase attention and recognition of the benefits of nature for biodiversity and wellbeing and bring new uses to nature spaces. Their understanding of digital placemaking is expanded, following Tsekeri et al. (2022) value on implementing digital technology in nature-based solutions to increase citizens' awareness of nature connectedness.

Similarly, assessment of data presents taking notice of nature as another goal for digital placemaking in nature for wellbeing. Besides being aware of nature and its impact, it is important to take notice and have nudges to make the consumer stop and appreciate nature and its effects.

My answer is that create an app that nudges people to notice and appreciate nature, even for a small amount of time, through our 12, or 14 different connection gateways that we've identified from the literature. (...) Find ways to get people doing the trails, put up big welcome signs, use the promotion of off the council's and the people who own them, do anywhere content into the apps. (Expanded Expert 14).

One approach has been to use app technology. Basically, mobile apps on people's phones, to get people to connect, (...) to remember to notice good things in nature, every day. And then to record those experiences and approaches. (Expanded Expert 1).

Noticing nature can be really helpful and beneficial. But we need things that will give us an incentive or a nudge to say, "why don't you do this?". On the other hand, the key things that could potentially benefit is quantifying what that benefit is. If you do notice that caterpillar that's walking along the leaf and you go "that's really cool" and notice the colours on it. How is the digital intervention helping you to understand that by doing that is better for you? What you've gained from it? There's a nudge and there's an impact, is a realisation that it's helped you. I think the latter bit is a bit more difficult. (Expanded Expert 13).

Noticing nature has a positive impact on nature connectedness, wellbeing, and pro-environmental behaviours, as found by Pocock et al. (2023). In their study, technology is commonly faced as a challenge with negative aspects in the connectedness process due to acting as a distraction when submitting data or problems on the platform. However, the

analysis of the data presents technology as an enhancer of place experiences that can boost the dynamics involved in place and therefore enhance the wellbeing benefits of nature by promoting pro-environmental behaviours. Digital placemaking can help take notice and educate about the impact of nature on wellbeing.

Linked to the educational aspect of being part of these place experiences, results point to using digital placemaking as a place management tool, where managers and decision-makers acknowledge the importance of creating places that maintain the human-nature relationship. The priority is to benefit nature through connectedness and positive relationships with the environment, which have an effect on wellbeing, beyond economical aspects.

I think we can use it to allow the managers, the decision-makers understand what that natural environment will be like in 5 years, 10 years, 20 years. Because they make decisions, a lot of times based on the cost of things right now. They don't see that if we spend, or if we keep the budget for the landscape architecture or landscape element the way it is and don't cut it, when in 5-10-20 years we'll get this beautiful environment that gets back to that education dimension as well. If we are able to show the maintenance relationship of those, it could work to the benefit of establishing that connection or using it as a tool to help with positive decisions towards the environment, instead of just cutting the landscape as one of the first things because it's going to cost too much or whatever. (Expert 10).

As understood as part of the place management trifecta (Keegan, 2021), placemaking, place marketing, and place maintenance are important in place experiences. However, the technological enhancement of nature to improve the human-nature relationship has been criticised due to the idea of technology replacing nature experiences. In this context, Galle et al. (2019) defend the use of technology for urban environmental management dynamics through the Internet of Nature concept. The dichotomised approach to the concept of digital placemaking and the defence of its use merely for environmental management are challenged to broaden the conception of technology for nature into enhancing place

experiences. While it can be used as a place management tool that improves environmental management through community co-creation processes, it also inevitably affects how the community experiences the place.

The analysis of results presents the potential of imagining futures for nature and sharing them with the community to encourage pro-environmental behaviours, raise awareness, and promote a participatory place brand.

That gets back to the place branding, as well, because you can say that in 20 years by doing this, the environment is going to look like that. That will then start to attract people, because you can imagine a new suburb, let's say, no trees, no nothing, everything's just planted. But 30 years, when the trees have grown, if they plant trees to begin with, then it'll look like a beautiful environment. People want to live there, they want to invest in in that setting, which will be different to a setting that just doesn't have any of those things in 30 years, it's the same. (Expert 10).

The other one would be raising awareness about potential consequences of urban life. Therefore, this idea of bringing potential possible futures, good or bad, showing potential directions that we could go as a society and a community, and all different scales of urban living. Technology can be very helpful, which is also storytelling in a way. It's telling different ends for our story, to simulate and communicate to people, that could be another way. (Expert 5).

Envisioning futures through augmented reality in digital placemaking has been explored to co-create utopian urban experiences and foster community belonging (Clarke, 2021). The navigation of omni-temporal places is key in place branding processes as it shapes the brand's meaning construction (Reynolds et al., 2024). The use of future representations of places in nature environments is expanded to promote nature connectedness, supporting wellbeing. The digital placemaking in nature for wellbeing model combines Social Identity Theory and participatory place branding to empower community place identity, image, and brand in nature connectedness to support wellbeing. The value of envisioning possible futures through digital placemaking resides

in the formation and modification of the place brand, identity, and image to adapt to community needs and desires while also promoting community belonging, nature connectedness, and place attachment, which support wellbeing.

One of the most repeated uses of digital placemaking in nature for wellbeing is to act as a way to find nature spaces in the city. Since the COVID-19 pandemic, studies have defended the revaluation of nature spaces in the city. Yet, the analysis described how citizens and place consumers do not have the information required to find urban nature spaces – where they are, what facilities they have, opening hours, etc.

The obvious one is around the active travel, and trails and using apps to encourage people to walk or maybe access. (...) During the pandemic, there wasn't a park necessarily that you could go to but there were all these other types of spaces, which I know of because I've just lived there a long time. It'd be interesting if you came to Manchester, and you could download an app, which would then create these trails and invite you into places. I mean, it does exist, Google does it somehow, but it's never been done in a more targeted way maybe. Often that app driven trail is aimed at tourists rather than people who live locally. (Expanded Expert 6).

I guess the digital technology, there is definitely central, because that's how people who know this new place exist, and then they get curious to visit it. Today, most of the information goes around through Facebook or social media anyways. It can also help in creating events that actually then take place there, for example. (Expanded Expert 15).

I had heard about people using biking apps for this as well. Not to map the quickest route, but to map the most beautiful. You want to go from A to B but you ride along the river, it finds you a path where you could appreciate nature and might take a little longer. That's sort of a sense of health, but the wellbeing aspect would come from just being in this beautiful space within your city that you didn't know existed. (Expert 1).

What that looks like in a tech sense is installing guided wellness walks in urban and semi urban parks (...) The idea is people would move from location to location, and we do it in a therapeutic flow that made sense, in alignment with literature. Originally, it was using a QR code on a sign and you would scan it and it would go to the web. Now that's evolved into an app that's geo located, so just when you get close to the site, the routine pops up and then you can hit play, and you can listen to the audio, or you can read the text. (Expanded Expert 14).

Digital placemaking can facilitate consumers finding, accessing, and engaging with nature places in the city while fostering place attachment and community nature connectedness to support wellbeing. It can facilitate place location and information while augmenting the place experience through guided walks or specific trails that are local-focused to increase belonging. Digital placemaking acts as a medium to enhance the nature experience by providing consumers with information and meaning to foster those dynamics.

Analysis of the results suggests that digital placemaking can help communities navigate safely through the city, either by showcasing safe paths or healthier paths due to nature. Beyond community interactions and establishing attachment with place, the wellbeing support of digital placemaking for nature stands in the safety aspect of travel.

Security and the flip side of security, safety and all that. We've not touched upon about health in these apps already, which monitor street level air quality. You could choose which way to navigate through the cleaner streets. (Expanded Expert 6).

For the connection with health and wellbeing that's all-around getting people to walk more safely. (...) To me, the goal is to get more active transportation infrastructure and to get more nature into the city environment that's going to improve on so much of your health and wellbeing outcomes. If there's a way that digital technology can help with that, in a way that has a placemaking approach where the community is the expert, the community is driving the process, you consult everybody every step of the way, and they're the one leading that transformation forward, then yes, that would be the connection, but I just don't know what that looks like. (Expanded Expert 12).

Safety and its promotion through digital placemaking have been mainly focused on refugee experiences (Kale, 2019), online data use (Pang et al., 2020a), and safety in public spaces, specifically towards women (Toland et al., 2020). This thesis extends their approach to forecasting the use of digital placemaking in nature for wellbeing, where

safety journeys and paths involving the health benefits of nature can be promoted. Data assessment suggests digital placemaking can promote safe mobility in the city and encourage communities to connect with nature, supporting their wellbeing.

Additionally, the digital aspect of these experiences can also bring nature to those with no access, lowering the entry barriers and promoting accessibility and inclusion. It is important that digital technologies not only augment the physical place but also increase the accessibility of those places to community members that would be traditionally excluded.

Somebody did little soundscapes and visuals of nature, and they shared that in their local community group, it may have been a WhatsApp thing or a Facebook thing. They said that felt really important to them, because they weren't near a park, or any sort of big green space like that. They knew that it wasn't the real thing, they knew that it was compensating for something that was a lack but they said it really made a difference to them in that moment. (Expanded Expert 4).

Definitely see a lot of opportunities for connecting people who've been historically excluded from certain spaces. If you think about nature, various minoritized groups or people with disabilities, thinking about somebody in a wheelchair being able to know exactly which trails are accessible, where there's going to be support, where there might be a challenge, what the nature of that challenge is, maybe they want that challenge, but just having that information, that accessibility. I think just opens up spaces to more people in terms of just like the inclusive nature of space. (Expert 4).

But we also have the Castlefield via, which is a very big strip on this disused rail track in Castlefield the has become a garden. I would be beautiful to have live events, a daily walk, that can be presented digitally where people who are actually unable to go have an idea of how this place looks like every day, that could be like a digital walk for them. It is democratising in a sense that it makes it more open, we're not making these spaces for the few, it has to be uploaded by everybody who lives in town, that's how you can actually create those emotional connections, even when you cannot actually physically visit the space. (Expanded Expert 5).

For us, we see technology as an enabler to improve access and reduce inequalities in access to nature. What we would not want to see is technology being used as a substitute for nature, but rather as a means of helping people access nature more easily, if that makes sense. (Expanded Expert 10).

Studies have explored using digital placemaking to bring inclusion to individuals with mobility restrictions (Szaszák & Kecskés, 2020) or capture and share the stories of excluded groups (Stokes et al., 2021). Their approach is extended by proposing the potential of augmenting nature place experiences beyond virtual nature through digital placemaking, where communities can connect with nature and with others in nature. It opens up accessibility and inclusion opportunities due to the particularities of the concept. Accessibility opportunities help build stronger communities where individuals build a social identity that includes all members despite their differences.

Involving nature for wellbeing, data analysis presents climate change as a common challenge that can be tackled through digital placemaking. Climate change is part of the research problem faced in this study, as the disconnection between people and nature also affects the current impact of climate change and the solutions around this challenge. Data analysis suggests digital placemaking combined in nature for wellbeing can reframe this relationship using technological tools that promote wellbeing and promote pro-environmental behaviours.

Of course, the climate crisis is not going to go away either, so addressing our relationship with nature, across everything we do, and particularly when it comes to the environments that most of us live in, which are cities, with the tools that we live with every day, which are technological tools, becomes quite important. We need to promote wellbeing in those situations, because we don't have any other choice. (Expert 5).

I think that's where we can connect very well the three [digital placemaking, nature and wellbeing]. Looking at common challenges. The climate change issue is one of the ones we need to work on, the first one, but then we can work later on others. (Expanded Expert 7).

It's also necessary to potentially proactively use this as a modality to increase nature connection. That is more not just for the wellbeing of the individuals, in terms of improving mental health and wellbeing, but also just in terms of looking at climate change and ensuring that children and young people have a strong appreciation for nature and protecting it. (Expanded Expert 10).

As described earlier, the promotion of community nature connectedness through digital placemaking can foster pro-environmental behaviours and concerns (Richardson et al., 2020), psychologically benefit place consumers through place attachment (Scannell & Gifford, 2017), and mediate nature connectedness and wellbeing (Basu et al., 2020). In the broader picture, the implementation of the conceptual model can also help cities become climate resilience (Gulstrud et al., 2018) and provide a clear strategy in smart city planning for healthy social spaces (Thompson et al., 2023), as a way to help mitigate climate change in urban environments while supporting consumer wellbeing. This is aligned with Amirzadeh and Sharifi (2024) major change on the evolution of placemaking to building resilient cities.

Finally, beyond promoting relationships with nature for wellbeing, digital placemaking is found in the analysis to act as a tool to collect data, linked with the evaluation section of the findings of the concept.

What I see is that the digital placemaking tools, initiatives and things are made to promote a place but especially to collect data through digital platforms. When you add the data, then you study the two other areas, the two other elements, the nature part and the health part, the wellbeing of people. But what we do a lot is using the digital placemaking tool, not only for promoting, but also as a side effect, to collect the data to be able to study the phenomenon at large. (Expanded Expert 16).

The value of digital placemaking as a data collection tool specifically involving nature and wellbeing is found as another strategy or use in this context. As described earlier, the digital dimension of the concept opens up a number of benefits for data collection, specifically. Beyond promoting relationships among users and the different dynamics tested by the model, digital placemaking can add the benefit of collecting data for further study.

5.12.5.3. Challenges and risks

Despite the numerous benefits and uses of digital placemaking in nature for wellbeing, analysis of data shows several challenges and risks that need to be considered when implementing these experiences. Specifically involving wellbeing, participants described the detrimental role of digital; not only the sensorial limitations of technology but also the digital elements are presented as distractions that take away from the experience. Technology accessibility is a risk when creating digital placemaking experiences in nature for wellbeing.

We're moving out of the digital to live the experience and the psychological benefits. I mean, what would you rather do, go to a forest or look at a picture of a forest or walk through that forest with a GoPro? It's not the same in terms of the multi-sensory experiences you can get from lived experience. I don't think we'll ever be fully replicated no matter how clever AI gets and all that. There's always limits to it and therefore, there are probably limits to the transformative power of digital placemaking. (Expanded Expert 6).

Especially if we are talking about health and wellbeing, who are the most in need of the access of green, those that maybe their households are like super small, and they share with like a large family? I think in that sense, how do you do and how do you guarantee that everyone is going to have a phone or something to connect and bridge the gap from the physical. (Expanded Expert 2)

I think the technology would be a distraction from it. I think that would be where you would do the reverse, where you take physical nature, and you replicate it in a virtual space, so that people experience nature simulated. So that's where I think the reverse would be more useful. (Expert 8)

Digital placemaking presents a number of limits that need to be considered (see Table 5.11), as described earlier in [Finding I](#). When targeting nature for wellbeing, further assessment needs to be considered to ensure the place experience that is augmented is ethical and safe for consumers. Digital placemaking does not aim to be a replacement for nature experiences; it needs to be adapted to the characteristics and needs of the community and provide tools for them to be in charge and take ownership of their place.

Extending Foth's (2017a) urban guerrilla placemaking into the digital realm, potential opportunities and challenges to support consumer wellbeing through urban nature experiences are proposed. Considering the complexity of urban spaces, communities, and the involvement of technology, a number of challenges that need to be considered to ensure digital placemaking is optimised for the community are described.

Challenge / Risk from Digital Placemaking	Connected to	Found in
Detrimental role of technology	Digital Placemaking in nature for wellbeing	Round 1 Interview
Sensorial Limitation	Digital Placemaking in nature for wellbeing	Round 1 Interview
Digital as a distraction	Digital Placemaking in nature for wellbeing	Round 1 Interview

Table 5.11: Challenges and Risks of Digital Placemaking in nature for wellbeing

5.4.5.1. Summary of Round One Findings

The analysis of results from the Delphi Round One of qualitative semi-structured interviews presents five thematic results involving digital placemaking as a concept, the place branding dimension of digital placemaking, online place attachment, digital enhancement of community nature connectedness and the results of forecasting digital placemaking in nature for wellbeing. Each thematic finding is divided into different sections exploring connectors, challenges and other aspects such as the definition and maturity of the concept of digital placemaking or the pivotal role of analytics in its understanding. Therefore, the initial round of this modified Delphi study results in a thorough understanding of the different dynamics involved in digital placemaking, also specifically involving nature and wellbeing, which informs the consequent rounds of questionnaires to gauge agreement among participants. Findings from the Delphi round

one informs the consequent questionnaire rounds to gauge agreement and achieve consensus.

5.13. Round two: Questionnaire.

Round one was analysed and informed round two questionnaire creation. Round two data collection occurred from the 4th of December 2023 to the 29th of January 2024 and was sent to all participants (n = 26). Participants received a link to fill out the Delphi round two questionnaire with a time span of 8 weeks due to the holiday season. A total of twenty-three responses (88,46%) on the Delphi round two questionnaire were received (Table 5.12)

5.13.1. Factors presented to the panel in round two.

From round one analysis, the round two questionnaire included a total of one hundred and forty items for participants to review using a 5-point Likert scale. Items were divided into three sections: digital placemaking, place attachment and place branding, and nature and wellbeing implications. A total of twenty-three responses were recorded.

Items were developed from the initial interview analysis. Criterion for item selection was the strength of the item in the interview analysis. Item list was reduced to minimise the time it would take the participants to complete, with an ideal 10-15 final time. The questionnaire rounds were tested with independent researchers. Some items were collected together under the same statement, for example in the digital placemaking and nature section “3. Digital placemaking can be used as a way to find, explore and discover nature places (e.g., place information, audio guides)”.

This round was formed by ten items from the digital placemaking definition and twenty-one items from the digital placemaking characteristics. Fifteen items from digital placemaking challenges. Nine items from technology are used in digital placemaking. Eighteen items from measurement in digital placemaking. Ten items from the place attachment. Fourteen items from place branding. Eighteen items from digital placemaking

and nature. Six items from digital placemaking and wellbeing. Nineteen items from digital placemaking in nature for wellbeing (Appendix G).

5.13.2. Descriptive Statistics: Agreement of Items.

Descriptive analysis was performed on the quantitative responses, including the percentage of agreement, mean, SD, median, and IQR displayed in Table 5.12. Responses of ‘agree’ and ‘strongly agree’ were combined to conclude the percentage of panellists’ agreement on an item. Similar process was followed for “disagree” and “strongly disagree”. A cut-off of at least 70% was prescribed for a level of agreement to be noteworthy (Avella, 2016). One item achieved >70% on the combination of ‘disagree’ and ‘strongly disagree’ and was also included in the following round to consolidate the disagreement in that item. The level of agreement indicated the initial consensus among participants on an item. The level of agreement combined with other descriptive statistics data was used to understand the dispersion of responses and further consolidate the level of agreement.

Item category	Item	Disagreement %	Agreement %	Mean	SD	Median	IQR
Definition of digital placemaking	Digital placemaking is an umbrella term	0.00	87.00*	4.13	0.612	4.00	0.50
Definition of digital placemaking	Placemaking is digital nowadays	73.90*	13.00	2.17	1.049	2.00	1.00
Definition of digital placemaking	Digital placemaking should be defined as a tool	30.40	47.80	3.35	1.202	3.00	2.00
Definition of digital placemaking	Digital placemaking should be defined as a process	13.00	78.20	3.96	0.955	4.00	1.00
Definition of digital placemaking	Sense of place/place attachment is a key aspect in the digital placemaking definition	4.30	82.60*	4.09	0.775	4.00	1.00
Definition of digital placemaking	Hybrid place experience (mixing the physical space with a digital layer) is a key aspect of the digital placemaking definition	4.30	78.30*	3.96	0.908	4.00	0.50
Definition of digital placemaking	Community connection is a key aspect of the digital placemaking definition	8.70	73.90*	3.96	0.908	4.00	1.50
Definition of digital placemaking	The physical place characteristics/connection (as an anchor) is a key aspect in the digital placemaking definition	0.00	78.30*	4.13	0.74	4.00	1.00
Definition of digital placemaking	Enhancement of the place is a key aspect of the digital placemaking definition	8.70	56.50	3.74	0.943	4.00	1.50
Definition of digital placemaking	An attractive/enjoyable experience is a key aspect of the digital placemaking definition	13.00	52.20	3.43	0.924	4.00	1.00

Characteristics of digital placemaking	The digital element of digital placemaking brings back to the physical place	4.30	65.20	3.78	0.778	4.00	1.00
Characteristics of digital placemaking	Inclusion and accessibility are key characteristics of digital placemaking	4.30	78.20	4	0.933	4.00	1.00
Characteristics of digital placemaking	Digital placemaking experiences should focus on one target audience	69.60	13.00	2.22	1.061	2.00	1.50
Characteristics of digital placemaking	Digital placemaking creates a place for people to connect with each other	8.70	43.50	3.43	0.77	3.00	1.00
Characteristics of digital placemaking	Co-creation is a key characteristic of digital placemaking	13.00	52.10	3.65	1.127	4.00	2.00
Characteristics of digital placemaking	The community is the expert in digital placemaking	21.70	56.50	3.43	1.056	4.00	1.00
Characteristics of digital placemaking	The democratisation of spaces is a key characteristic of digital placemaking	8.60	60.90	3.74	1.031	4.00	1.50
Characteristics of digital placemaking	Digital placemaking must have a call to action that leads to behavioural change	34.70	34.70	3	0.978	3.00	2.00
Characteristics of digital placemaking	Storytelling is a way to empower communities through digital placemaking	4.30	91.30*	4.13	0.679	4.00	0.50
Characteristics of digital placemaking	Gamification is a strategy for digital placemaking practices	0.00	78.20*	3.91	0.583	4.00	0.00
Characteristics of digital placemaking	To enact the senses is a strategy for digital placemaking practices	4.30	65.20	3.83	0.816	4.00	1.00
Characteristics of digital placemaking	Digital placemaking is missing a sensorial touch	21.70	56.50	3.39	1.242	4.00	1.00

Characteristics of digital placemaking	Digital placemaking must adapt to the place and community characteristics	4.30	87.00*	4.35	0.813	5.00	1.00
Characteristics of digital placemaking	Digital placemaking must focus on the aim and purpose of the project	4.30	78.20*	4.13	0.85	4.00	1.00
Characteristics of digital placemaking	Digital placemaking projects are unique for each location and community	17.40	73.90*	3.96	1.083	4.00	1.50
Characteristics of digital placemaking	Digital placemaking projects should be easy to replicate from one location to another	47.80	26.10	2.7	0.953	3.00	1.50
Characteristics of digital placemaking	Digital placemaking experiences should be short. temporary and one-off interventions	65.20	0.00	2.22	0.657	2.00	1.00
Characteristics of digital placemaking	Digital placemaking experiences should be long efforts in time that ensure continuity	0.00	47.80	3.57	0.648	3.00	1.00
Characteristics of digital placemaking	Social media is a key tool for digital placemaking	4.30	52.20	3.61	0.92	4.00	1.00
Characteristics of digital placemaking	Digital placemaking professionals are facilitators	4.30	82.60*	3.91	0.654	4.00	0.00
Challenges of digital placemaking	Privacy and online safety concerns are challenges to digital placemaking	4.30	73.90*	4	0.834	4.00	1.50
Challenges of digital placemaking	“Digital public spaces” are not publicly owned. and this is a risk for digital placemaking	13.00	65.20	3.7	1.04	4.00	1.00
Challenges of digital placemaking	Digital equity is a challenge to digital placemaking	4.30	87.00*	4.17	0.761	4.00	1.00
Challenges of digital placemaking	Inclusion and accessibility are challenges to digital placemaking	4.30	87.00*	4.35	0.813	5.00	1.00

Challenges of digital placemaking	Digital literacy is a barrier to digital placemaking	8.70	86.90*	4.26	0.895	4.00	1.00
Challenges of digital placemaking	Technology reliance is a challenge to digital placemaking	8.60	73.90*	3.96	1.042	4.00	1.50
Challenges of digital placemaking	The exclusion of some audiences is a challenge to digital placemaking	4.30	82.60*	4.3	0.856	5.00	1.00
Challenges of digital placemaking	Participant motivation and incentives are challenges to digital placemaking	8.70	82.60*	4.09	0.88	4.00	1.00
Challenges of digital placemaking	The cost and lack of funding are challenges to digital placemaking	8.60	73.90*	3.83	0.962	4.00	0.50
Challenges of digital placemaking	Digital stickiness (the engagement and adoption/retention of participants using technology) is a challenge to digital placemaking	4.30	73.90*	4	0.834	4.00	1.50
Challenges of digital placemaking	Top-down practices are a challenge to digital placemaking	8.70	56.50	3.74	0.943	4.00	1.50
Challenges of digital placemaking	Ethics of digital placemaking practice is a challenge to digital placemaking	4.30	86.90*	4.13	0.74	4.00	1.00
Challenges of digital placemaking	Gentrification is an outcome challenge to digital placemaking	17.30	47.80	3.39	1.01	3.00	1.00
Challenges of digital placemaking	The interdisciplinary nature of digital placemaking is challenging	26.00	56.50	3.52	1.211	4.00	2.00
Technology in digital placemaking	Technology promotes place experiences	4.30	52.20	3.61	0.92	4.00	1.00
Technology in digital placemaking	Technology is a medium. not a final product	0.00	100.00*	4.35	0.476	4.00	1.00
Technology in digital placemaking	Technology is a means to capture data	13.00	65.20	3.7	0.906	4.00	1.00

Technology in digital placemaking	Technology promotes conversations	8.70	39.10	3.39	0.766	3.00	1.00
Technology in digital placemaking	Digital placemaking helps connect everything together	13.00	43.50	3.39	0.82	3.00	1.00
Technology in digital placemaking	Technology is a distraction in placemaking	56.50	17.40	2.43	0.97	2.00	1.00
Technology in digital placemaking	Technology is used as a quick fix in placemaking	43.40	30.40	2.83	0.916	3.00	2.00
Technology in digital placemaking	Digital placemaking is a way to create temporary roots and develop a sense of connection with the place	8.70	56.50	3.57	0.77	4.00	1.00
Technology in digital placemaking	Digital placemaking is a vehicle for thinking about place differently and creating emotional connections	0.00	82.60*	4	0.59	4.00	0.00
Measurement of digital placemaking	The best way to measure digital placemaking is through an ethnographic study	13.00	34.80	3.3	0.804	3.00	1.00
Measurement of digital placemaking	Digital KPIs (i.e., app downloads, web visits or usability) are the best way to measure digital placemaking	34.80	13.00	2.7	0.804	3.00	1.00
Measurement of digital placemaking	Most digital placemaking projects are not assessed due to lack of funding or time	8.60	43.40	3.35	0.813	3.00	1.00
Measurement of digital placemaking	Prototyping tests are the best way to measure digital placemaking	8.70	21.70	3.13	0.536	3.00	0.00
Measurement of digital placemaking	Analysis of the target audience, audience needs, and policy requirements is the best way to measure digital placemaking	13.00	39.10	3.26	0.674	3.00	1.00

Measurement of digital placemaking	Interviews/focus groups are the best way to measure digital placemaking	13.00	43.40	3.35	0.758	3.00	1.00
Measurement of digital placemaking	Context analysis of digital placemaking is essential for its impact measurement	0.00	69.50	3.74	0.529	4.00	1.00
Measurement of digital placemaking	Digital placemaking measurement is very difficult and depends on the project	4.30	78.20*	3.96	0.751	4.00	0.00
Measurement of digital placemaking	Observable metrics at the urban level are the best way to measure digital placemaking	13.00	43.40	3.35	0.758	3.00	1.00
Measurement of digital placemaking	Rubrics involving problem and solution. goals. technology purpose. power dynamics. place context. participation and collaboration. ownership and place characteristic are the best way to measure digital placemaking	4.30	39.10	3.39	0.642	3.00	1.00
Measurement of digital placemaking	Longevity of the experience is the best way to measure digital placemaking	13.00	21.70	3.04	0.69	3.00	0.00
Measurement of digital placemaking	Surveys are the best way to measure digital placemaking	26.00	4.30	2.74	0.606	3.00	0.50
Measurement of digital placemaking	Community participation is the best way to measure digital placemaking	8.70	39.10	3.43	0.825	3.00	1.00
Measurement of digital placemaking	Before/after controlled studies are the best way to measure digital placemaking	4.30	39.10	3.39	0.642	3.00	1.00

Measurement of digital placemaking	The definition of success in digital placemaking is essential for impact measurement	8.70	78.20*	3.83	0.761	4.00	0.00
Measurement of digital placemaking	Stakeholder feedback is the best way to measure digital placemaking	4.30	34.70	3.35	0.633	3.00	1.00
Measurement of digital placemaking	Psychological scales and scores (i.e., place attachment scores, nature connectedness, or wellbeing self-assessment questionnaires) are the best way to measure digital placemaking	4.30	52.10	3.52	0.651	4.00	1.00
Measurement of digital placemaking	Mixed methods are the best way to measure digital placemaking	0.00	82.60*	4.39	0.766	5.00	1.00
Place attachment	A physical connection to the place in digital placemaking is essential for the creation of place attachment	8.70	73.90*	3.78	0.778	4.00	0.50
Place attachment	Digital placemaking can be a shortcut to promote place attachment feelings	17.40	52.10	3.39	0.82	4.00	1.00
Place attachment	Digital placemaking helps maintaining and reinforce place attachment feelings	4.30	69.60	3.74	0.674	4.00	1.00
Place attachment	Digital placemaking opens up place attachment to a community dimension	8.70	56.50	3.48	0.651	4.00	1.00
Place attachment	Digital placemaking could convey people's memories and stories of belonging to place to create and maintain place attachment	0.00	91.30*	4.22	0.587	4.00	1.00

Place attachment	Digital placemaking takes away from creating place attachment	65.20	4.30	2.17	0.816	2.00	1.00
Place attachment	Communal feeling of attachment to place benefits wellbeing	0.00	86.90*	4.17	0.636	4.00	1.00
Place branding	Digital placemaking creates a shared sense of place image and brand	0.00	56.50	3.65	0.633	4.00	1.00
Place branding	Place branding can use digital placemaking as a tool for the identification of common sense of place	0.00	78.30*	3.96	0.624	4.00	0.00
Place branding	Digital placemaking as a place branding strategy must be participatory	4.30	73.90*	3.87	0.74	4.00	0.50
Place branding	Participatory place branding and digital placemaking have to focus on people's representation of place. its materiality and the digital as a performative act	0.00	65.20	3.96	0.806	4.00	2.00
Place branding	Digital placemaking as a participatory place branding strategy needs clear guidelines	8.70	69.50	3.74	0.792	4.00	1.00
Place branding	Place branding can use digital placemaking to communicate stories of a place	0.00	87.00*	4.13	0.612	4.00	0.50
Place branding	Social media creates a space for people to share and build a place brand image	0.00	69.50	3.91	0.717	4.00	1.00
Place branding	Place branding is very superficial and dominant	21.70	39.10	3.22	0.976	3.00	1.00

Place branding	Events are key for digital placemaking as a place branding strategy	4.30	56.50	3.74	0.845	4.00	1.00
Place branding	Digital placemaking for place branding is a place management tool to ensure users' needs are met and monitor the place brand	8.70	39.10	3.39	0.766	3.00	1.00
Place branding	Digital placemaking for place branding can modify place perceptions	0.00	69.60	3.7	0.46	4.00	1.00
Place branding	Digital placemaking can have a negative impact in perpetuating the image of a place	13.00	52.10	3.43	0.77	4.00	1.00
Place branding	Place branding should be an iterative process where the brand evolves with the community over time. which conflicts with common strict branding guidelines	0.00	78.30*	3.87	0.536	4.00	0.00
Place branding	Branding spaces as hybrid locations for everyday place connections will benefit nature connectedness	8.70	43.40	3.39	0.706	3.00	1.00
Digital placemaking and nature	Technology is a distraction from nature experiences	43.50	26.00	2.87	0.899	3.00	1.50
Digital placemaking and nature	Technology can help people positively reconnect with nature	4.30	82.60*	3.87	0.612	4.00	0.00
Digital placemaking and nature	Sense engagement through technology enhances emotional connection with nature	8.70	52.10	3.48	0.714	4.00	1.00

Digital placemaking and nature	Technology can promote behaviour change towards nature connectedness	4.30	73.90*	3.83	0.701	4.00	0.50
Digital placemaking and nature	Digital placemaking can be used as a way to find, explore and discover nature places (e.g., place information, audio guides)	0.00	91.30*	4.35	0.633	4.00	1.00
Digital placemaking and nature	Digital placemaking lowers the entry barriers in natural places	13.00	43.40	3.43	0.876	3.00	1.00
Digital placemaking and nature	Digital placemaking can help people understand and take notice of nature (e.g., an app to learn about trees, listen to bird sounds, and recognise species)	0.00	82.60*	4.22	0.72	4.00	1.00
Digital placemaking and nature	Digital placemaking can be used to tell stories about nature	0.00	95.70*	4.22	0.507	4.00	0.50
Digital placemaking and nature	Technology can help raise awareness and educate on the importance of nature and biodiversity	0.00	95.60*	4.26	0.529	4.00	1.00
Digital placemaking and nature	Technology can expose people to nature (e.g., nature videos, nature sounds)	0.00	82.60*	4	0.59	4.00	0.00
Digital placemaking and nature	Technology helps us imagine futures for nature	0.00	78.20*	3.83	0.48	4.00	0.00
Digital placemaking and nature	Technology for nature should also be approached beyond the human lens (e.g., for animals sharing the space with humans)	0.00	86.90*	4.09	0.583	4.00	0.00
Digital placemaking and nature	Digital placemaking is a place management tool for nature spaces	4.30	39.10	3.39	0.642	3.00	1.00

Digital placemaking and nature	Digital placemaking allows sharing experiences in nature places	0.00	78.20*	4	0.659	4.00	0.00
Digital placemaking and nature	Digital placemaking creates sense of ownership needed for nature connectedness	8.70	34.70	3.3	0.687	3.00	1.00
Digital placemaking and nature	Social media has helped people reflect on their experiences with nature	21.70	39.10	3.17	0.916	3.00	1.00
Digital placemaking and nature	Digital placemaking for nature should measure the nature element	0.00	65.20	3.83	0.701	4.00	1.00
Digital placemaking and nature	Digital placemaking for nature should measure the experience in nature	0.00	65.20	3.78	0.657	4.00	1.00
Digital placemaking and wellbeing	The wellbeing impact of digital placemaking practices resides in the sense of belonging created with the community	0.00	60.80	3.65	0.56	4.00	1.00
Digital placemaking and wellbeing	The wellbeing impact of digital placemaking practices resides in the sense of belonging created with the place	0.00	82.60*	4.04	0.624	4.00	0.00
Digital placemaking and wellbeing	The wellbeing impact of digital placemaking practices resides in feelings of ownership and co-ownership	8.70	47.80	3.43	0.712	3.00	1.00
Digital placemaking and wellbeing	Maximising people's experiences of place through digital placemaking affects their wellbeing	4.30	65.20	3.7	0.687	4.00	1.00

Digital placemaking and wellbeing	Only the physical experience can benefit people's wellbeing	52.10	8.70	2.43	0.825	2.00	1.00
Digital placemaking and wellbeing	Digital placemaking can be used to monitor the health/wellbeing status of a community	4.30	60.80	3.61	0.642	4.00	1.00
Digital placemaking, nature and wellbeing	User ownership of the digital placemaking experience is the link between digital placemaking and nature-supporting wellbeing.	17.40	39.10	3.22	0.72	3.00	1.00
Digital placemaking, nature and wellbeing	Virtual nature increases feelings of wellbeing for those with no access to nature	8.60	52.10	3.43	0.825	4.00	1.00
Digital placemaking, nature and wellbeing	Virtual nature has a positive effect on wellbeing. but real nature is better	8.60	65.20	3.91	1.1	4.00	2.00
Digital placemaking, nature and wellbeing	Technology can help people understand how nature benefits their wellbeing (e.g., mood improvement. relief of stress. etc).	0.00	87.00*	4.04	0.55	4.00	0.00
Digital placemaking, nature and wellbeing	To encourage behaviour change is the connection between digital placemaking. nature and wellbeing	8.60	43.40	3.35	0.813	3.00	1.00
Digital placemaking, nature and wellbeing	Digital guided wellness walks in nature benefit citizen wellbeing	4.30	69.60	3.74	0.674	4.00	1.00
Digital placemaking, nature and wellbeing	Gamified digital placemaking experiences in nature (i.e., a treasure hunt in nature using qr codes) is a good health and wellbeing initiative	4.30	65.20	3.74	0.735	4.00	1.00
Digital placemaking, nature and wellbeing	Digital placemaking. nature and wellbeing are part of a circular	8.70	43.40	3.39	0.706	3.00	1.00

	economy approach to benefit a sustainable future						
Digital placemaking, nature and wellbeing	Digital placemaking can repurpose spaces to link them with nature supporting wellbeing	4.30	73.90*	3.74	0.606	4.00	0.50
Digital placemaking, nature and wellbeing	Digital placemaking creates awareness and consciousness among a sense of place. sense of environment and nature to support wellbeing	0.00	65.20	3.7	0.547	4.00	1.00
Digital placemaking, nature and wellbeing	Digital placemaking should educate communities on nature and its support for wellbeing	0.00	73.90*	3.87	0.612	4.00	0.50
Digital placemaking, nature and wellbeing	Digital placemaking iterative characteristic can be a strategy to reintroduce nature digitally in urban environments to create case studies examples of its benefits	0.00	56.50	3.65	0.633	4.00	1.00
Digital placemaking, nature and wellbeing	Digital placemaking for nature supporting wellbeing is a complementary measure to getting out in real nature	13.00	65.20	3.74	0.943	4.00	1.00
statements for digital placemaking. nature and wellbeing	Digital placemaking can help communities find nature places to support their wellbeing	0.00	82.60*	4.04	0.624	4.00	0.00
Digital placemaking, nature and wellbeing	The link between technology. nature and wellbeing has been mostly approached from a digital data perspective	13.00	34.70	3.26	0.735	3.00	1.00
Digital placemaking, nature and wellbeing	Digital placemaking can ‘trick’ people to get in nature and benefit from it	26.10	17.30	2.96	0.751	3.00	0.50

Digital placemaking, nature and wellbeing	Digital placemaking initiative that supports safe location information involving nature spaces community wellbeing (e.g., changing your commute to go through a nature space)	0.00	56.50	3.78	0.778	4.00	1.00
Digital placemaking, nature and wellbeing	Digital placemaking can create a sense of accountability in the community when involving nature and wellbeing	0.00	43.40	3.48	0.58	3.00	1.00
Digital placemaking, nature and wellbeing	1Nature as an assessment element is key to understanding the wellbeing impact of digital placemaking	4.30	43.50	3.48	0.714	3.00	1.00

Table 5.12: Modified Delphi Round Two results.

Notes: * indicates the $\geq 70\%$ agreement among participants is achieved (Avella, 2016).

Fifty-five out of hundred and forty items achieved panel agreement (39,28%) (see Table 5.13). Regarding the definition of digital placemaking, six items achieved agreement, including the concept being an umbrella term (87%), which should be defined as a process (78.2%). Sense of place (82.6%), hybrid place experience (78.3%), community connection (73.9%), and the physical as an anchor (78.3%), were found to be key in the definition of the concept. This initial agreement in the definitional aspects of digital placemaking presents the first attempt to reach a consensual definition among experts and expanded experts in the field. Key aspects mentioned in previous definitions, such as sense of place or community connection, found agreement with the hybrid environment created using digital technology and the need for a physical anchor. The technological approach to the definition states the need to mix digital and physical elements in order to consider the experience digital placemaking. Therefore, Hespanhol (2022) augmented placemaking approach is extended describing how a fully immersive virtual place experience with no connection to physical attributes cannot be considered digital placemaking. Finally, the agreement on the concept being an umbrella term and a process denotes the interdisciplinary approach to the term and its iterative nature.

When exploring its characteristics, inclusion and accessibility (78.2%), as well as its adaptability to the place and community (87%), achieve agreement in this round. The main focus of a digital placemaking experience should be the purpose of the project (78.2%), making the experience unique for each location (73.9%). Storytelling (91.3%) and gamification (78.2%) are found as strategies and ways to empower communities. Finally, participants agreed digital placemaking professionals are facilitators (82.6%), which helps with the idea of professionals being on the same level as community members and other stakeholders, facilitating experiences and the process of creating these

experiences. Additional characteristics found agreement in this round, with ways to engage with all community members and making meaningful experiences being crucial.

The challenges of digital placemaking that found agreement in this round are related to privacy and online safety (73.9%), digital equity (87%), digital literacy (86.9%), technology reliance (73.9%), motivation (82.6%), costs (73.9%), and digital stickiness (73.9%). Furthermore, despite being agreed upon as a characteristic of digital placemaking, inclusion and accessibility are also found to be challenges for the concept (87%). Since a description of ethics as a clear step in the maturity of digital placemaking as a concept, it is found in this round to be a challenge to digital placemaking (86.9%). The technological dimension of the concept opens new risks and challenges derived from data usage, user knowledge and the digital divide. As described previously, accounting these aspects is a basic step in the digital placemaking process to ensure the safety of the experience.

The technology used in digital placemaking was grouped as a section itself due to the variations in projects and digital tools that can be implemented. Participants achieve agreement on two items in this section, technology as a medium (100%) and digital placemaking as a vehicle for thinking differently about places to create emotional connections (82.6%). The digital element of the concept can act as a tool to enhance the experience and create emotional connections with the place. The importance of this section agreement is, again, the role of the digital, not replacing but augmenting experiences and boosting the processes involved.

Participants agreed on the difficulty of measurement or assessing digital placemaking, (78.2%), where the definition of success is essential for the choice of assessment tools (78.2%) and mixed methods are the best way to measure digital placemaking (82.6%). The lack of agreement in other elements of this section represents the interdisciplinary

approach of the concept and the multiple opportunities for impact assessment depending on what is considered success, whether this is augmenting place attachment, place awareness, or space use.

The panel of participants was asked to rate items in place attachment, and six elements achieved agreement. Participants agreed on the physical connection to the place being essential to developing place attachment in digital placemaking (73.9%). It could convey people's memories and stories of belonging (91.3%), as well as positively affect wellbeing due to a communal feeling of attachment (86.9%). Therefore, place attachment is highly linked to social identity, where digital placemaking can help in carrying the physical identity into the digital environment, and it supports wellbeing benefits.

Exploring place branding, participants agreed for it to be used as a tool for the identification of a common sense of place (78.3%), which strategy must be participatory (73.9%). As an iterative process, it created conflict with the strict place branding guidance (78.3%). A place branding approach to digital placemaking helps boost community place identification, which affects social identity, and it is strictly linked to place attachment or sense of place.

Specifically exploring digital placemaking and nature, technology is agreed to help reconnect with nature (82.6%) and promote behaviour change towards nature connectedness (73.9%). Digital placemaking can be used to find and explore natural places (91.3%), as well as to understand and take notice of nature (82.6%). Participants agreed that digital placemaking can tell stories about nature (95.7%), raise awareness and educate people on its importance (95.6%), expose people to nature (82.6%), and help them imagine new futures for nature (78.2%). The panel of experts conveyed that technology for nature needs to be approached beyond the human lens (86.9%). Finally, digital placemaking allows sharing experiences in nature (78.2%). When exploring digital

placemaking uses for nature connectedness, a variety of approaches depending on the goal or aim of the experience were found. This provides a rich picture of the applications of digital placemaking in this setting, which are innovative and adapted to the needs of the community.

However, participants only agreed on one item for digital placemaking and wellbeing, where the wellbeing impact of these practices resides in the sense of belonging created with the place (82.6%). Similarly to the place attachment section, wellbeing is again found to achieve agreement when connected with place attachment and belonging feelings with place. The conceptual model from this programme of research explains that in order to create belonging with the place, the person interacts with others and with nature, enhancing the benefits of place attachment.

Lastly, in investigating digital placemaking in nature for wellbeing, participants agreed it can help understand how nature benefits wellbeing (87%) by repurposing places (73.9%), educating communities (73.9%), and helping communities find nature spaces to support their wellbeing (82.6%). The wellbeing connection with nature and digital placemaking is found to reside in information communication and engagement, where the digital is a tool to share stories and find nature spaces. Thus, digital placemaking provides multiple areas and approaches to understanding and engaging with the wellbeing outcomes of the dynamics it promotes.

Item section	N° of items achieved agreement	N° of items achieved disagreement
Digital placemaking definition	6	1
Characteristics of digital placemaking	7	
Challenges of digital placemaking	11	
Technology	2	
Measurement of digital placemaking	3	
Place attachment	6	

Place branding	4	
Digital placemaking and nature	10	
Digital placemaking and wellbeing	1	
Digital placemaking in nature for wellbeing	4	
Total	54	1

Table 5.13: Summary of results from the modified Delphi Round Two.

Two items achieved 100% agreement, item 2 in technology of placemaking (“Technology is a medium, not a final product”, mean = 4,35, SD = 0,476) and item 5 in place attachment (“Communities have multiple identities”, mean = 4,65, SD = 0,476) (Table 5.12). Participants agreed that the technology used in digital placemaking should act as a medium and not a final product, which is aligned with the approach proposed in the conceptual model presented. This explains how technology does not focus on replacing the place experience but acts as a tool that helps enhance places and mediate the experience. This is essential for the maturity of the concept and its differentiation from virtual reality experiences.

One item achieved > 70% of disagreement (combination of rating 1 and 2), regarding placemaking being understood as digital nowadays. Despite the participant discussion on updating digital placemaking, place attachment, place branding and nature connectedness to the current digital era, participants agreed to disagree on placemaking being digital nowadays. This is aligned with the complexity of digital placemaking and its evolution from placemaking practices and presents how placemaking and digital placemaking are two separate concepts that are interconnected.

Only two items out of fifty-five had no initial coherence between the percentage of agreement and the combination of mean and standard deviation criteria. One in the characteristics (“Digital placemaking projects are unique for each location and

community”), and one in the challenges (“Technology reliance is a challenge to digital placemaking”). Despite a median of 4 in both cases, the coefficient of variation is 27% (with a minimum = 2) and 26% (with a minimum = 1), respectively. The higher dispersion between these two items can be caused by the complexity of the concept and the confusion described around it. The median described is considered agreement, but participants differed in the rating of the item.

5.13.3. Qualitative analysis: Free form comments

This round also included optional open-ended questions for participants to voluntarily provide additional comments. Most of these comments were a reaffirmation of the participant's choice and a further explanation of their rating. In total, forty-seven qualitative statements (Table 5.14) were received, with an average of 2,04 comments per participant, written in paragraphs and complete sentences. Considering twenty-six participants and ten free comment boxes in the questionnaire, two hundred and sixty comments were possible. Thus, a comment rate of 24,74% was achieved, considering comments were voluntary. The comments were comprehensive and well-structured sentences, which made them a valuable addition to reinforce the participants responses.

Item section	N° of comments
Digital placemaking definition	8
Digital placemaking characteristics	6
Digital placemaking challenges	5
Technology in digital placemaking	5
Measurement in digital placemaking	7
Place attachment	2
Place branding	5
Digital placemaking and nature	2
Digital placemaking and wellbeing	1
Digital placemaking in nature for wellbeing	6
Total	47

Table 5.14: Analysis of free-form comments in Round Two

The majority of comments were shared on the definition of digital placemaking (n = 8), measurement of digital placemaking (n = 7), characteristics (n = 6), and digital placemaking in nature for wellbeing. Comments were analysed using thematic analysis (Braun & Clarke, 2012; 2021) (Table 5.15), and codes were grouped into themes due to relationships.

Comment theme	TID
Digital placemaking	37
Critic to item	20

Table 5.15: Thematic Analysis results from the free-form comments in Round Two

When exploring the concept of digital placemaking, comments referred to further explaining their rating and sharing their thoughts on the questions. Comments regarding the definition of the concept, analysis measurements, the importance of it being tailored by location, and challenges were expressed as a continuation of their rating in the questionnaire.

The historic resistance of clear definitions and frameworks about the practice-nature for placemaking is a challenge to digital placemaking (...) From the field of Evaluation Research it's well known that measurement is complex and highly contextual, especially as context scales increase in any dimension. (Participant 1761).

I stated that ethics isn't a challenge to digital placemaking because I think the ethical aspects should readily be able to be resolve with sufficient user privacy and control of data. (Participant 7862).

Although there might be transferable know how from one location to another - key elements to form a framework perhaps - ultimately all placemaking - to secure community buy-in must be participatory and tailored to specific locations. (Participant 0415).

Participants expressed the importance of digital placemaking experiences being tailored and adapted to locations, which is aligned with the participatory and community-led

aspect of the concept found in round one. Some elements can be the same or follow the same guidelines, but the experience needs to tackle community needs and desires in order to be considered relevant, ethical, and effective. Ethics were described as highly linked to digital risks such as data usage and privacy. However, in the round one interview sections, the ethical approach to digital placemaking refers to a broader idea of the use and purpose of the practice. Finally, the definitional dilemma and complexity of assessment are found to be crucial challenges for concept development. Participants describe a number of challenges that need to be considered for the evolution of the concept and its maturity.

The critical comments were found on the contradictory words in the statement and the dichotomic approach between digital placemaking and nature. Critics were also found on the use of absolute statements with words such as 'the best' or 'must'. Finally, critics also allude to a lack of understanding of the discipline, for example, in place branding.

The neutral answers are due to lack of knowledge mostly on these particular ones. (Participant 4138).

I have answered in many point as Neutral, because I agree with the statement but at the same time I disagree. So it is more like "in some cases yes, in some cases no. (Participant 8799).

I struggled a bit with these items because 'the best' implies that one is superior than all the others - i.e. a ranking?. (Participant 6696).

The researcher understands that questions might generate critical comments in the interdisciplinary participant panel, and general statements may generate doubts as digital placemaking is an adaptative concept depending on the place and community peculiarities. However, for the purpose of reducing the number of items in the questionnaire and accommodating the findings from the interview round, generalised statements were included in the questionnaire.

5.14. Round three: Questionnaire

Round two was analysed and informed round three questionnaire creation, where only agreed items were carried over (Miller et al., 2020) (Appendix H). Round three data collection occurred from the 12th of February 2024 to the 8th of March 2024 and was sent to all participants (n = 26), asking them to only fill it in if they had participated in round two. A total of nineteen responses (73.08%) on the Delphi round three questionnaire were received.

Fifty-five agreed items were included in the round three questionnaire (Table 5.16), for experts and expanded experts to rate their agreement. Means were shared for each item to inform about the group response. Round three included a 'N/A' option next to the Likert scale following some of the comments from round two regarding participants identifying themselves as not 'experts' in specific fields such as place branding. This questionnaire was formed by the same three sections: a digital placemaking section (seven items on the definition of digital placemaking, seven items on its characteristics, eleven items on challenges, two items on technology use, and three items on measurement), place attachment (six items) and place branding (four items) section, and digital placemaking in nature for wellbeing section (ten items on digital placemaking and nature, one item on wellbeing, and four on digital placemaking in nature for wellbeing).

Analysis of the questionnaire followed round two analysis and resulted in forty-two items achieving consensus (76.36%). Six items achieved 100% consensus (Table 5.18), and no item achieved >70% dissensus. In this round, participants did not agree to disagree with any item provided, which excluded the dissensus item from the previous round. Furthermore, in this round, consensus was consolidated, with a higher rate on 100%

agreed items than in the previous round, this time in several sections. Round three analysis confirmed the stopping criteria described in [Chapter 4](#).

Item Category	Item	Disagreement %	Agreement %	Mean	SD	Median	IQR
Definition of digital placemaking	Digital placemaking is an umbrella term (mean=4.13)	0.00	100.00*	4.53	0.499	5	1.00
Definition of digital placemaking	Placemaking is digital nowadays (mean=2.17)	63.20	15.80	2.26	1.163	2	2.00
Definition of digital placemaking	Digital placemaking should be defined as a process (mean=3.96)	0.00	84.30*	4.05	0.605	4	1.00
Definition of digital placemaking	Sense of place/place attachment is a key aspect in the digital placemaking definition (mean=4.09)	5.30	42.10	4.32	0.729	4	3.00
Definition of digital placemaking	Hybrid place experience (mixing the physical space with a digital layer) is a key aspect of the digital placemaking definition (mean=3.96)	5.30	79.00*	3.89	0.912	4	3.00
Definition of digital placemaking	Community connection is a key aspect of the digital placemaking definition (mean=3.96)	5.30	84.20*	4.11	0.788	4	3.00
Definition of digital placemaking	The physical placeCharacteristics/connection (as an anchor) is a key aspect in the digital placemaking definition (mean=4.13)	0.00	89.40*	3.79	3.071	5	14.00
Characteristics of digital placemaking	Inclusion and accessibility are keyCharacteristics of digital placemaking (mean=4)	0.00	89.50*	4.32	0.653	4	2.00
Characteristics of digital placemaking	Storytelling is a way to empower communities through digital placemaking (mean=4.13)	0.00	94.80*	4.58	0.591	5	2.00

Characteristics of digital placemaking	Gamification is a strategy for digital placemaking practices (mean=3.91)	5.30	78.90*	3.95	0.944	4	3.50
Characteristics of digital placemaking	Digital placemaking must adapt to the place and community Characteristics (mean=4.35)	0.00	100.00*	4.58	0.494	5	1.00
Characteristics of digital placemaking	Digital placemaking must focus on the aim and purpose of the project (mean=4.13)	0.00	94.80*	4.42	0.591	4	2.00
Characteristics of digital placemaking	Digital placemaking projects are unique for each location and community (mean=3.96)	5.30	68.40	3.95	0.887	4	3.00
Characteristics of digital placemaking	Digital placemaking professionals are facilitators (mean=3.91)	5.30	63.20	3.74	0.784	4	2.00
Challenges of digital placemaking	Privacy and online safety concerns are challenges to digital placemaking (mean=4)	0.00	89.50*	4.37	0.666	4	2.00
Challenges of digital placemaking	Digital equity is a challenge to digital placemaking (mean=4.17)	5.30	84.20*	3.74	3.109	5	14.00
Challenges of digital placemaking	Inclusion and accessibility are challenges to digital placemaking (mean=3.35)	10.50	78.90*	4.11	0.968	4	3.00
Challenges of digital placemaking	Digital literacy is a barrier to digital placemaking (mean=4.26)	5.30	79.00*	4.21	0.893	4	3.00
Challenges of digital placemaking	How to address multiple identity communities is a challenge to digital placemaking (me	15.80	68.40	3.79	1.004	4	2.50

Challenges of digital placemaking	Technology reliance is a challenge to digital placemaking (mean=3.96)	21.10	63.10	3.63	1.179	4	3.50
Challenges of digital placemaking	The exclusion of some audiences is a challenge to digital placemaking (mean=4.3)	15.80	84.20*	4.11	1.021	4	3.00
Challenges of digital placemaking	Participant motivation and incentives are challenges to digital placemaking (mean=4.09)	5.30	73.70*	3.95	0.825	4	2.50
Challenges of digital placemaking	The cost and lack of funding are challenges to digital placemaking (mean=3.83)	10.50	73.70*	3.89	0.912	4	2.50
Challenges of digital placemaking	Digital stickiness (the engagement and adoption/retention of participants using technology) is a challenge to digital placemaking (mean=4)	10.50	73.70*	3.84	0.874	4	2.00
Challenges of digital placemaking	Ethics of digital placemaking practice is a challenge to digital placemaking (mean=4.13)	5.30	84.20*	4.16	0.812	4	3.00
Technology in digital placemaking	Technology is a medium. not a final product (mean=4.35)	0.00	100.00*	4.74	0.44	5	1.00
Technology in digital placemaking	Digital placemaking is a vehicle for thinking about place differently and creating emotional connections (mean=4)	0.00	94.70*	4.37	0.581	4	2.00
Measurement of digital placemaking	Digital placemaking measurement is very difficult and depends on the project (mean=3.96)	15.80	63.20	3.58	1.042	4	3.00
Measurement of digital placemaking	The definition of success in digital placemaking is essential for impact measurement (mean=3.83)	10.60	79.00*	3.84	0.987	4	3.00

Measurement of digital placemaking	Mixed methods are the best way to measure digital placemaking (mean=4.39)	10.50	78.90*	4.05	0.944	4	3.00
Place attachment	A physical connection to the place in digital placemaking is essential for the creation of place attachment (mean=3.78)	15.80	57.90	3.63	1.134	4	3.50
Place attachment	A place's identity is built through shared experiences and the digital can help with it (mean=4.13)	10.50	89.50*	4.11	0.852	4	3.00
Place attachment	Communities have multiple identities (mean=4.65)	0.00	94.70*	4.79	0.521	5	2.00
Place attachment	Digital placemaking allows people to carry their identity even though they are no longer physically there (mean=3.96)	15.80	68.40	3.84	1.182	4	4.00
Place attachment	Digital placemaking could convey people's memories and stories of belonging to place to create and maintain place attachment (mean=4.22)	5.30	94.70*	4.42	0.748	5	3.00
Place attachment	Communal feeling of attachment to place benefits wellbeing (mean=4.17)	0.00	84.20*	4.42	0.748	5	2.00
Place branding	Place branding can use digital placemaking as a tool for the identification of common sense of place (mean=3.96)	0.00	94.70*	3.47	2.962	4	13.00
Place branding	Digital placemaking as a place branding strategy must be participatory (mean=3.87)	5.30	63.20	3.26	3.023	4	14.00

Place branding	Place branding can use digital placemaking to communicate stories of a place (mean=4.13)	0.00	100.00*	4.37	0.482	4	1.00
Place branding	Place branding should be an iterative process where the brand evolves with the community over time. which conflicts with common strict branding guidelines (mean=3.87)	0.00	94.80*	4.26	0.547	4	2.00
Digital placemaking and nature	Technology can help people positively reconnect with nature (mean=3.87)	10.50	68.40	3.74	0.849	4	2.00
Digital placemaking and nature	Technology can promote behaviourChange towards nature connectedness (mean=3.83)	10.50	73.70*	3.79	0.832	4	2.00
Digital placemaking and nature	Digital placemaking can be used as a way to find. explore and discover nature places (e.g., place information. audio guides) (mean=4.35)	0.00	100.00*	4.32	0.465	4	1.00
Digital placemaking and nature	Digital placemaking can help people understand and take notice of nature (e.g., an app to learn about trees. listen to bird sounds. and recognise species) (mean=4.22)	0.00	94.70*	4.37	0.581	4	2.00
Digital placemaking and nature	Digital placemaking can be used to tell stories about nature (mean=4.22)	0.00	94.80*	4.26	0.547	4	2.00
Digital placemaking and nature	Technology can help raise awareness and educate on the importance of nature and biodiversity (mean=4.26)	0.00	94.80*	4.42	0.591	4	2.00
Digital placemaking and nature	Technology can expose people to nature (e.g., nature videos. nature sounds) (mean=4)	5.30	89.50*	4.11	0.912	4	4.00

Digital placemaking and nature	Technology helps us imagine futures for nature (mean=3.83)	5.30	79.00*	3.95	0.759	4	2.00
Digital placemaking and nature	Technology for nature should also be approached beyond the human lens (e.g., for animals sharing the space with humans) (mean=4.09)	0.00	94.70*	4.53	0.595	5	2.00
Digital placemaking and nature	Digital placemaking allows sharing experiences in nature places (mean=4)	0.00	79.00*	4	0.649	4	1.00
Digital placemaking and wellbeing	The wellbeing impact of digital placemaking practices resides in the sense of belonging created with the place (mean=4.04)	0.00	63.20	3.84	0.744	4	1.00
Digital placemaking, nature and wellbeing	Technology can help people understand how nature benefits their wellbeing (e.g., mood improvement, relief of stress, etc). (mean=4.04)	0.00	84.20*	4.11	0.64	4	1.50
Digital placemaking, nature and wellbeing	Digital placemaking can repurpose spaces to link them with nature supporting wellbeing (mean=3.74)	5.30	73.70*	3.84	0.744	4	2.00
Digital placemaking, nature and wellbeing	Digital placemaking should educate communities on nature	0.00	68.40	3.95	0.759	4	1.50
Digital placemaking, nature and wellbeing	Digital placemaking can help communities find nature places to support their wellbeing (mean=4.04)	0.00	100.00*	4.32	0.465	4	1.00

Table 5.16: Modified Delphi Round Three results.

Notes: * indicates the $\geq 70\%$ agreement among participants is achieved (Avella, 2016).

Five items achieved consensus on the definition of digital placemaking, and all participants agreed 100% on it as an umbrella term, which should be defined as a process (84.3%) that creates hybrid place experiences (79%) and community connections (82.2%) where the physical anchor is essential (89.4%). This can be considered the first consensual elements in the definition of digital placemaking among experts and expanded experts in the field. The novelty of this definition besides the agreement from participants, is the consideration of it as an umbrella term and process that develops hybrid place experiences that connect communities. The unanimous consensus on the concept as an umbrella term reflects the volatility of its evolution and understanding. The consolidation of key aspects in the definition of digital placemaking helps set the stage for the maturing evolution of digital placemaking.

Involving digital placemaking's characteristics, participants achieved consensus on inclusion and accessibility as key aspects (89.5%), where gamification (78.9%) and storytelling empower communities (94.8%), and the need to focus on the aim and purpose of the project (94.8%). Item four, which referred to the adaptability of digital placemaking to the place and community characteristics, achieved 100% agreement. Besides agreeing on a definition of digital placemaking, participants also achieved consensus on the importance of the digital placemaking experience to be inclusive and accessible and to focus on the aim and purpose of the project. Furthermore, gamification and storytelling are found to be essential strategies in digital placemaking to engage the community and promoting connection. Finally, the adaptability of digital placemaking to the community and place characteristics, which unable the experience to be to fully replicate to other locations. However, a structure and process on how to develop can help fulfilling digital placemaking criteria while tailoring the experience to the place.

The challenges of digital placemaking are one of the sections that achieved a higher rate of consensus in this study. Participants agreed that privacy and online safety (89.5%), digital equity (84.2%), inclusion and accessibility (78.9%), the exclusion of some audiences (84.2%), participant motivation (73.7%), costs (73.7%), digital stickiness (73.7%), ethics (84.2%), and digital literacy (79%) are barriers and challenges for this concept. Despite the confusion and dilemmas described previously, participants agree on the risks of digital placemaking, which should be assessed to ensure the experience is safe and coherent with the concept.

Technology in digital placemaking is found to act as a medium, not a final product, achieving again in this round a 100% agreement among participants (Table 5.17). Consensus was also achieved in digital placemaking as a vehicle for thinking about place differently and creating an emotional connection (94.7%), which explains the value of this concept for reframing experiences through attachment and connection feelings.

Assessment of the experience, on the other side, found consensus on the importance of defining success (79%) and the use of mixed methods as the best way to evaluate a digital placemaking experience (78.9%). Mixed methods can help evaluate the quantitative and qualitative aspects of digital placemaking, adapting to its interdisciplinary nature.

Digital placemaking is found to convey people's memories and stories creating place attachment feelings (94.7%), and the communal feeling of attachment to a place can benefit wellbeing (84.2%). Despite sense of place or place attachment not meeting the agreement criteria in the definition section, participants converge on key aspects that support the conceptual model, as they involve place identity being built through shared experiences using technology, memories, and stories to create place attachment and a communal feeling of place attachment to benefit wellbeing. Therefore, place attachment

processes involved in digital placemaking can be linked to social identity development to benefit wellbeing and emotional attachment.

Place branding items achieved consensus when used as a tool for the identification of common sense of place (94.7%) and the need for them to be treated as an iterative process instead of the use of strict branding guidelines (94.8%). The use of place branding in digital placemaking to communicate stories of place achieved 100% agreement. This finding's importance resides in the communal identification of the value of using a place branding approach to digital placemaking. However, the participatory place branding approach to digital placemaking did not achieve consensus in this round (63.2%).

When involving nature, one item achieved 100% agreement on the way digital placemaking can be used to find, explore, and discover nature places. Consensus was also achieved through its use to help people understand and take notice of nature (94.7%), tell stories about nature (94.8%), and share experiences in nature (79%). Technology was found to help raise awareness and educate people on its importance for this connection (94.8%), exposing people to nature (89.5%), imagining futures for nature (79%), and promoting behaviour change towards nature connectedness (73.3%). Finally, the nature-technology relationship should be approached beyond the human lens (94.7%). Several approaches to digital placemaking in nature came to a consensus in this Delphi round, confirming the value of implementing digital placemaking for nature, specifically helping consumers navigate and find these spaces.

On digital placemaking in nature for wellbeing, technology is found to help people understand the benefits of nature for wellbeing (84.2%), where digital placemaking can repurpose spaces to link them to nature and wellbeing (73.7%). The use of digital placemaking to help communities find nature places to support their wellbeing achieved 100% agreement in this round. This consensus highlights the potential of digital

technologies to foster connections between urban spaces and natural environments, ultimately supporting community wellbeing. These findings underscore the importance of incorporating digital placemaking strategies in urban planning and community health initiatives.

In this round of the study on digital placemaking for wellbeing, no item achieved more than 70% agreement among the participants. This result suggests that the relationship between digital placemaking and wellbeing remains uncertain and unsettled among the expert panel. The lack of consensus indicates that further research is needed to explore and clarify how digital placemaking can effectively contribute to wellbeing. This uncertainty highlights the complexity of integrating digital technologies with wellbeing initiatives and suggests that more comprehensive studies and diverse perspectives are necessary to establish a clearer understanding. However, besides in the digital placemaking in nature for wellbeing section, wellbeing achieved consensus in combination with place attachment ('communal feeling of attachment to place benefits wellbeing'). This result ensures that participants agreed on the wellbeing outcomes from nature experiences mediated through digital placemaking as well as the support of wellbeing when a community or network place attachment is developed in a location.

Item Section	Item's that achieved a 100% agreement in Round 3	Round 2 Agreement Rate
Statements for characteristics of digital placemaking	Digital placemaking must adapt to the place and community characteristics (Round 2 mean=4,35)	87%
Technology in digital placemaking	Technology is a medium, not a final product (Round 2 mean=4,35)	87%
Statements for Place Branding	Place branding can use digital placemaking to communicate stories of a place (Round 2 mean=4,13)	100%
Statements for digital placemaking and nature	Digital placemaking can be used as a way to find, explore and	87%

	discover nature places (e.g., place information, audio guides) (Round 2 mean=4,35)	
Statements for digital placemaking, nature and wellbeing	Digital placemaking can help communities find nature places to support their wellbeing (Round 2 mean=4,04)	91,3%

Table 5.17: Items that achieved a 100% agreement in round three, compared to round two.

Five items achieved a 100% consensus in this round, with only one from round two maintaining this score (Table 5.17). Analysis of results demonstrates that participants achieved a consensus stage on technology being used as a medium and not a final product (mean = 4.74, SD = 0.44), confirming the use of digital placemaking as an enhancer of place experiences and not a replacement. Digital placemaking must adapt to the place and community characteristics (mean = 4.58, SD = 0.49), be used as a way to find and discover nature (mean = 4.32, SD = 0.46), and help communities find nature places to support their wellbeing (mean = 4.32, SD = 0.46). Therefore, digital placemaking should be used as a wayfinding tool for nature spaces in the city, allowing users to discover and explore the place, supporting their wellbeing. Finally, place branding achieved 100% agreement when used to communicate stories of a place in digital placemaking (mean = 4.37, SD = 0.48). The storytelling role of place branding and digital placemaking is found to be the main connector among concepts. Furthermore, the panel of experts and expanded experts achieved a 100% consensus on digital placemaking statements and on place branding, confirming the intrinsic role and connection among concepts and the importance of including a place branding strategy in digital placemaking.

Only four items received a N/A vote from the final consensus list of items. One participant chose N/A for statements in digital placemaking definition, characteristics, and challenges, with two items in place branding. This result highlights the confusion around

digital placemaking as a concept as well as the lack of place branding knowledge in all participants, which was considered since place branding knowledge and expertise were not a request in the ‘expert’ recruitment process, but part of the ‘expanded expert’ criteria. The lack of use of N/A in the other sections of the study enhances the importance and value of the results for nature, wellbeing, and place attachment, as they are found to be interlinked in the wellbeing outcomes of digital placemaking.

Regarding coherence between percentage of agreement and mean and SD, only three items were found to obtain a higher SD number on the definition of digital placemaking ("The physical place characteristics/connection (as an anchor) is a key aspect in the digital placemaking definition", mean = 3,79, SD = 3,07, minimum = 3), one challenge of digital placemaking ("Digital equity is a challenge to digital placemaking", mean = 3,74, SD = 3,1, minimum = 2), and a place branding item ("Place branding can use digital placemaking as a tool for the identification of common sense of place", mean = 3,47, SD = 2,96, minimum = 4). This result presents a higher dispersion of responses among consensus on definition, characteristics, and place branding use of digital placemaking, which is aligned with the complexity of the concept and the difficulty of achieving a communal understanding of it as shown in literature.

When looking at dissensus items, sense of place as a characteristic of digital placemaking did not achieve the set percentage of agreement, as neither did the enhancement aspect, co-creation, uniqueness, or identity generation. However, related items such as technology as a medium, the importance of tailoring digital placemaking experiences to the place and community, and a place identity being created through shared experiences to create place attachment did find consensus in this round. Despite some peculiarities, the conceptual model tested found consensus on the dynamics involved and the value of

digital placemaking, specifically finding social identity formation and development as the binding actors in the model.

5.14.1. Consensus agreement (Rounds One, Two and Three)

A comparative analysis of the 19 participants that completed all rounds helped to further analyse the consensus agreement between rounds two and three.

Examining the nineteen participants that completed all three rounds, a total of fifty items achieved over 70% agreement in the percentages of responses in round two. Three items were carried over to round three in the initial round two ($n = 23$) that did not achieve agreement in round two, completed only by the nineteen participants that fulfilled all three rounds. On the contrary, two items achieved consensus in round two ($n = 19$) that did not achieve this status in the initial round two ($n = 23$). When analysing dissensus, two items achieved over 70% agreement in round two ($n = 19$) compared to one item in round two ($n = 23$) (Table 5.18).

Item Category	Item description	Round 2 Agreement % (n=19)	Round 2 Agreement % (n=23)	Round 3 Agreement % (n=19)
Definition of digital placemaking	Digital placemaking is an umbrella term	84.21*	87*	100
Definition of digital placemaking	Placemaking is digital nowadays	10.53	13	15.8
Definition of digital placemaking	Digital placemaking should be defined as a tool	52.63	47.8	0
Definition of digital placemaking	Digital placemaking should be defined as a process	84.21*	78.2*	84.3
Definition of digital placemaking	Sense of place/place attachment is a key aspect in the digital placemaking definition	84.21*	82.6*	42.10
Definition of digital placemaking	Hybrid place experience (mixing the physical space with a digital layer) is a key aspect of the digital placemaking definition	78.95*	78.3*	79
Definition of digital placemaking	Community connection is a key aspect of the digital placemaking definition	73.68*	73.9*	84.2*
Definition of digital placemaking	The physical place characteristics/connection (as an anchor) is a key aspect in the digital placemaking definition	78.95*	78.3*	89.4*
Definition of digital placemaking	Enhancement of the place is a key aspect of the digital placemaking definition	63.16	56.5	0
Definition of digital placemaking	An attractive/enjoyable experience is a key aspect of the digital placemaking definition	57.89	52.2	0

Characteristics of digital placemaking	The digital element of digital placemaking brings back to the physical place	63.16	65.2	0
Characteristics of digital placemaking	Inclusion and accessibility are key characteristics of digital placemaking	73.68*	78.2*	89.5*
Characteristics of digital placemaking	Digital placemaking experiences should focus on one target audience	10.53	13	0
Characteristics of digital placemaking	Digital placemaking creates a place for people to connect with each other	47.37	43.5	0
Characteristics of digital placemaking	Co-creation is a key characteristic of digital placemaking	47.37	52.1	0
Characteristics of digital placemaking	The community is the expert in digital placemaking	52.63	56.5	0
Characteristics of digital placemaking	The democratisation of spaces is a key characteristic of digital placemaking	57.89	60.9	0
Characteristics of digital placemaking	Digital placemaking must have a call to action that leads to behavioural change	36.84	34.7	0
Characteristics of digital placemaking	Storytelling is a way to empower communities through digital placemaking	94.74*	91.3*	94.8*
Characteristics of digital placemaking	Gamification is a strategy for digital placemaking practices	78.95*	78.2*	78.9*
Characteristics of digital placemaking	To enact the senses is a strategy for digital placemaking practices	68.42	65.2	0
Characteristics of digital placemaking	Digital placemaking is missing a sensorial touch	47.37	56.5	0
Characteristics of digital placemaking	Digital placemaking must adapt to the place and community characteristics	84.21*	87*	100*
Characteristics of digital placemaking	Digital placemaking must focus on the aim and purpose of the project	73.68*	78.2*	94.8*
Characteristics of digital placemaking	Digital placemaking projects are unique for each location and community	73.68*	73.9*	68.4

Characteristics of digital placemaking	Digital placemaking projects should be easy to replicate from one location to another	26.32	26.1	0
Characteristics of digital placemaking	Digital placemaking experiences should be short, temporary and one-off interventions	0	0	0
Characteristics of digital placemaking	Digital placemaking experiences should be long efforts in time that ensure continuity	36.84	47.8	0
Characteristics of digital placemaking	Social media is a key tool for digital placemaking	52.63	52.2	0
Characteristics of digital placemaking	Digital placemaking professionals are facilitators	78.95*	82.6*	63.2
Challenges of digital placemaking	Privacy and online safety concerns are challenges to digital placemaking	73.68*	73.9*	89.5*
Challenges of digital placemaking	“Digital public spaces” are not publicly owned, and this is a risk for digital placemaking	57.89	65.2	0
Challenges of digital placemaking	Digital equity is a challenge to digital placemaking	84.21*	87*	84.2*
Challenges of digital placemaking	Inclusion and accessibility are challenges to digital placemaking	84.21*	87*	78.9*
Challenges of digital placemaking	Digital literacy is a barrier to digital placemaking	89.47*	86.9*	79
Challenges of digital placemaking	Technology reliance is a challenge to digital placemaking	68.42	73.9*	63.1
Challenges of digital placemaking	The exclusion of some audiences is a challenge to digital placemaking	84.21*	82.6*	84.2*
Challenges of digital placemaking	Participant motivation and incentives are challenges to digital placemaking	78.95*	82.6*	73.7*
Challenges of digital placemaking	The cost and lack of funding are challenges to digital placemaking	68.42	73.9*	73.7*

Challenges of digital placemaking	Digital stickiness (the engagement and adoption/retention of participants using technology) is a challenge to digital placemaking	68.42	73.9*	73.7*
Challenges of digital placemaking	Top-down practices are a challenge to digital placemaking	52.63	56.5	0
Challenges of digital placemaking	Ethics of digital placemaking practice is a challenge to digital placemaking	89.47*	86.9*	84.2*
Challenges of digital placemaking	Gentrification is an outcome challenge to digital placemaking	42.11	47.8	0
Challenges of digital placemaking	The interdisciplinary nature of digital placemaking is challenging	47.37	56.5	0
Technology in digital placemaking	Technology promotes place experiences	47.37	52.2	0
Technology in digital placemaking	Technology is a medium. not a final product	100*	100*	100*
Technology in digital placemaking	Technology in digital placemaking - 3. Technology is a means to capture data	68.42	65.2	0
Technology in digital placemaking	Technology promotes conversations	36.84	39.1	0
Technology in digital placemaking	Digital placemaking helps connect everything together	36.84	43.5	0
Technology in digital placemaking	Technology is a distraction in placemaking	15.79	17.4	0
Technology in digital placemaking	Technology is used as a quick fix in placemaking	26.32	30.4	0
Technology in digital placemaking	Digital placemaking is a way to create temporary roots and develop a sense of connection with the place	52.63	56.5	0
Technology in digital placemaking	Digital placemaking is a vehicle for thinking about place differently and creating emotional connections	84.21*	82.6*	94.7*

Measurement of digital placemaking	The best way to measure digital placemaking is through an ethnographic study	31.58	34.8	0
Measurement of digital placemaking	Digital KPIs (i.e., app downloads, web visits or usability) are the best way to measure digital placemaking	10.53	13	0
Measurement of digital placemaking	Most digital placemaking projects are not assessed due to lack of funding or time	47.37	43.4	0
Measurement of digital placemaking	Prototyping tests are the best way to measure digital placemaking	26.32	21.7	0
Measurement of digital placemaking	Analysis of the target audience, audience needs, and policy requirements is the best way to measure digital placemaking	42.11	39.1	0
Measurement of digital placemaking	Interviews/Focus groups are the best way to measure digital placemaking	42.11	43.4	0
Measurement of digital placemaking	Context analysis of digital placemaking is essential for its impact measurement	65.26	69.5	0
Measurement of digital placemaking	Digital placemaking measurement is very difficult and depends on the project	73.68*	78.2*	63.2
Measurement of digital placemaking	Observable metrics at the urban level are the best way to measure digital placemaking	47.37	43.4	0
Measurement of digital placemaking	Rubrics involving problem and solution, goals, technology purpose, power dynamics, place context, participation and collaboration, ownership and place characteristic are the best way to measure digital placemaking	47.37	39.1	0
Measurement of digital placemaking	Longevity of the experience is the best way to measure digital placemaking	21.05	21.7	0

Measurement of digital placemaking	Surveys are the best way to measure digital placemaking	0	4.3	0
Measurement of digital placemaking	Community participation is the best way to measure digital placemaking	36.84	39.1	0
Measurement of digital placemaking	Before/After controlled studies are the best way to measure digital placemaking	36.84	39.1	0
Measurement of digital placemaking	The definition of success in digital placemaking is essential for impact measurement	78.95*	78.2*	79
Measurement of digital placemaking	Stakeholder feedback is the best way to measure digital placemaking	36.84	34.7	0
Measurement of digital placemaking	Psychological scales and scores (i.e., place attachment scores, nature connectedness, or wellbeing self-assessment questionnaires) are the best way to measure digital placemaking	52.63	52.1	0
Measurement of digital placemaking	Mixed methods are the best way to measure digital placemaking	78.95*	82.6*	78.9*
Place Attachment	A physical connection to the place in digital placemaking is essential for the creation of place attachment	78.95*	73.9*	57.9
Place Attachment	Digital placemaking can be a shortcut to promote place attachment feelings	52.63	52.1	0
Place Attachment	Digital placemaking helps maintaining and reinforce place attachment feelings	73.68*	69.60	0
Place Attachment	Digital placemaking opens up place attachment to a community dimension	63.16	56.5	0
Place Attachment	Digital placemaking could convey people's memories and stories of belonging to place to create and maintain place attachment	89.47*	91.3*	94.7*

Place Attachment	Digital placemaking takes away from creating place attachment	5.26	4.3	0
Place Attachment	Communal feeling of attachment to place benefits wellbeing	89.47*	86.9*	84.2*
Place Branding	Digital placemaking creates a shared sense of place image and brand	63.16	56.5	0
Place Branding	Place branding can use digital placemaking as a tool for the identification of common sense of place	78.95*	78.3*	94.7*
Place Branding	Digital placemaking as a place branding strategy must be participatory	73.68*	73.9*	63.2
Place Branding	Participatory place branding and digital placemaking have to focus on people's representation of place. its materiality and the digital as a performative act	68.42	65.2	0
Place Branding	Digital placemaking as a participatory place branding strategy needs clear guidelines	68.42	69.5	0
Place Branding	Place branding can use digital placemaking to communicate stories of a place	84.21*	87*	100*
Place Branding	Social media creates a space for people to share and build a place brand image	68.42	69.5	0
Place Branding	Place branding is very superficial and dominant	31.58	39.1	0
Place Branding	Events are key for digital placemaking as a place branding strategy	47.37	56.5	0
Place Branding	Digital placemaking for place branding is a place management tool to ensure users' needs are met and monitor the place brand	36.84	39.1	0

Place Branding	Digital placemaking for place branding can modify place perceptions	68.42	69.6	0
Place Branding	Digital placemaking can have a negative impact in perpetuating the image of a place	47.37	52.1	0
Place Branding	Place branding should be an iterative process where the brand evolves with the community over time. which conflicts with common strict branding guidelines	73.68*	78.3*	94.8*
Place Branding	Branding spaces as hybrid locations for everyday place connections will benefit nature connectedness	42.11	43.4	0
Digital placemaking and nature	Technology is a distraction from nature experiences	57.89	26	0
Digital placemaking and nature	Technology can help people positively reconnect with nature	78.95*	82.6*	68.4
Digital placemaking and nature	Sense engagement through technology enhances emotional connection with nature	47.37	52.1	0
Digital placemaking and nature	Technology can promote behaviour change towards nature connectedness	73.68*	73.9*	73.7*
Digital placemaking and nature	Digital placemaking can be used as a way to find. explore and discover nature places (e.g., place information. audio guides)	89.47*	91.3*	100*
Digital placemaking and nature	Digital placemaking lowers the entry barriers in natural places	42.11	43.4	0
Digital placemaking and nature	Digital placemaking can help people understand and take notice of nature (e.g., an app to learn about trees. listen to bird sounds. and recognise species)	84.21*	82.6*	94.7*

Digital placemaking and nature	Digital placemaking can be used to tell stories about nature	94.74*	95.7*	94.8*
Digital placemaking and nature	Technology can help raise awareness and educate on the importance of nature and biodiversity	94.74*	95.6*	94.8*
Digital placemaking and nature	Technology can expose people to nature (e.g., nature videos, nature sounds)	78.95*	82.6*	89.5*
Digital placemaking and nature	Technology helps us imagine futures for nature	78.95*	78.2*	79*
Digital placemaking and nature	Technology for nature should also be approached beyond the human lens (e.g., for animals sharing the space with humans)	89.47*	86.9*	94.7*
Digital placemaking and nature	Digital placemaking is a place management tool for nature spaces	31.58	39.1	0
Digital placemaking and nature	Digital placemaking allows sharing experiences in nature places	78.95*	78.2*	79*
Digital placemaking and nature	Digital placemaking creates sense of ownership needed for nature connectedness	31.58	34.7	0
Digital placemaking and nature	Social media has helped people reflect on their experiences with nature	36.84	39.1	0
Digital placemaking and nature	Digital placemaking for nature should measure the nature element	63.16	65.2	0
Digital placemaking and nature	Digital placemaking for nature should measure the experience in nature	63.16	65.2	0
Digital placemaking and wellbeing	The wellbeing impact of digital placemaking practices resides in the sense of belonging created with the community	52.63	60.8	0

Digital placemaking and wellbeing	The wellbeing impact of digital placemaking practices resides in the sense of belonging created with the place	78.95*	82.6*	63.2
Digital placemaking and wellbeing	The wellbeing impact of digital placemaking practices resides in feelings of ownership and co-ownership	47.37	47.8	0
Digital placemaking and wellbeing	Maximising people's experiences of place through digital placemaking affects their wellbeing	63.16	65.2	0
Digital placemaking and wellbeing	Only the physical experience can benefit people's wellbeing	10.53	8.7	0
Digital placemaking and wellbeing	Digital placemaking can be used to monitor the health/wellbeing status of a community	57.89	60.8	0
Digital placemaking. nature and wellbeing	User ownership of the digital placemaking experience is the link between digital placemaking and nature-supporting wellbeing.	47.37	39.1	0
Digital placemaking. nature and wellbeing	Virtual nature increases feelings of wellbeing for those with no access to nature	52.63	52.1	0
Digital placemaking. nature and wellbeing	Virtual nature has a positive effect on wellbeing. but real nature is better	63.16	65.2	0
Digital placemaking. nature and wellbeing	Technology can help people understand how nature benefits their wellbeing (e.g., mood improvement. relief of stress. etc).	84.21*	87*	84.2*
Digital placemaking. nature and wellbeing	To encourage behaviour change is the connection between digital placemaking. nature and wellbeing	36.84	43.4	10
Digital placemaking. nature and wellbeing	Digital guided wellness walks in nature benefit citizen wellbeing	73.68*	69.60	0

Digital placemaking. nature and wellbeing	Gamified digital placemaking experiences in nature (i.e., a treasure hunt in nature using QR codes) is a good health and wellbeing initiative	63.16	65.2	0
Digital placemaking. nature and wellbeing	Digital placemaking. nature and wellbeing are part of a circular economy approach to benefit a sustainable future	36.84	43.4	0
Digital placemaking. nature and wellbeing	Digital placemaking can repurpose spaces to link them with nature supporting wellbeing	68.42	73.9*	73.7*
Digital placemaking. nature and wellbeing	Digital placemaking creates awareness and consciousness among a sense of place. sense of environment and nature to support wellbeing	57.89	65.2	0
Digital placemaking. nature and wellbeing	Digital placemaking should educate communities on nature and its support for wellbeing	73.68*	73.9*	68.4
Digital placemaking. nature and wellbeing	Digital placemaking iterative characteristic can be a strategy to reintroduce nature digitally in urban environments to create case studies examples of its benefits	57.89	56.5	0
Digital placemaking. nature and wellbeing	Digital placemaking for nature supporting wellbeing is a complementary measure to getting out in real nature	63.16	65.2	0
Digital placemaking. nature and wellbeing	Digital placemaking can help communities find nature places to support their wellbeing	78.95*	82.6*	100*
Digital placemaking. nature and wellbeing	The link between technology. nature and wellbeing has been mostly approached from a digital data perspective	36.84	34.7	0

Digital placemaking. nature and wellbeing	Digital placemaking can ‘trick’ people to get in nature and benefit from it	21.05	17.3	0
Digital placemaking. nature and wellbeing	Digital placemaking initiative that supports safe location information involving nature spaces community wellbeing (e.g., changing your commute to go through a nature space)	57.89	56.5	0
Digital placemaking. nature and wellbeing	Digital placemaking can create a sense of accountability in the community when involving nature and wellbeing	47.37	43.4	0
Digital placemaking. nature and wellbeing	Nature as an assessment element is key to understanding the wellbeing impact of digital placemaking	47.37	43.5	0

Table 5.18: Comparative analysis of Round Two and Round Three between all responses (n=23) and only participants that responded to both rounds (n=19)

Notes: * indicates the $\geq 70\%$ agreement among participants is achieved (Avella, 2016).

5.14.2. Consensus Agreement and Stability Between Rounds

Forty-two items achieved consensus (76.36%), and thirty-three items achieved stability of response (78.57%). These high results led us to finish the rounds here, following the stopping criteria.

A higher stability variation is identified in items included in the definition of digital placemaking, the characteristics of digital placemaking, and place branding, with less variation in challenges and measurement of digital placemaking, place attachment, and digital placemaking in nature for wellbeing (Table 5.19). This is aligned with the consensual agreement found in previous sections, where coherence of percentage of agreement with descriptive statistics perceived a higher dispersion of responses. When defining, characterising, and involving place branding, participants differ on approaches due to the complexity of the concept and the dichotomic connection between place branding and digital placemaking.

Perfect stability of response (variance of 0) is found in technology acting as a medium and not a final product, which is aligned with its repeated 100% agreement achieved during questionnaire rounds. This is one of the key findings of the Delphi rounds of questionnaires, technology used in digital placemaking is a medium, a tool that enhances the place experience, and should not be the key focus of the process. Closer stability (variance < 1) is found in items within the digital placemaking and nature sections, understanding its use to raise awareness and educate, telling stories, and sharing experiences. Storytelling, raising awareness, and building communal experiences with others are key aspects of digital placemaking when involving nature spaces. Round one interview findings suggested storytelling as a key strategy to foster place attachment,

place branding, and nature connectedness, which was validated in the questionnaire rounds.

Item category	Item	CV	Frequency variance %
Definition of digital placemaking	Digital placemaking is an umbrella term (mean=4.13)	-0.04	13.00
Definition of digital placemaking	Digital placemaking should be defined as a process (mean=3.96)	-0.09	6.10
Definition of digital placemaking	Hybrid place experience (mixing the physical space with a digital layer) is a key aspect of the digital placemaking definition (mean=3.96)	0.01	0.70
Definition of digital placemaking	Community connection is a key aspect of the digital placemaking definition (mean=3.96)	-0.04	10.30
Definition of digital placemaking	The physical place characteristics/connection (as an anchor) is a key aspect in the digital placemaking definition (mean=4.13)	0.63	11.10
Characteristics of digital placemaking	Inclusion and accessibility are key characteristics of digital placemaking (mean=4)	-0.08	11.30
Characteristics of digital placemaking	Storytelling is a way to empower communities through digital placemaking (mean=4.13)	-0.04	3.50
Characteristics of digital placemaking	Gamification is a strategy for digital placemaking practices (mean=3.91)	0.09	0.70
Characteristics of digital placemaking	Digital placemaking must adapt to the place and community characteristics (mean=4.35)	-0.08	13.00
Characteristics of digital placemaking	Digital placemaking must focus on the aim and purpose of the project (mean=4.13)	-0.07	16.60*
Challenges of digital placemaking	Privacy and online safety concerns are challenges to digital placemaking (mean=4)	-0.06	15.60*
Challenges of digital placemaking	Digital equity is a challenge to digital placemaking (mean=4.17)	0.65	-2.80
Challenges of digital placemaking	Inclusion and accessibility are challenges to digital placemaking (mean=3.35)	0.05	-8.10
Challenges of digital placemaking	Digital literacy is a barrier to digital placemaking (mean=4.26)	0.00	-7.90

Challenges of digital placemaking	The exclusion of some audiences is a challenge to digital placemaking (mean=4.3)	0.05	1.60
Challenges of digital placemaking	Participant motivation and incentives are challenges to digital placemaking (mean=4.09)	-0.01	-8.90
Challenges of digital placemaking	The cost and lack of funding are challenges to digital placemaking (mean=3.83)	-0.02	-0.20
Challenges of digital placemaking	Digital stickiness (the engagement and adoption/retention of participants using technology) is a challenge to digital placemaking (mean=4)	0.02	-0.20
Challenges of digital placemaking	Ethics of digital placemaking practice is a challenge to digital placemaking (mean=4.13)	0.02	-2.70
Technology in placemaking	Technology is a medium. not a final product (mean=4.35)	-0.02	0.00
Technology in placemaking	Digital placemaking is a vehicle for thinking about place differently and creating emotional connections (mean=4)	-0.01	12.10
Measurement of digital placemaking	The definition of success in digital placemaking is essential for impact measurement (mean=3.83)	0.06	0.80
Measurement of digital placemaking	Mixed methods are the best way to measure digital placemaking (mean=4.39)	0.06	-3.70
Place attachment	Digital placemaking could convey people's memories and stories of belonging to place to create and maintain place attachment (mean=4.22)	0.03	3.40
Place attachment	Communal feeling of attachment to place benefits wellbeing (mean=4.17)	0.02	-2.70
Place branding	Place branding can use digital placemaking as a tool for the identification of common sense of place (mean=3.96)	0.70	16.40*
Place branding	Place branding can use digital placemaking to communicate stories of a place (mean=4.13)	-0.04	13.00
Place branding	Place branding should be an iterative process where the brand evolves with the community over time.	-0.01	16.50*

	which conflicts with common strict branding guidelines (mean=3.87)		
Digital placemaking and nature	Technology can promote behaviour change towards nature connectedness (mean=3.83)	0.04	-0.20
Digital placemaking and nature	Digital placemaking can be used as a way to find. explore and discover nature places (e.g., place information. audio guides) (mean=4.35)	-0.04	8.70
Digital placemaking and nature	Digital placemaking can help people understand and take notice of nature (e.g., an app to learn about trees. listen to bird sounds. and recognise species) (mean=4.22)	-0.04	12.10
Digital placemaking and nature	Digital placemaking can be used to tell stories about nature (mean=4.22)	0.01	-0.90
Digital placemaking and nature	Technology can help raise awareness and educate on the importance of nature and biodiversity (mean=4.26)	0.01	-0.80
Digital placemaking and nature	Technology can expose people to nature (e.g., nature videos. nature sounds) (mean=4)	0.07	6.90
Digital placemaking and nature	Technology helps us imagine futures for nature (mean=3.83)	0.07	0.80
Digital placemaking and nature	Technology for nature should also be approached beyond the human lens (e.g., for animals sharing the space with humans) (mean=4.09)	-0.01	7.80
Digital placemaking and nature	Digital placemaking allows sharing experiences in nature places (mean=4)	0.00	0.80
Digital placemaking, nature and wellbeing	Technology can help people understand how nature benefits their wellbeing (e.g., mood improvement. relief of stress. etc). (mean=4.04)	0.02	-2.80
Digital placemaking, nature and wellbeing	Digital placemaking can repurpose spaces to link them with nature supporting wellbeing (mean=3.74)	0.03	-0.20
Digital placemaking, nature and wellbeing	Digital placemaking can help communities find nature places to support their wellbeing (mean=4.04)	-0.05	17.40*

Table 5.19: Comparative analysis of the stability of variation of the modified Delphi items.

Notes: * indicates the $\geq 15\%$ frequency variance among participants is achieved (von der Gracht, 2012).

5.14.3. Qualitative Analysis: Free form comments

This round also included optional open-ended questions for participants to voluntarily provide additional comments if they so considered. Qualitative feedback refers to explanations of their rating for item sections. In total, twenty qualitative statements (Table 5.20) were received, with an average of 1.05 comments per expert and expanded expert, written in paragraphs and complete sentences. Considering nineteen participants and ten free comment boxes in the questionnaire, one hundred and ninety comments were possible. Thus, a rate of 10.53% was achieved for these voluntary comments. A lower rate than the previous round was found, which indicates that participants did not feel the need to provide additional feedback on the items of this round. This might have been enhanced with the inclusion of an N/A option in the rating for each item. The majority of comments were comprehensive and well-structured sentences, which made them a valuable addition to reinforce the participants responses. Encouraging comments from participants confirming the value of specific items that achieved initial consensus were also recorded.

Item section	N° of comments
Digital placemaking definition	4
Digital placemaking characteristics	7
Digital placemaking challenges	1
Technology in digital placemaking	2
Measurement in digital placemaking	1
Place attachment	0
Place branding	1
Digital placemaking and nature	2
Digital placemaking and wellbeing	1
Digital placemaking in nature for wellbeing	1
Total	20

Table 5.20: Analysis of free-form comments in Round Three.

The majority of comments were shared on the characteristics of digital placemaking (n = 7) and definition (n = 4). Comments were analysed using thematic analysis (Table 5.21), and codes were grouped into themes due to relationships. One additional theme was found in this round of comment analysis besides digital placemaking and criticism of a specific item, digital placemaking for nature was also explored.

Comment theme	TID
Digital placemaking	12
Critic to item	8
Digital placemaking and nature	3

Table 5.21: Thematic Analysis results from the free-form comments in Round Three.

When investigating the concept of digital placemaking, comments referred to further explaining their rating and sharing their thoughts on the statements. Comments regarding the definition of the concept, challenges, inclusion opportunities, and the importance of an ecological lens in placemaking were expressed as a continuation of their rating in the questionnaire.

Digital Placemaking as Placemaking should be define as a process and a tool. (Participant 5108).

The digital overlay should be an enhancement to the physical space, work in conjunction with the objectives of the physical. ().

Digital literacy is a barrier when tech-centred approaches dominate (e.g. using cutting edge tech that's unethical or not widely used/owned or using/creating horrible UX in software due to lack of Human-Centred design, etc.). (...) Stickiness is often due to a lack of human-staffed community management/organizing digital is a replacement for the real work of community organizing. (Participant 1761).

Digital placemaking is reinforced in the comments as a process that evolves from placemaking practices, where technology enhances the physical experience. Participants also further discussed challenges derived from digital placemaking, from digital literacy

to stickiness. Technology-centred projects are what lead to a number of risks for the community and the place.

The inclusion aspect of digital placemaking was highlighted, as it can facilitate community participation and plural versions of place that, in the end, incorporate an ecological lens into the concept.

Digital placemaking, being context-aware, chooses appropriate tech that increases or gap-fills inclusive participation. In-person meeting is often more-exclusionary than digital, but all methods must be considered contextually to meeting people where they are. (...) Strongly support the medium lens, the media ecology lens. All human artifacts are mediums, from bricks to bits. This ecological consciousness is deeply core to placemaking. Why Digital Placemaking aligns most with Media Ecology school of thought. (Participant 1761).

In one community there could be diverging aims and visions for placemaking and digital placemaking so that there are plural versions of place, community, and placemaking. (Participant 5524).

The ecological and inclusive lens is embedded in the conceptual model from a Social Identity Theory perspective, where feelings of community membership and belonging (Hornsey, 2008; Tajfel & Turner, 1986) help create and build a communal identity that, when in place, enhances the dynamics involved in digital placemaking and acts as a binding agent or connecting principle. Digital opens new opportunities for the inclusion of multiple identities that are considered in a place experience.

When involving nature, references to technology facilitating nature connections that in the end will lead to 'real' nature experiences were shared to emphasise the importance of physical nature experiences without technological mediation.

Same point as last time: "nature" is a false dichotomy, all things on Earth are natural just at different levels of processing and dysfunction or well-functioning. Indigenous worldviews here help: another question/provocation would be that digital methods should help people become more indigenous, more connected to the land they are on and all the life in it. (Participant 1761).

the best kind of tech for nature experiences, ends with people experiencing nature without the technology. I.e. it's gets you to the place, engages you in the place, but then, in very last moment it's just your senses and nature. (Participant 804).

These comments represent the difficult task of digital placemaking, which never aims to replace the nature experience yet is criticised for taking away from it. The digital placemaking approach to nature for wellbeing aims to increase and enhance the physical place, boosting the benefits by facilitating the community to connect with others, with the public, and with nature. Creating meaningful place experiences that are enhanced through technology is not contradictory to experiencing nature itself, but a complement.

Critical comments decreased, which indicates that clarity and relevance were stronger in this round. However, some participants feel unsure about rating some items due to the ambiguity of statements and the complexity of digital placemaking as a concept.

As in the previous questionnaire, I feel that the questions are ambiguous. For example, it is unclear whether I should rank them based on what they are, or on what they ought to be. (Participant 1473).

I did not understand Q7 too well and felt that I couldn't give a meaningful answer. (Participant 6696).

The complexity of digital placemaking and the broad concept of multiple disciplines are also shown by participants not feeling confident when rating some specific aspects in the Delphi round. An agreed-upon approach to digital placemaking can shed light on the concept of maturity and also help the broad spectrum of digital placemaking practitioners and potential practitioners use and promote positive attachment feelings among participants, with the place and with nature.

5.15. Summary

This chapter includes a presentation and summary of the findings from the three-round modified Delphi study. Experts and expanded experts identified the most important aspects of digital placemaking in nature for wellbeing, exploring place attachment and place branding. The final forty-two items achieved >70% consensus agreement for inclusion in developing the field of digital placemaking:

Statements for definition of digital placemaking:

1. Digital placemaking is an umbrella term
2. Digital placemaking should be defined as a process
3. Hybrid place experience (mixing the physical space with a digital layer) is a key aspect of the digital placemaking definition
4. Community connection is a key aspect of the digital placemaking definition
5. The physical place characteristics/connection (as an anchor) is a key aspect in the digital placemaking definition

Statements for characteristics of digital placemaking:

1. Inclusion and accessibility are key characteristics of digital placemaking
2. Storytelling is a way to empower communities through digital placemaking
3. Gamification is a strategy for digital placemaking practices
4. Digital placemaking must adapt to the place and community characteristics
5. Digital placemaking must focus on the aim and purpose of the project

Statements for challenges of digital placemaking:

1. Privacy and online safety concerns are challenges to digital placemaking
2. Digital equity is a challenge to digital placemaking
3. Inclusion and accessibility are challenges to digital placemaking

4. Digital literacy is a barrier to digital placemaking
5. The exclusion of some audiences is a challenge to digital placemaking
6. Participant motivation and incentives are challenges to digital placemaking
7. The cost and lack of funding are challenges to digital placemaking
8. Digital stickiness (the engagement and adoption/retention of participants using technology) is a challenge to digital placemaking
9. Ethics of digital placemaking practice is a challenge to digital placemaking

Technology in digital placemaking:

1. Technology is a medium, not a final product
2. Digital placemaking is a vehicle for thinking about place differently and creating emotional connections

Statements for measurement of digital placemaking:

1. The definition of success in digital placemaking is essential for impact measurement
2. Mixed methods are the best way to measure digital placemaking

Statements for Place Attachment:

1. Digital placemaking could convey people's memories and stories of belonging to place to create and maintain place attachment
2. Communal feeling of attachment to place benefits wellbeing

Statements for Place Branding:

1. Place branding can use digital placemaking as a tool for the identification of common sense of place
2. Place branding can use digital placemaking to communicate stories of a place

3. Place branding should be an iterative process where the brand evolves with the community over time, which conflicts with common strict branding guidelines

Statements for digital placemaking and nature:

1. Technology can promote behaviour change towards nature connectedness
2. Digital placemaking can be used as a way to find, explore and discover nature places (e.g., place information, audio guides)
3. Digital placemaking can help people understand and take notice of nature (e.g., an app to learn about trees, listen to bird sounds, and recognise species)
4. Digital placemaking can be used to tell stories about nature
5. Technology can help raise awareness and educate on the importance of nature and biodiversity
6. Technology can expose people to nature (e.g., nature videos, nature sounds)
7. Technology helps us imagine futures for nature
8. Technology for nature should also be approached beyond the human lens (e.g., for animals sharing the space with humans)
9. Digital placemaking allows sharing experiences in nature places

Statements for digital placemaking, nature and wellbeing:

1. Technology can help people understand how nature benefits their wellbeing (e.g., mood improvement, relief of stress, etc).
2. Digital placemaking can repurpose spaces to link them with nature supporting wellbeing

As a result of the three-round modified Delphi study, consensus has been achieved in a number of areas that support the conceptual model and answer the research question of

this study. The aim of the study is to explore how digital placemaking as a place branding strategy promotes place attachment processes to foster community-nature connectedness and support consumer wellbeing.

Data analysis suggests social identity is the binding actor that sustains all dynamics together in digital placemaking, boosting the different wellbeing outcomes produced. The rich interview data provided a number of insights that pointed to the use and role of identity in place attachment, place branding, nature connectedness, and digital placemaking. After the three rounds of the study, participants converged on place identities being built through shared experiences in place attachment, where digital placemaking acts as a tool, and place branding using digital placemaking to help identify a common sense of place. Place attachment, place branding, and social identity found consensus on their interrelationships, which in the end act together with nature connectedness, supporting wellbeing, helping communities understand nature benefits, repurposing places, and finding nature spaces.

One of the key findings deepens the understanding of digital placemaking as a concept, advancing through a consensual definition and providing essential characteristics, challenges, and assessment methods to help position the concept in a maturing state in the social sciences. The key finding in the third Delphi round is the unanimous consensus on the technology dimension of digital placemaking to act as a medium, not as an end goal or product itself. This confirms the hybrid environment created in digital placemaking and differentiates it from virtual immersive experiences that have been criticised as aiming to replace real-place experiences. Digital placemaking does not aim to replace nature or place experiences, but to enhance them through digital mediation that adds meaning and facilitates the connection with others, with place, and with nature.

The interconnections with place branding are important in the development of place image, identity, and branding. Similarly, the links between place attachment and digital placemaking reside in community engagement and multiple identities, which can be preserved and respected through the inclusion aspect of the concept.

Finally, specifically exploring nature and wellbeing connections with digital placemaking provides a number of opportunities to develop and implement digital placemaking in this setting, and specifically fostering wellbeing outcomes when technology communicates the wellbeing benefits of nature helps users find nature spaces and repurpose existing spaces.

The next chapter includes the interpretation and discussion of the study results, followed by a description of its limits and connections to existing literature, current findings, and future research agenda.

Chapter 6. Discussion of Contribution to Knowledge

6.1. Introduction

This chapter synthesizes the research findings to answer the research question described in [Chapter 1](#). Specifically, this chapter discusses the findings of the research and outlines different contributions to knowledge in the respective areas of digital placemaking, place branding, place attachment, and nature connectedness. The chapter begins by providing an overview of the major contributions as themes and sub-themes of the research. Contributions to theory and practice are described, identifying how the research has advanced previous studies. Finally, a summary concludes the chapter by demonstrating how this research has achieved its aims and objectives, highlighting generated insights that are beneficial to theory and practice. The main findings of the research will be briefly described in [Section 6.2](#). The following sections will discuss the main contributions of the research to existing scientific knowledge. Conclusion remarks and future research are described in [Chapter 7](#). A division between the discussion and conclusion chapter is chosen to thoroughly explain the research contributions and final remarks and facilitate comprehension.

6.2. Summary of findings

The principal aims of this PhD thesis are:

- To incorporate digital placemaking as a place branding strategy to help reframe the human-nature relationship enhancing urban nature experiences, supporting wellbeing

- To understand how digital placemaking can be implemented from a place branding perspective to promote hybrid place attachment in urban nature spaces, foster community nature connectedness, and support consumer wellbeing.

Regarding the research aims, four research questions were addressed:

1. How does digital placemaking as a place branding strategy promote place attachment processes to foster community-nature connectedness to support consumer wellbeing?
2. How can digital placemaking reframe the human-nature disconnection affecting urban consumers?
3. How are the dynamics involved in digital placemaking in nature for wellbeing interconnected?
4. How can the wellbeing impact of digital placemaking practices in nature be assessed?

Therefore, the research objectives are:

Research Objective 1: To review the various literatures for knowledge, theory and practice in: digital placemaking, nature and wellbeing

Research Objective 2: To investigate how digital placemaking as a place branding strategy can promote place attachment processes, foster community nature connectedness, and support consumer wellbeing.

Research Objective 3: To understand the interconnected dynamics of digital placemaking in nature for wellbeing, generating the core components for the development and test of a conceptual model.

Research Objective 4: To provide strategies and solutions to reframe the human-nature disconnection and enhance urban nature experiences.

Research Objective 5: To advance assessment methods on digital placemaking in nature for wellbeing

The described aims and objectives address significant knowledge gaps in the concept of digital placemaking and its relationships with place attachment, place branding, and nature connectedness to support wellbeing. These questions and aims also examine opportunities that have not been explored when addressing the human-nature disconnection that affects cities. Finally, the aim and objectives address knowledge gaps regarding assessment processes for digital placemaking in nature for wellbeing. These aims and objectives discussed in the following major and sub-thematic contribution sections. In summary, each major contribution addresses each research question through the research method described.

This research used a modified Delphi method on digital placemaking in nature for wellbeing, with experts in digital placemaking and expanded experts in related fields of interest. The panel of participants has numerous years of experience in the fields of placemaking, technology, health, nature, place branding, and urbanism, as well as seminal work on digital placemaking. The novelty of using an initial qualitative stage, along with the combination of experts and expanded experts, situates this research as the first to achieve a consensual approach not only to digital placemaking but also to its application in nature for wellbeing, which is explored in the thesis chapters. The research contributions are grounded in the critical realist belief that reality exists independently of the researcher perceptions, while their understanding of this reality is mediated by social, cultural and cognitive processes (Creswell & Poth, 2016; Sayer, 2010). Therefore, knowledge must be approached with a sense of openness to different interpretations. The contributions discussed in this chapter provide a deeper understanding of the phenomenon

explored as a step towards uncovering the underlying structures and mechanisms in digital placemaking in nature for wellbeing.

The method employed investigated the relationships among digital placemaking, place attachment, nature connectedness, and place branding. First, an exploration of digital placemaking as a concept and its relationship with place attachment, place branding, nature, and wellbeing highlighted the interconnections of the dynamics and the different strategies and uses that bring digital placemaking together, as well as the challenges and benefits. Through the Delphi rounds, consensus was achieved on a number of statements on digital placemaking, its relationship with place attachment and place branding, and its connection with nature and wellbeing. This chapter highlights the different dilemmas in the concept due to the lack of maturity and its interdisciplinary approach. Moreover, the consensus achieved, and the different variations of consensus determine the areas of consolidated knowledge on digital placemaking and the areas that are open to further interpretation.

Quantitative and qualitative methods were used to answer each of the research questions and have been presented in Chapter 5. A first qualitative round highlighted how the different dynamics involved in digital placemaking in nature for wellbeing were interconnected and affect each other. This qualitative approach provided greater depth to the understanding of digital placemaking and its implications in relation to place attachment, place branding, and nature connectedness. A quantitative approach through the Delphi rounds of questionnaires was used to quantify agreement with regard to the statements analysed in the qualitative round, exploring the level of dispersion and consensus. Finally, both approaches assessed digital placemaking's hybrid place experiences with a focus on nature settings for wellbeing outcomes. This mixed-methods approach has been used by previous scholars to examine place branding and marketing,

forecast future uses, and explore emergent concepts. The combination of qualitative responses with standardised quantitative questionnaires helps reduce potential biases such as Delphi biases (Grime & Wright, 2016).

6.3. Overview of Major Themes and Sub-Themes

This chapter discusses the findings of the programme of research and outlines the different contributions to knowledge in different areas of digital placemaking. An overview of the major themes is provided, and sub-thematic contributions to knowledge are also presented to identify how this PhD thesis advances several studies discussed in relation to theory. Sub-thematic contributions to knowledge are also presented to identify how this PhD research advances several studies (see Figure 6.1).

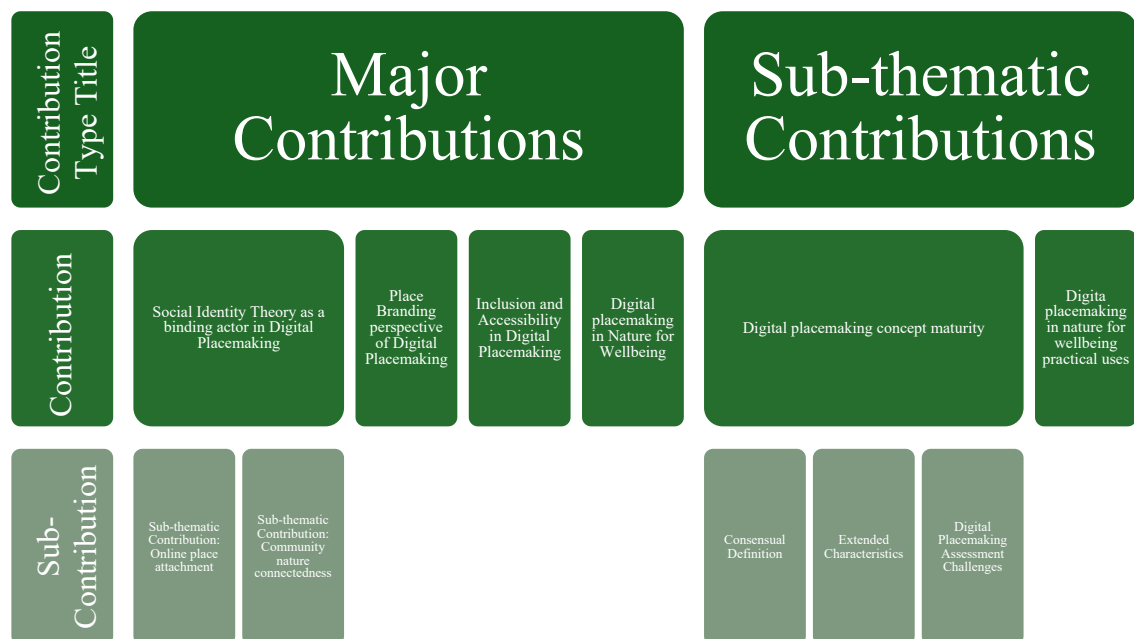


Figure 6.1: Summary of contributions by major themes and sub-themes.

6.4. Major Contributions to Knowledge

The major contribution to knowledge from this programme of research is the test and validation of the conceptual model of digital placemaking in nature for wellbeing. The

model, which presents how digital placemaking promotes place attachment and community nature connectedness through place branding strategies, contains four propositions that introduce social identity as a binding actor, update place attachment and nature connectedness, and demonstrate the potential in nature for wellbeing. Each contribution described is supported by previous findings in addition to the identified new findings.

6.4.1. Major Contribution to Knowledge: Social Identity is the Major Factor in Digital Placemaking.

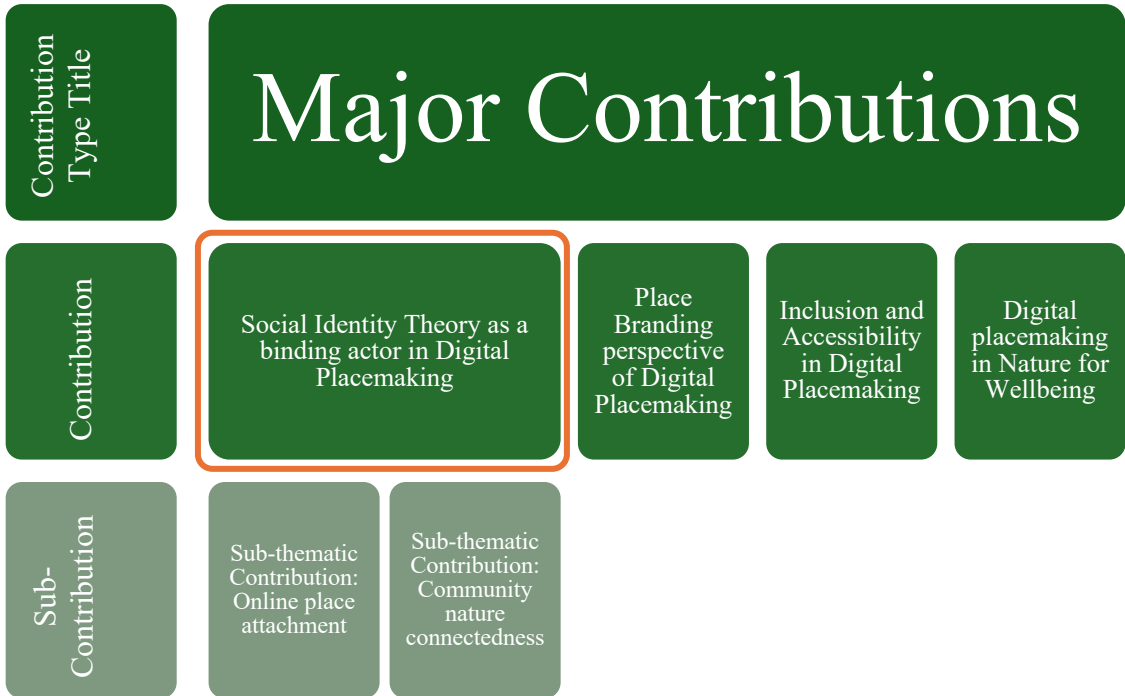


Figure 6.2: Summary of major contributions – Social Identity Theory as a binding actor in Digital Placemaking.

The first major contribution of the research is:

social identity is a major factor in digital placemaking, acting as a binding agent among dynamics in the experience.

This programme of research has advanced the conceptualization of digital placemaking by describing Social Identity Theory as an agent that binds all dynamics (Figure 6.2). Previous studies have explored place identity in placemaking (Imara et al., 2024; Razi & Ziminski, 2022; Soedarsono et al., 2021), place image as a combination of sense of place and identity (Klein, 2022; Törnberg, 2022), and place culture and identity development through branding (Wang, 2019). Specifically, the connection between place attachment and place identity is found in the review as a substructure of social identity (Qazimi, 2014), with brief mention of the creation of social identity in placemaking (Kotus et al., 2022; Sacramento et al., 2022; Törnberg, 2022). However, these identity processes are mainly described in analogue experiences. Therefore, the direct connection between digital placemaking and social identity understanding the role it plays in the experience has not been explored previously. This research and the study in Chapter 5 advance their approach through an innovative understanding of how digital placemaking fosters the development of social identity, which acts as a binding agent among place attachment, nature connectedness and place branding. This Social Identity Theory perspective also impacts communities and how the wellbeing benefits of this experience are developed through the social identity that is created. As a result, the Social Identity Theory lens to digital placemaking is an innovative angle that acts as a binding agent that empowers place attachment processes in digital placemaking.

Social Identity Theory permeates all the dynamics studied and the different findings of this research. Social identity is found to be enacted in digital placemaking's hybrid physical-digital space ([Chapter 5 Part A](#)), but also in the different dynamics that occur during a digital placemaking experience: place branding and attachment (see [Finding 5.7](#)), and nature connectedness (see [Finding 5.12.4.1](#)). Social Identity Theory is found to recognise and attend to the communal dimension and relationships in each dynamic. It is

important to understand effects and impacts on an individual level. However, since digital placemaking is found to be a community-driven concept (Courage, 2021), the community dimension, which has been overlooked in the related dynamics of place attachment, nature connectedness, and place branding, needs to be taken into consideration. Therefore, Social Identity Theory is found to play a key role as a binding actor among the different processes involved in digital placemaking in nature for wellbeing (see [Finding 5.12.5.1](#)), finding consensus on the item “A place’s identity is built through shared experiences, and the digital can help with it” (89.5%). Social Identity Theory enhances the rest of the dynamics in digital placemaking, opening a community dimension where all of them participate in building membership and belonging feelings with others, with the place, and with nature.

This contribution advances knowledge of updated approaches to digital placemaking, offering new insights that have implications for theory and practice. The literature gap found in Chapter 3 targeted in the conceptual model presented in this programme of research explores technology-mediated consumer wellbeing and social change benefits of digital placemaking in nature-based place experiences, which have been overlooked in the scarce explanatory frameworks of the concept (e.g., Chen et al., 2022; 2024; Hespanhol, 2022; Razi & Ziminski, 2022). To further deepen the understanding of digital placemaking dynamics and facilitate its implementation in cities to support nature connectedness and wellbeing, it was necessary to develop and test a conceptual model that understands how digital placemaking, nature, and wellbeing are interconnected.

The systematic review developed through this PhD investigation identified a number of gaps in digital placemaking as a concept when involving nature regarding wellbeing (Chapter 2, Fernandez-Osso Fuentes et al., 2023b). Despite recognising digital placemaking to create sense of place or place attachment (Chen et al., 2022; Halegoua &

Polson, 2021; Polson, 2015) and finding it interconnected with identity and place in the literature review (e.g., Dai & Liu, 2024; Harner et al., 2017), these approaches focus mainly on place identity in specific media platforms (e.g., Breek et al., 2018; Razi & Ziminski, 2022) and identity formation through place attachment (e.g., Soedarsono et al., 2021) at an individual level in digital placemaking (Freeman et al., 2019). The different digital paths in digital placemaking have in common that place attachment generates an identity of the place, where feelings of identity and belonging might differ (Harner et al., 2017). It is also connected with branding and the development of place culture, which affects identity (Ebaid, 2023; Imara et al., 2024; Klein, 2022; Törnberg, 2022; Wang, 2019).

The modified Delphi findings in this programme of research suggested that digital placemaking fosters social identity processes that enhance the different dynamics involved, such as place attachment, place branding, and nature connectedness. The basic digital placemaking's characteristics of community engagement and inclusion that are developed in a hybrid environment context open up place attachment to a community identity dimension where the interactions among members foster feelings of belonging and identity with others and with the place. The connection between place identity and place attachment has been explored and demonstrated (e.g., Razi & Ziminski, 2022). Recently, studies have directly mentioned the role of social dynamics in place attachment and place identity in placemaking practices (Moodley & Marks, 2023; Razi & Ziminski, 2022). However, only brief suggestions of the potential of social identity in digital placemaking are found in the literature, with a focus on analogue processes and negative effects (Kotus et al., 2022; Sacramento et al., 2022; Törnberg, 2022). Therefore, the generalised individual focus of place identity (Hernández et al., 2007) was aligned with the traditional individual lens of place attachment (Lewicka, 2011) that was called upon

to broaden through a community perspective, addressed in the conceptual model of this study. The role of place identity and the community in Moodley and Marks's (2023) study suggests that sense of belonging and community fosters place identity, where the interaction among community members build the identity of the place. In this programme of research, the role of the community in building the different processes involved in digital placemaking, which accordingly creates a social identity, is crucial to understand the benefits of this concept.

Advancing Qazimi's (2014) understanding of place attachment as part of place identity, and place identity as a substructure of social identity, this PhD thesis implemented a Social Identity Theory lens to hybrid place experiences in digital placemaking. This social identity approach to digital placemaking has not been explicitly explored in literature previously. The novelty is the implementation and understanding of the social identity effects of place attachment, place branding, nature connectedness, and digital placemaking, which extend them to a community lens that enhances each dynamic. Results presented how social identity was an intrinsic aspect of the mature understanding of digital placemaking, where group membership becomes part of an individual's self-concept (Heath et al., 2017; Tajfel, 1978), promoting feelings of belonging with the place and nature that support wellbeing. Furthermore, findings describe how the dynamics involved in digital placemaking in nature for wellbeing were interconnected through Social Identity Theory, answering the research question 3.

Findings confirmed the positive effects of involving digital technology in placemaking, which extends the place identity approach by incorporating digital technologies as crucial in the development of social identity in place. Scholars have incorporated a technological approach to some degree. Çöteli (2019) described the evolution of social identity into digital social identity, Özkul (2021) investigated the effect of digital identities in

collective identities that have been homogenised through placemaking, and Bouncken and Barwinski (2021) defined the shared digital identity focused on the use of digital technology that creates feelings of belonging. However, the implementation of technology in community dynamics tends to be demonised due to the disconnection created between people and place (Kotus et al., 2022; Shih et al., 2021; Törnberg, 2022). Results demonstrated the positive outcomes of involving technology as a mediator in place experiences while addressing several challenges and risks. No dynamic or strategy is free of negative potential effects, and the assessment of these risks is crucial to ensuring the experience is safe and positive for the community. This PhD study determined how community involvement in the hybrid environment allows identity formation (see [Finding 5.7](#)), belonging with others and with the place (see [Findings 5.7](#), [5.12.3](#), [5.12.5](#)), and feelings of ownership (see [Findings 5.12.2.3](#), [5.12.4.1](#), [5.12.5.1](#)), as explored by this research participants.

Delphi Items that achieved consensus in the third round such as "A place's identity is built through shared experiences, and the digital can help with it", "Digital placemaking could convey people's memories and stories of belonging to a place to create and maintain place attachment", "Place branding can use digital placemaking as a tool for the identification of common sense of place," and "Digital placemaking allows sharing experiences in nature places" confirmed the key role of community experiences in place attachment, place branding, social identity formation, and nature connectedness. The role of digital placemaking in promoting place attachment and nature connectedness resides in the social identity that is developed through a digital mediated place experience. The social identity formed is found to be the binding actor that enhances each dynamic involved in digital placemaking, as the development of feelings of attachment with the place, feelings of belonging with others, and feelings of connection with nature affect the

identity of the individual and the community, as well as contributing to pro-environmental behaviours. Therefore, digital placemaking in nature for wellbeing can help reframe the human-nature relationship in cities.

In conclusion, the research has confirmed the first proposition of the conceptual model presented:

P1. Digital placemaking creates sense of place between the community and the space where it is developed, facilitating group belongingness and social identity among members and with the place.

In summary, this investigation has substantiated the first proposition of the conceptual model, demonstrating that digital placemaking effectively fosters place attachment by creating social identity through technology. This process not only strengthens group belonging and identity among community members but also cultivates a deeper connection with the place itself. These findings underscore the pivotal role of digital interventions in enhancing communal ties and spatial attachment, which can inform future practices in urban planning and community development.

6.4.1.1. *Sub-Thematic Contribution: Community hybrid/online? place attachment is fostered in digital placemaking*

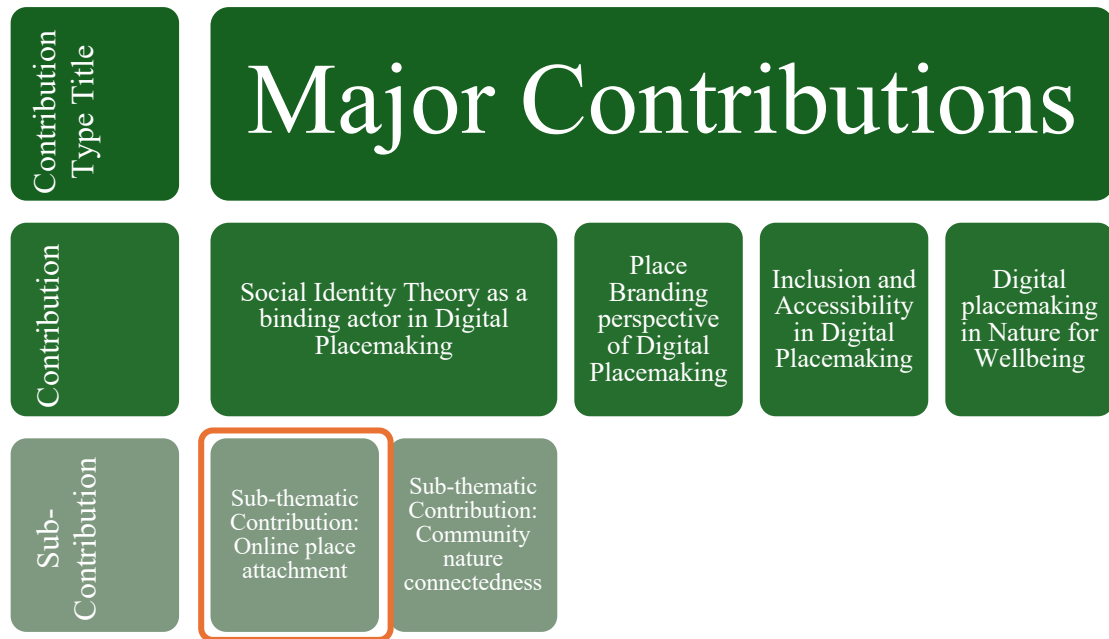


Figure 6.3: Summary of major contributions – sub-thematic contribution: online place attachment.

The sub-thematic contribution derived from the above major contribution is:

community online place attachment is fostered in digital placemaking.

The first major contribution of the programme of research refers to the first proposition of the conceptual model that has been confirmed (P1). In the model, there are two additional sub propositions (P1.a and P1.b) that are also part of the first major contribution as sub-thematic contributions (Figure 6.3).

This research extended place attachment theory by integrating its application to the contemporary digital media landscape and the technological context of urban environments, while also considering the enhanced social and community dimensions. The findings of the programme of research asserted the need to update place attachment theory to the current digital context, which is found to be scarce in the literature

(Birnbaum et al., 2021; Rutha & Abbas, 2021; Schwartz, 2015). The model presented advanced key studies in place attachment such as Rutha and Abbas (2021) understanding of technology enhancement of place attachment in public spaces, or Lewicka (2011) critique of the individual lens of place attachment, by creating a new paradigm that affects how the theory evolves and is applied through digital placemaking. This expansion highlighted the significant role of digital tools in strengthening communal bonds and spatial attachment, providing a comprehensive understanding that is relevant to current urban dynamics. Therefore, the programme of research advanced the place attachment theory due to the change in the media landscape by providing a deeper understanding of the role of online place attachment. Moreover, this is one of the propositions confirmed through the modified Delphi study.

Online place attachment is extended through the modified Delphi study (see [Findings 5.7.1.3](#) and [5.12.3](#)), with confirmation of the role of technology in place attachment in the consensual items found: “A place’s identity is built through shared experiences and the digital can help with it” (89.5%) and “Digital placemaking could convey people’s memories and stories of belonging to place to create and maintain place attachment” (94.7%). Furthermore, storytelling is found to be a key strategy to promote online place attachment and empower the community and social identity aspects of this (see [Findings 5.7](#), [5.12.3.2](#) and [Contribution 6.5.2](#)).

Previous studies have examined place attachment and digital media (Birnbaum et al., 2021; Rutha & Abbas, 2021), digital sense of place (Dai & Liu, 2024; Relph, 2007), specifically referring to online place attachment (Huang et al., 2022; Schwartz, 2015). However, findings from this PhD research illustrated how the implementation of digital technology in place attachment advances the theory into a community dimension, updating it to the current digital context and allowing deeper connections with the place

and with others in the place. This community dimension is enhanced through digital technology, which answers the call by Lewicka (2011), who described how community aspects of place attachment have been overshadowed by individual differences in literature. Despite initial descriptions of online place attachment to promote user-to-user interactions (Birnbaum et al., 2021; Schwartz, 2015), no further analysis of the effects of collective place attachment in hybrid environments has been found. Only Dai and Liu (2024) present a conceptual framework on the concept of sense of place in the context of ICT, where digital, hybrid and physical sense of place are connected. In their framework, community belonging can be fostered through social media, which enhances the emotional connection to the community. However, the authors call to use digital media to enhance place experiences, which is proven through this programme of research of the need to shift the focus from place replacement to place enhancement in hybrid environments. The findings of this modified Delphi study advanced previous work deepening the understanding of this updated approach to online place attachment by describing and considering hybrid environments that combine online and offline interactions with the place and with others in the place. Furthermore, digital placemaking's hybrid environment not only creates a mixed space for interactions but also has digital representations of the place that are anchored in the physical environment, allowing identities to be carried from the physical environment to the digital environment. The unique characteristic of digital placemaking resides in creating hybrid place experiences that combine digital and physical elements, where the online aspects enhances the offline dimension (Atteneder & Lohmeier, 2024; Dai & Liu, 2024; Hespanhol, 2022). The digital technology implemented in digital placemaking acts as a medium to foster place attachment. This contribution expanded Rutha and Abbas (2021) study, where technology enhances place attachment processes in public spaces, by

focusing on the community dynamics that are promoted in this hybrid environment. The revision of place attachment in the digital context, which enhances its social aspect, contributes to understanding the evolution of this theory nowadays and the key role digital placemaking plays in this dynamic.

Furthermore, in examining place attachment in the digital context and its social dimension that is boosted through technology, a differentiation over identity creation is produced. By creating feelings of belonging with the place and with others in place, an identity is formed through local interactions (Schwartz, 2015). Despite place attachment being understood as part of place identity (Qazimi, 2014), scholars have focused on the individual aspect of this identity created with the place (Hernández et al., 2007), which is aligned with the traditional individual dimension of place attachment (Lewicka, 2011). This research extended previous work on place attachment and place identity by demonstrating the interconnection between place attachment and social identity, where the updated digital context acts as an enhancer of community identity formation, which affects individual self-identification. Limited literature has described the connections between place attachment, place identity, and social identity (e.g., Dandotiya & Aggarwal, 2023; Qazimi, 2014). However, the digital effect in these dynamics has been overlooked, again focusing on analogue attachment processes without addressing the impact of hybrid place experiences and their effects on identity formation processes, which help differentiate and promote an authentic identity. Moreover, Dandotiya and Aggarwal (2023) found neighbourhood place identity and attachment levels to be lower than city levels. Their results, aligned with Hernández et al. (2007), provided a gap in the understanding of identity and attachment creation in smaller places, which is addressed in this programme of research. Digital placemaking tends to focus on communities at a

neighbourhood scale, providing knowledge on smaller dimensions of place (Fernandez-Osso Fuentes et al., 2024b).

Therefore, this research has confirmed the first sub-proposition (P1.a) of the conceptual model presented as a sub-thematic contribution:

P1.a. Digital placemaking experiences foster community hybrid sense of place attachment, promoting authenticity and differentiating them from others.

In conclusion, this programme of research has substantiated the initial sub-proposition of the proposed conceptual model, specifically contributing to the sub-theme that digital placemaking experiences significantly enhance community hybrid/online place attachment. This attachment not only promotes a sense of authenticity within these digital layers but also distinctly differentiates them from other place-based experiences. By integrating digital and physical spaces, digital placemaking initiatives foster a unique connection among community members, enriching overall place attachment and engagement.

6.4.1.1. *Sub-Thematic Contribution: Community Nature connectedness hybrid dimension in digital placemaking.*

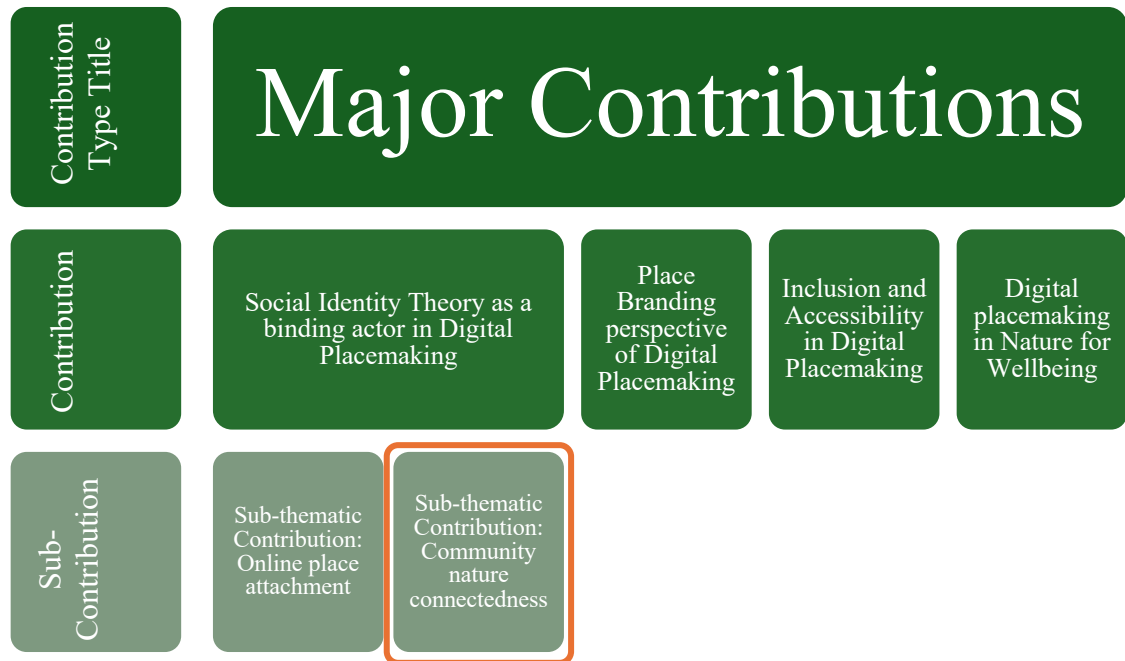


Figure 6.4: Summary of major contributions – sub-thematic contribution: community nature connectedness.

The second sub-thematic contribution also derived from the first major contribution of the research is:

nature connectedness is approached from a community and hybrid environment dimension in digital placemaking.

This research offered an innovative approach to nature connectedness where the community and the digital dimensions are brought together through digital placemaking in nature settings in the city (Figure 6.4). Previous studies in nature connectedness are focused on simulated or fully immersive experiences of digital nature (Litleskare et al., 2022), without considering less immersive technologies such as digital placemaking. Additionally, despite referring to expanding the self-identity when connecting to nature (Clayton & Opatow, 2003), limited studies apply a collective and social identity approach

to nature connectedness (Lengieza & Aviste, 2024; Mackay et al., 2021). Therefore, the psychological construct of nature connectedness is advanced in this programme of research by describing the implications of its community aspect and the enhancement of digital tools in this process. By acquiring a Social Identity Theory perspective through digital placemaking, the nature connectedness developed in the experience introduces new dimensions that foster community engagement and social identity. The digital layer created in digital placemaking also updates the concept of nature connectedness to the current digital context. Thus, the innovation of digital placemaking for nature connectedness resides in the advance of the construct into the current digital media landscape and its approach from a Social Identity Theory perspective.

The result of the research presented an extension of nature connectedness, both adding a community dimension (see [Finding 5.12.4.1](#)) and a digital dimension (see [Finding 5.12.4.2](#)) through digital placemaking. Digital placemaking in nature settings promotes place attachment with nature (see [Finding 5.12.3.3](#)), which is found to act as a shortcut to increasing nature connectedness in a community. This was also confirmed in the final round of the modified Delphi study, with consensus on items "Technology can promote behaviour change towards nature connectedness" (73.7%), "Technology for nature should also be approached beyond the human lens (e.g., for animals sharing the space with humans)" (94.7%), or "Digital placemaking allows sharing experiences in nature places" (79%). Scarce studies have explored the positive relationship between place attachment and nature connectedness (e.g., Basu et al., 2020; Gosling & Williams, 2010) with no references to the implications of technology or digital media. Similarly to the previous sub-thematic contribution, this research results refuted nature connectedness due to the change in the media landscape.

Most virtual nature studies have focused on simulated and immersive experiences (e.g., Litleskare et al., 2022). However, this research suggested that less immersive digital nature experiences created in digital placemaking through the hybrid environment, combine digital and physical elements that can augment the nature connectedness of the users. Livingston's (2022) study on tour apps to promote biodiversity engagement demonstrates the benefits of lower technology implementation to foster place attachment, connection to nature, and pro-environmental behaviours. This PhD research extended their work by presenting digital placemaking as a broader concept that creates hybrid environments for communities that promote place attachment and nature connectedness. Previous studies have explored the connections between place attachment and nature connectedness (e.g., Basu et al., 2020; Gosling & Williams, 2010) without addressing the implications of technology. In this thesis, the development of place attachment in a nature setting through digital placemaking is connected to the enhancement of the nature connectedness of the users. Moreover, the process of fostering belonging and emotional feelings with nature can promote pro-environmental behaviours (Paraschivoiu & Layer-Wagner, 2021). Similar to the previous section, the digital dimension opens up new opportunities to enhance place attachment and nature connectedness to a community dimension, also using technology to visualise possibilities of spatial changes with nature (Nikšič et al., 2023).

Nature and technology tend to be presented in a dichotomic relationship (e.g., Kesebir & Kesebir, 2017), where technology's description is mainly negative. Not only defending that nature cannot be replaced by digital nature (Kahn et al., 2009) but also discussing the digital harm to the environment (Bedford et al., 2022). This research defended the use of technology as an enhancer of nature experiences, acting as a medium and not a replacement (see [Finding 5.14](#)), which tends to be a misconception (Kotus et al., 2022;

Najafi & Mohammadi, 2024). All tools and dynamics involve positive and negative outcomes; even nature experiences could have negative effects on people (McAllister et al., 2017). This research aims, not only to explore the concept of digital placemaking in nature for wellbeing, but also the dynamics involved and how the human-nature relationship can be reframed using technology. Despite the dichotomic relationship between nature and technology, the results defended digital placemaking to augment and enhance place experiences that can then be shifted into reframing the human-nature relationship in cities. Extending Sheffield et al. (2022), nature connectedness can reframe the human-nature relationship affecting wellbeing with indirect contact through digital placemaking. This programme of research proposed a broader technological approach to nature experiences enhanced through technology in a location.

Regarding the community dimension, studies reference place attachment and nature connection to expand an individual's identity (e.g., Clayton & Opatow, 2003; Mayer & Frantz, 2004). However, this research defended the importance of the community approach in both place attachment and nature connectedness, specifically involving social identity processes that enhance these dynamics. Scholars have described how nature is part of one self-identity where connection to nature expands the self to include non-human living beings and biospheric concerns (Clayton & Opatow, 2003; Gosling & Williams, 2010; Mackay et al., 2021). Mayer et al. (2009) present the crucial need to feel part of the natural world and the natural community in nature connectedness. But the collective approach to the psychological construct is scarce in literature (e.g., Mackay et al., 2021). Boros et al. (2024) suggest an innovative shift to nature-as-subject in their more-than-human approach to placemaking and planning. These approaches are extended by proposing a social identity lens for nature connectedness specifically, where the perspective from which the relationship is understood does not start from an individual

self-conception but from a community level. The findings of this research highlighted group membership feelings between humans and other living creatures, where technology can bridge the gap between Social Identity Theory and nature connectedness by including all living actors in nature when fostering nature connectedness and identity formation through place attachment. Answering Petersen et al. (2019) call to advance knowledge on social relational emotions and human nature connectedness through technology as a medium, digital tools can help communities feel connected to nature and its actors through different strategies that are presented in the following contributions. Consistent with previous studies, the connection and relationship with nature developed can improve wellbeing (e.g., Howell et al., 2011; Petersen et al., 2019; Pritchard et al., 2020). The conceptual model presented demonstrated the crucial role of social identity and its impact on place attachment and nature connectedness through community relationships' development.

Therefore, the second sub-proposition (P1.b) derived from the first major contribution is confirmed:

P1.b. Digital placemaking fosters nature connectedness through place attachment with the urban nature place fostering digital and physical community engagement and identification in that place.

This finding corroborates the transformative potential of digital placemaking as a strategy for fostering meaningful connections between individuals and urban natural spaces, emphasising the importance of incorporating digital strategies in urban planning and nature-based community initiatives.

6.4.2. 2nd Major Contribution to Knowledge: The Place Branding dimension of Digital Placemaking Benefits Processes of Group Identity and Belonging

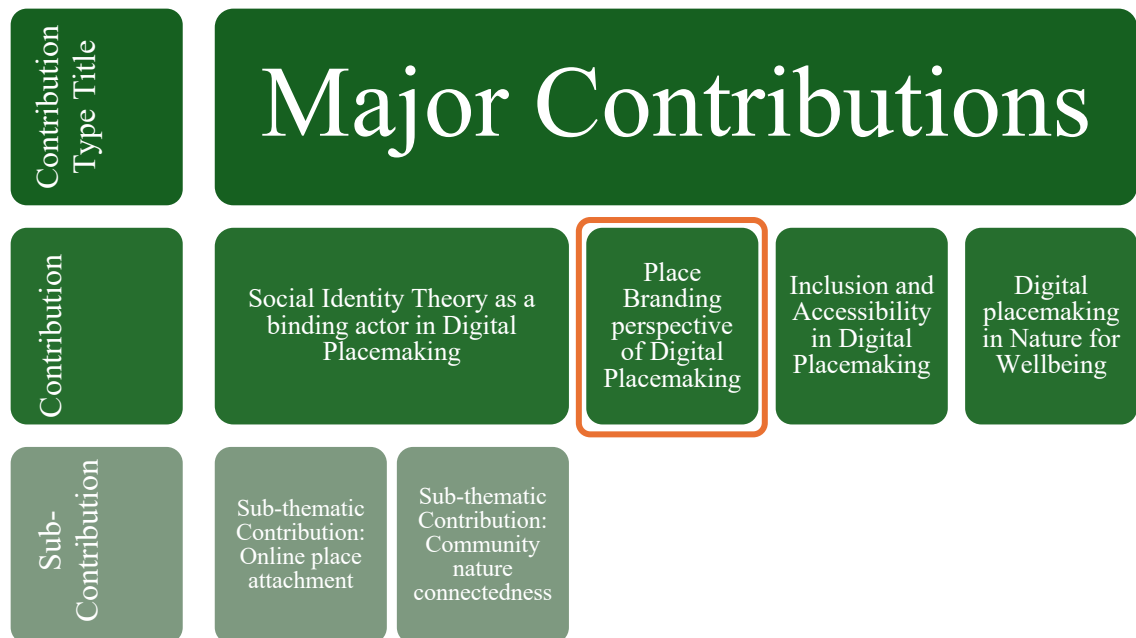


Figure 6.5: Summary of major contributions – place branding perspective of digital placemaking.

The second major contribution of the research is:

the place branding dimension of digital placemaking benefits processes of group identity and belonging.

This programme of research has advanced the place branding approach of digital placemaking by emphasising consumer interaction in the process, which fosters a social identity lens while enhancing attachment feelings with place (Figure 6.5). The digital effect on place branding has received limited attention in literature (e.g., Florek, 2011; Hudak, 2019) while different scholars have called to update the discipline to the current digital era, climate challenges and the role of locals (Ashworth et al., 2015; Graziano & Albanese, 2020; Kavaratzis & Florek, 2021). This PhD research offered an innovative

understanding of how digital placemaking can employ marketing and communication tools to ensure the place experience is appealing, important, and meaningful for the community. Advancing Ashworth et al. (2015) understanding of placemaking as one of the four approaches to building a place branding, this study demonstrated the crucial role of this place branding perspective in digital placemaking by empowering communities and place experiences to foster community and identity processes.

The second major contribution to knowledge from this programme of research represents an innovative approach to digital placemaking from a place branding perspective. This research updated the current understanding of place branding to the digital era (see [Findings 5.7.1.2](#) and [5.12.2.1](#)). In view of the seemingly profound shift due to the digitalization experienced, few direct attempts, besides some notable exceptions (Florek, 2011; Hanna & Rowley, 2015; Hudak, 2019), have explored the digital augmentation of place branding. Despite Graziano & Albanese's (2020) call to support place branding through online and offline actions, a helpful but incomplete body of knowledge on the area is described in this research (see Chapter 2). Therefore, in this PhD research, the place branding dimension of digital placemaking is explored (see [Finding 5.7](#) and [5.12.2](#)), with key aspects acting as connectors such as the digital enhancement of the place experience, the use of place branding as a communication tool, and the authenticity developed and shared (see [Finding 5.12.2.1](#)). Challenges and applications to nature are also found through the modified Delphi study (see [Findings 5.12.2.2](#) and [5.12.2.4](#)).

Moreover, the third and final round of the study confirmed consensus among participants in items "Place branding can use digital placemaking as a tool for the identification of common sense of place" (94.7%), "Place branding can use digital placemaking to communicate stories of a place" (100%), and "Place branding should be an iterative process where the brand evolves with the community over time, which conflicts with

common strict branding guidelines" (94.8%). These consensual items demonstrated the connections not only between digital placemaking and place branding but also how this approach to the concept enhances other processes such as community place attachment, where storytelling can be used as a strategy.

Earlier studies mentioned briefly digital aspects of place branding and placemaking, but mostly as a context rather than a tool. Evans (2015) exploration of city branding and placemaking (place-making in the chapter) defends the value of using placemaking as a way to rebrand cities where digital metrics are analysed. In their study, the value of placemaking for place branding is demonstrated, where bottom-up processes are encouraged to ensure the needs and characteristics of the target audience are met. Ashworth et al. (2015) call to rethink the place branding roots, specifically exposing how there are four different approaches to what builds a place brand, where placemaking acts as one of them. However, this PhD research extended their proposal by describing how digital placemaking specifically answers each one of their approaches (see [Finding 5.12.5.2](#)) since it is part of the place management trifecta (Keegan, 2021). Razi and Ziminski (2022) refer to the use of social media in digital placemaking due to the possibilities for communication and rebranding of places, which we extend to a deeper understanding of the place branding use of digital placemaking. Moreover, digital placemaking is demonstrated as an evolution of placemaking that enhances sense of place in hybrid environments (see [Findings 5.7](#), [5.12.3](#), and [Major Contribution 6.4.1.1](#)), while building narratives of places through digital storytelling (see [Findings 5.7](#), [5.12.1.2.4](#), [5.12.1.2.5.1](#), [5.12.2.3](#), [5.12.3.2](#)) and promotes interactive formations where social identity is constructed by fostering place attachment and nature connectedness (see [Major Contribution 6.4.1](#)). Hudak (2019) explores resident stories using digital storytelling for participatory place branding, which benefits wellbeing. In their study, it is demonstrated

the importance of participatory place branding and digital storytelling in fostering community empowerment, place brand responsibility, and multiple identity inclusion. This PhD research extended this work by confirming digital placemaking as a facilitated approach to place branding, where place consumers are key in the process of promoting place attachment and community nature connection to support wellbeing. Therefore, this PhD contributed to place branding by applying this dimension to digital placemaking, presenting an innovative addition to the concept that brings a number of benefits to the place experience.

In examining the group and social identity process that is enhanced through a place branding approach of digital placemaking, this research extended Çöteli's (2019) impact of new media in digital culture and identity by exploring the dynamics involved in digital placemaking. Çöteli (2019) demonstrate how technologies have emerged the digital culture which has transformed the social identity, influencing identity formation through digital social relationships. Similarly, Pedeliento and Kavaratzis (2019) point to places being identified beyond geographical or political borders, but imaginary representations of social relations influenced by cultural structures. The proposed approach to digital placemaking from a place branding perspective where social identity acts as a binding agent complemented their studies by extending the place branding value of digital placemaking as a concept that can help communities develop their identity and culture, how they want their place and their brand to be identified, perceived and imagine.

This programme of research also linked place branding to sustainability, answering Kavaratzis and Florek's (2021) discussion on the future of place branding. Specifically, they describe the need to refine the nature of place branding as opposed to tourism branding, the relationship between place branding and sustainability, and the digital means of place branding, among others. Moreover, this research answers the call by de

San Eugenio-Vela et al. (2023) to update place branding due to the impact of society, which is attributed to the environmental challenge in cities. This PhD research revealed that digital placemaking as a place branding strategy focuses on involving community members to foster belonging feelings with the place and with others, acting as an augmented nature-based solution (Mahmoud et al., 2024), in addition to the mentioned digital enhancement of place branding. In [Finding 5.12.2.4](#), this research described the potential use of place branding for nature connectedness, where emotional place attachment to the natural setting can be developed, as well as the potential for creating attractive and meaningful place experiences in nature for consumers and the use of rebranding nature spaces through hybrid environments. This elevates place branding by connecting it with place attachment, nature connectedness, and the hybrid environment created in digital placemaking, opening opportunities for urban planners, placemakers, and place branding experts to support sustainability goals and community needs.

Hence, the second major contribution of the research confirms the second proposition of the conceptual model:

P2. Digital placemaking facilitates place branding and consumer interactions through hybrid participation (online and offline) that fosters group identity and belonging.

Digital placemaking effectively promotes place branding and consumer interactions by enabling hybrid participation – combining online and offline engagement. This hybrid participation not only enhances group identity and belonging but also bridges the digital and physical realms, reinforcing the connection between consumers and the place brand. This finding highlights the pivotal role of digital placemaking in cultivating a cohesive community identity and fostering sustained engagement, underscoring its significance in contemporary place branding strategies.

6.4.3. 3rd Major Contribution to Knowledge: The Inclusion and Accessibility

Dimensions of Digital Placemaking are Key Factors

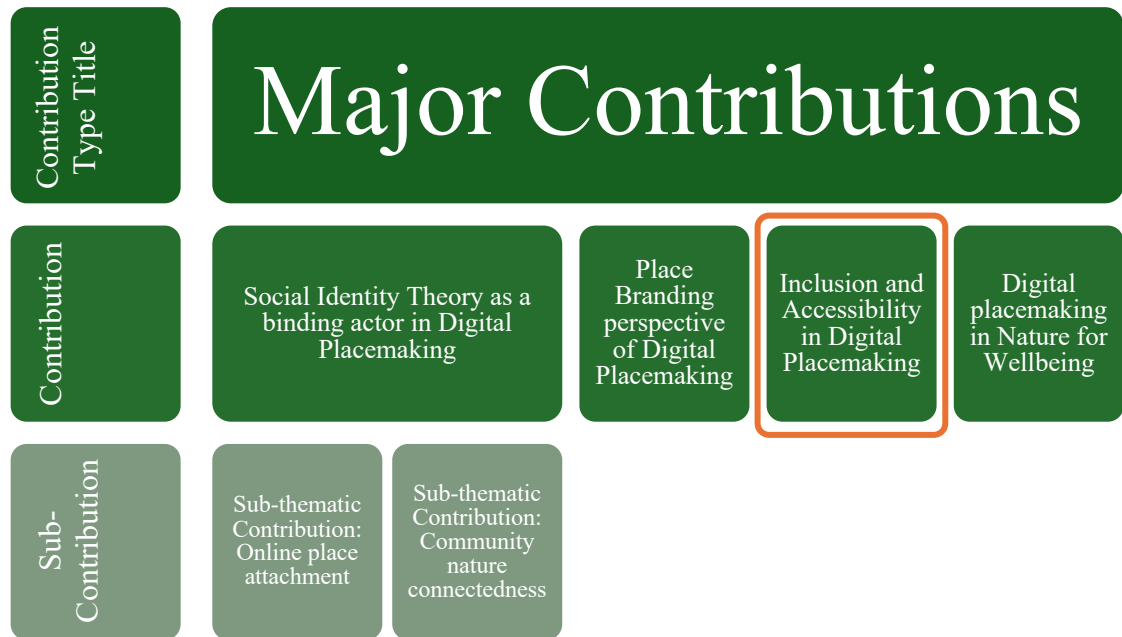


Figure 6.6: Summary of major contributions – inclusion and accessibility in digital placemaking.

The third major contribution of the research is:

the inclusion and accessibility dimensions of digital placemaking are key factors and opportunities for the concept in regard to the multiple identities in the community.

An additional layer to the digital placemaking concept is found throughout this programme of research (Figure 6.6). Despite being mentioned as one of the crucial aspects for placemaking (Foth, 2017b; Szaszák & Kecskés, 2020), where the digital can potentially open new barrier-free opportunities (Clarke, 2021), the lack of exploration and solutions on the inclusion and accessibility opportunities for digital placemaking is evident (Fernandez-Osso Fuentes et al., 2023b; Hespanhol, 2022). This research addressed these gaps by providing new avenues to successfully approach the inclusion

and accessibility opportunities of digital placemaking through multiple identity inclusion and reducing the exclusion of communities. The multiple identities in communities are a crucial aspect discovered in this research for digital placemaking, whose role is essential in fostering place attachment, community nature connectedness and place branding through social identity. Therefore, this research contributed to advancing digital placemaking and maturing its conceptualization by describing key aspects and realms that open up opportunities for inclusion and accessibility of the multiple identities in a community, as well as addressing potential risks and exclusionary elements.

The findings of this research offer a deeper understanding of the inclusion and accessibility dimensions of digital placemaking. The study confirmed inclusion and accessibility as basic characteristics of digital placemaking (see [Finding 5.12.1.2.4](#)) which was corroborated in the Delphi round three with consensus on item "Inclusion and accessibility are basic characteristics of digital placemaking" (89.5%). Furthermore, inclusion and accessibility are not only portrayed as crucial and beneficial through digital placemaking, but potential risks and challenges are found to detriment this aspect (see [Finding 5.12.1.3.1](#)), which also confirmed the finding consensus on round three item "Inclusion and accessibility are challenges to digital placemaking" (78.9%).

This programme of research asserted the importance of inclusion and accessibility as crucial aspects of digital placemaking by having social benefits for the community and building a connected and supportive group. In the past, the inclusion aspect of digital placemaking has focused on bringing voices and narratives that have been excluded from the community (e.g., Gonsalves et al., 2021). This programme of research analysis has shed light on identifying inclusion as a crucial aspect of digital placemaking that should identify, respect, and include the multiple identities that form a community. Breek et al.

(2018) describe places as having multiple identities, but some have been more supported than others when exploring place identities. Maciej (2024) explores the challenge of creating one cohesive identity through digital placemaking. Regarding place branding, Reynolds et al. (2024) expression of diversity and dissent among stakeholders in place branding is found to produce meaningful branding. Therefore, these approaches are extended by including a Social Identity Theory lens in digital placemaking, where multiple identities in a community can be promoted and respected, forming a diverse collective feeling of belonging with the group and with the place. This is one of the novel approaches to the concept, which should focus on how to address the diversity of identities in order to compel its characteristics.

Regarding accessibility, digital placemaking has been explored as a way of lowering entry barriers and making place experiences accessible to all. Scarce studies explore specific accessibility applications of digital placemaking (e.g., Clarke, 2021; Szaszák & Kecskés, 2020). This PhD research provided a strong foundation on the crucial role accessibility plays in digital placemaking, where digitally mediated place experience can bring the experience closer to those with difficulties while providing them with opportunities to feel connected with the place and with others in place.

Moreover, the participatory place branding approach to digital placemaking was found to enhance inclusion and accessibility opportunities for the concept (see [Finding 5.12.2.3](#)) by facilitating community engagement and community empowerment through consumer-created place branding and digital placemaking. However, no participatory place branding item found consensus on the final round of the study, while one item on storytelling achieved a 100% consensus when involving place branding and digital placemaking to communicate stories of a place. Therefore, the third proposition was not fully validated as the participatory place branding approach did not reach a consensual

state - *P3. Community consumers engaged in digital placemaking from a participatory place branding perspective become place brand ambassadors and storytellers.* This is the only model proposition that is not confirmed in the study. Despite participants discussing the potential benefits of participatory place branding in the first round of the study, no item achieved a consensus stage in the final round. The benefit of participatory processes is confirmed for place branding, specifically for digital placemaking. However, the challenge of implementing them and having real bottom-up processes might have a bigger impact that stops facilitators and experts from implementing them.

Thus, the third major contribution of the research confirms the third sub-proposition of the conceptual model:

P3.a. Excluded or marginalised members have the opportunity to connect with others and with the place through digital placemaking as an inclusive and barrier-free practice.

Digital placemaking emerges as a crucial practice for inclusivity, providing excluded or marginalised individuals with the means to connect both with each other and with their environment. By offering a barrier-free platform for engagement, digital placemaking ensures that diverse voices from the multiple identities that form the community are integrated into the communal narrative. This validation underscores the role of digital placemaking in bridging social divides and facilitating equitable participation in place-based interactions.

6.4.4. 4th Major Contribution to Knowledge: Digital Placemaking in nature for wellbeing Connects Consumers with Nature, with Place and with Others, Supporting Their Wellbeing

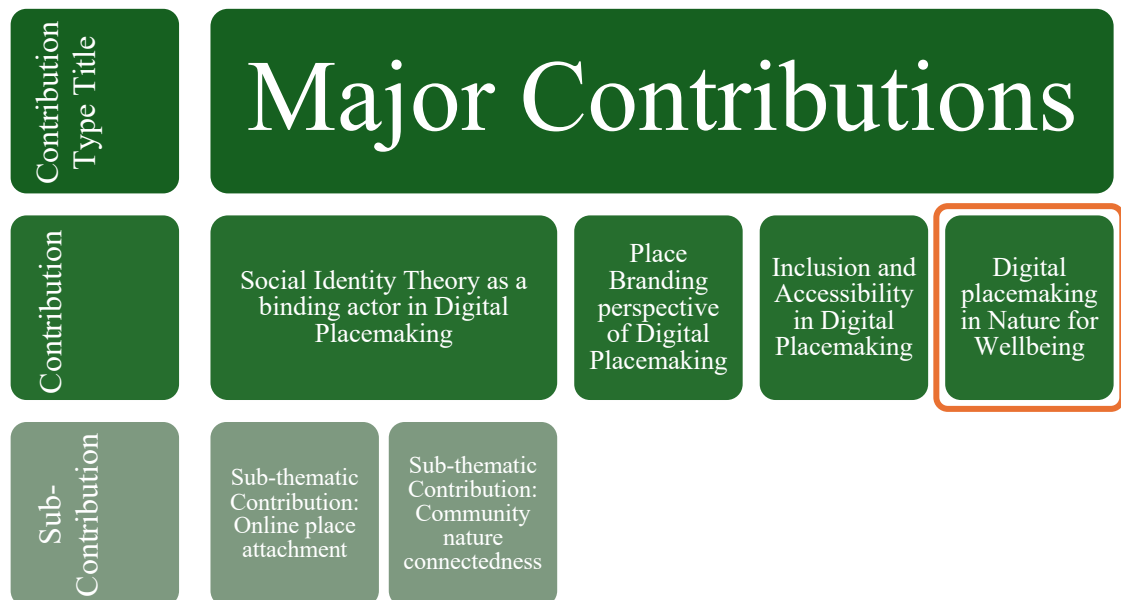


Figure 6.7: Summary of major contributions – digital placemaking in nature for wellbeing.

The fourth major contribution of the research is:

Digital placemaking in nature for wellbeing connects consumers with nature, with the place and with others supporting their wellbeing.

The fourth major contribution of the programme of research represents the connection among digital placemaking, nature, and wellbeing, demonstrating how the dynamics involved in a digital placemaking experience in an urban nature setting can support consumer wellbeing due to the development of social identity, place attachment, and nature connectedness (Figure 6.7). Studies have demonstrated the connection and benefit between place attachment, nature connectedness and wellbeing (Basu et al., 2020), also involving community belonging (Scannell & Gifford, 2017). However, the effect of

hybrid environments through digital placemaking that foster place attachment and nature connectedness has not been explored regarding its wellbeing effects. The realm of digital placemaking, nature, and wellbeing has been overlooked in the literature despite the potential benefits as a nature-based solution for social change, community wellbeing, and climate resilience (Fernandez-Osso Fuentes et al., 2023b; 2024a), and previous calls for future studies to explore and assess the psychological effects of digital interventions (Chen et al., 2024). Thus, in this PhD thesis, the specific explorations of digital placemaking in nature for wellbeing are addressed. By providing and testing the conceptual model of digital placemaking in nature for wellbeing, the interconnections among digital placemaking, place attachment, nature connectedness, place branding and wellbeing are demonstrated. Specifically, the social identity promoted in the hybrid environment experience acts as a binding agent that enhances each of the different dynamics mentioned which ultimately benefits the wellbeing of the place consumers.

The findings of this research offered a foundation for exploring the effects of digital placemaking on consumer wellbeing when the experiences involve nature (see [Finding 5.12.5](#)). The results bridged the gap on digital placemaking implementation in nature settings for consumer wellbeing, exploring the concepts through the conceptual model of the study (Chaptr 3 Part B, Fernandez-Osso Fuentes et al., 2024a), where social identity acts as a binding actor and sense of ownership and behaviour change are key drivers in the experience. Furthermore, the novelty of the test and confirmation of the model and the modified Delphi study provided unique uses and strategies for implementing digital placemaking in nature for wellbeing (see [Finding 5.12.5.2](#)) and key challenges and risks (see [Finding 5.12.5.3](#)). Results from Delphi round three confirmed consensus on items involving these three elements: "Technology can help people understand how nature benefits their wellbeing (e.g., mood improvement, relief of stress, etc.)" (84.2%), "Digital

placemaking can repurpose spaces to link them with nature, supporting wellbeing" (73.7%), and "Digital placemaking can help communities find nature places to support their wellbeing" (100%). Despite no specific item on digital placemaking and wellbeing finding final consensus in this round, one item involving place attachment and wellbeing confirms the potential of promoting community place attachment feelings that benefit wellbeing ("Communal feeling of attachment to place benefits wellbeing" (84.2%)). Thus, the results of this research demonstrated that digital placemaking in nature for wellbeing connects consumers with the place, with others in place, and with nature, which supports their wellbeing. This is one of the unique contributions to knowledge and practice from this research as per its potential in urban planning and city decision-making for sustainable goals and community health. Moreover, it answers the main research question: how does digital placemaking as a place branding strategy promote place attachment processes to foster community-nature connectedness to support consumer wellbeing?

This contribution advances knowledge of digital placemaking and its effects on wellbeing in natural settings, offering new insights that have implications for theory and practice. The clear gap in the literature identified in Chapter 2 transcends beyond the definitional dilemma of the concept, but the lack of in-depth understanding of its implications in nature for wellbeing (Fernandez-Osso Fuentes et al., 2023b) is addressed in this programme of research. In developing an understanding of digital placemaking's involvement of nature and nature connectedness, as well as wellbeing outcomes from the experiences, the literature explored a range of studies that, in silos, addressed some of the elements of the model of this research. Several studies have reported the wellbeing benefits of being connected with nature (e.g., Bratman et al., 2019; Jimenez et al., 2021), and some recent studies have found connections among place attachment, nature

connectedness, and wellbeing (e.g., Basu et al., 2020), or the potential of smart city approaches to healthy social spaces promoting connection with nature (Thompson et al, 2023). However, the current new media landscape and technological context effect in this relationship have been overlooked, as has the impact of the community dimension of these relationships. In this programme of research, their work is extended by offering more clarity on how digital mediations of place experiences through digital placemaking can foster community nature connectedness and place attachment processes to support wellbeing.

Regarding placemaking, healthy placemaking is defined by Ng (2016) as the treatment of cities as an integral part of the natural landscape, where humans should have plenty of opportunities to contact nature through the infrastructure. Recent reports mention healthy placemaking as a term (e.g., Morrison, 2021), and one of the paradigms of the evolution of placemaking (Amirzadeh & Sharifi, 2024). However, no digital implications are referenced when describing the term. This programme of research extends Moodley and Marks (2023) investigation on the healing potential of critical placemaking and Amirzadeh and Sharifi (2024) understanding of healthy placemaking by providing insights on the role of technology in this context. This PhD thesis results suggest that digital media can enhance place experiences fostering place attachment, nature connectedness social identity as a place branding strategy.

Moreover, green placemaking is defined by Cilliers et al. (2015) as the combination of green planning interventions (focusing on environmental functions) with placemaking (focusing on social functions), which enhances the natural environment and contributes to sustainability. Green placemaking does not address wellbeing benefits per se, nor do digital implications or uses. However, the idea of placemaking enhancing the natural environment through social aspects is aligned with the approach to digital placemaking

found in this programme of research. Green placemaking is later used for climate resilience in cities as a way to integrate social-cultural and scientific knowledge, where some digital uses are presented to help communities connect with nature (Gulsrud et al., 2018). Similarly, sustainable placemaking is described as another placemaking paradigm by Amirzadeh and Sharifi (2024) which comprises green placemaking or nature-based placemaking. Therefore, this research united the different placemaking approaches to nature and wellbeing into digital placemaking as an answer to the evolution of the concept and its full understanding when implementing it in nature for wellbeing. Additionally, the results described in this programme of research answers Costa et al. (2024) call to increase green projects that involve local communities as per the benefits of involving digital media through digital placemaking and the different positive effects described.

Whilst the findings of the research confirmed the relationships among digital placemaking, nature connectedness, and place attachment through Social Identity Theory, the wellbeing outcome from the experience in nature is evident through the community dimension of place attachment and the use of technology as a mediator in the nature-place-community experience. This new understanding of digital placemaking through a social identity lens that enhances wellbeing benefits from the dynamics involved in the experience represents how the community element drives wellbeing beyond individual appreciation (Lewicka, 2011). The study confirmed that social identity and belonging created through the digital placemaking experience specifically increases wellbeing benefits from nature connectedness and place attachment. Previous studies have mentioned the social dimension of place attachment. Maricchiolo et al. (2021) study the empirical mediating role of place attachment between local social identity and wellbeing. In their study, no nature setting is tested, but place identity is understood as part of a tripartite formed by place dependence and social bonds. Despite addressing the social

identity perspective of place attachment, a lack of understanding of these dynamics in a natural setting is found. Recent models have started to explore the connection between sense of place and digital environments (Dai & Liu, 2024) but lacking the specific consideration of place attachment and its social identity effect when involving nature and technology. In addition, previous studies have explored the psychological benefits of place attachment, specifically referring to belonging to others and connecting with nature (Basu et al., 2020; Scannell & Gifford, 2017). However, studies tended to overlook the community and social dimensions in place attachment (Lewicka, 2011). Therefore, their research is extended by implementing a Social Identity Theory perspective on the place attachment tripartite by Scannell and Gifford (2010a), associated with nature connectedness through digital placemaking. This PhD investigation have found that digital placemaking can promote the community and social identity of the place, which benefits consumer wellbeing. Therefore, the fields of digital placemaking, place marketing, and environmental psychology are contributed by demonstrating the cohesion and effects of digital placemaking in nature for wellbeing from a place branding perspective.

This programme of research expanded the opportunities for technologically mediated place experiences combining place attachment, place branding, and nature connectedness. Litleskare et al. (2022) explore immersive virtual nature and its benefits to augment health benefits through non-immersive technologies. Digital placemaking's hybrid environments are non-immersive technological mediations of place experiences that can benefit nature interactions and pro-environmental behaviour. Studies have referred to place attachment, nature connectedness, and pro-environmental behaviours (e.g., Basu et al., 2020), digital enhancement of place experience to drive social behaviour change towards sustainability (Paraschivoiu & Layer-Wagner, 2021), as well as place branding

and environmental perspectives (Aronczyk & Espinoza, 2021). Therefore, this PhD thesis advanced their research by combining digital placemaking, nature connectedness, place attachment, and place branding through a Social Identity Theory lens to promote pro-environmental behaviours.

El Khafif et al. (2021) study creative placemaking experiences, which integrate online community engagement with an individual's physical surroundings and significantly enhance community participation and local identity. These experiences positively impact physical, social, and emotional wellbeing. Building upon this, the present research reveals how these benefits emerge as outcomes of the various dynamics in the conceptual model, where the enhancement of social identity underpins each process contributing to wellbeing. Digital placemaking in nature for wellbeing is presented as a comprehensive framework that leverages technology to enrich real-world experiences and interactions, particularly by fostering connections within online communities and their relationship with the environment. The innovation of the programme of research lies in integrating all three components of the model to propose an interdisciplinary approach to digital placemaking, where social identity functions as a cohesive element that amplifies the benefits of each dynamic. Consequently, digital placemaking facilitates emotional place attachment and enhances community-nature connectedness by digitally mediating and serving as a nexus for both real-world and online interactions. This amalgamation of interactions with people, place, and nature is shown to significantly support wellbeing. Specifically, the sense of ownership developed in digital placemaking in nature for wellbeing is connected with Social Identity Theory. Advancing Clayton and Opatow (2003) identity to be shared by the natural world, the research findings demonstrated that this sense of ownership is linked to feeling responsible for the place experience, fostering

a social identity that is enhanced through place branding, place attachment, and nature connectedness.

The fourth major contribution of the research confirms the fourth proposition of the model:

P4. Consumers participating in digital placemaking nature-based place brand experiences for social change and civic pride can benefit from several wellbeing outcomes, feeling emotionally attached to the place, to the community and to nature.

The fourth major contribution of this research validates the proposition that consumers engaging in digital placemaking within nature-based place brand experiences can achieve wellbeing outcomes. This insight underscores the profound impact of digital placemaking on wellbeing, highlighting its potential to integrate emotional, social, and environmental dimensions into the experience of place, thus contributing to the holistic wellbeing of participants.

Therefore, the four major contributions described in this section confirm and validate the conceptual model developed and presented in this PhD research. Each major contribution described refers to each model proposition confirming the value, role and interconnected dynamics of digital placemaking in nature for wellbeing. The mechanisms uncovered through this research drive the community relationships in digital placemaking. Specifically, these are described in the context of nature environments in the city and might vary in different scenarios.

6.5. Sub-Thematic Contributions: Digital placemaking maturity

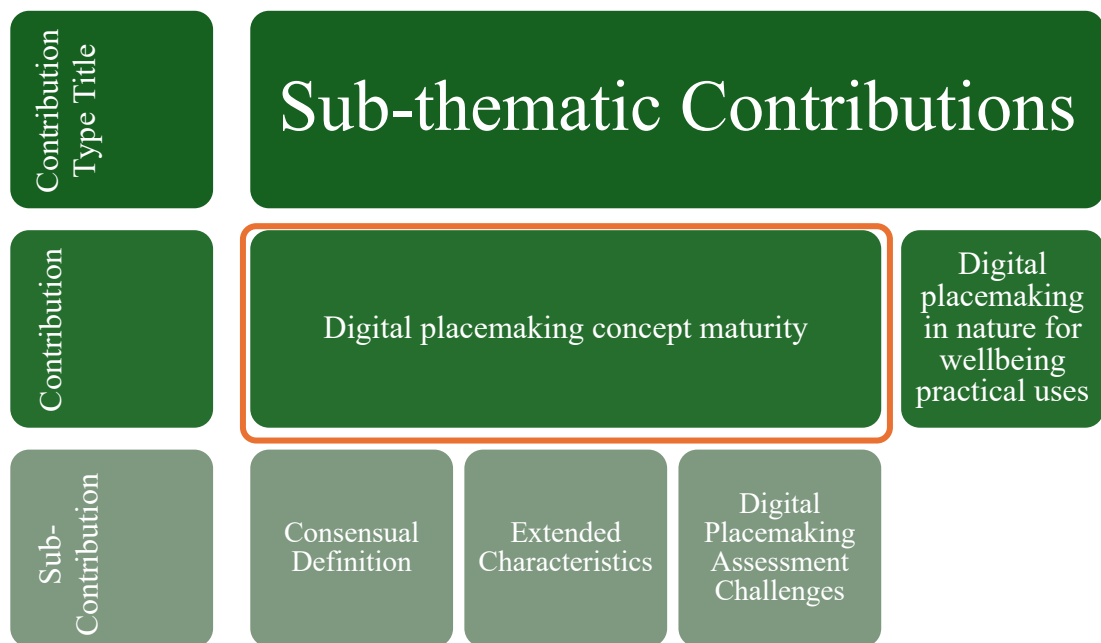


Figure 6.8: Summary of sub-thematic contributions – digital placemaking concept maturity.

This section of the chapter discusses the state of digital placemaking as a concept, its consensual definition, key extended characteristics, and assessment challenges (Figure 6.8). Digital placemaking is explored in the programme of research to further understand the definitional dilemmas and confusion surrounding the term, describing the maturing state of the concept. Through investigation of the concept of definitional challenges, a variety of approaches were found. However, participants explored different key aspects that were collated and fed back to the group, achieving the first consensual definition of digital placemaking and extending its characteristics, key dynamics, and assessment challenges. Therefore, this research advanced prior knowledge on digital placemaking conceptual explorations (Amirzadeh & Sharifi, 2024; Basaraba, 2021).

Despite the interdisciplinary approach to the concept and the definitional challenges (Chen et al., 2022), an ethical approach to digital placemaking was identified. In

particular, the importance of considering the ethical effects of digital placemaking to achieve consensus in understanding is a crucial challenge after the third round of the study (see [Finding 5.14.2](#)). The ethical approach to digital placemaking presented a valuable contribution to advancing the maturing state of the concept. Previous explorations of the ethical dimension of placemaking have focused on an ecological conception from an analogue approach (Eckenwiler, 2021), with recent calls to rethink and transition it to an ethical assessment of the practice (Amirzadeh & Sharifi, 2024; Gonsalves et al., 2023; Hespanhol, 2022; Klein, 2022; Najafi & Mohammadi, 2024). This PhD research extended their studies by incorporating the digital evolution of placemaking, where a revaluation of its purpose is presented through detailed conceptualization and strategies in nature for wellbeing. Ethical considerations are found to be crucial for the maturity of the concept. Furthermore, the digital dimension opened by digital placemaking presents new ethical risks and challenges that need considering and addressing from an expert and consensual perspective. Therefore, the programme of research contributed to revaluating the state of the concept and its maturity, proposing ethical considerations for the establishment of digital placemaking in the field of social sciences.

6.5.1. Consensual Definition

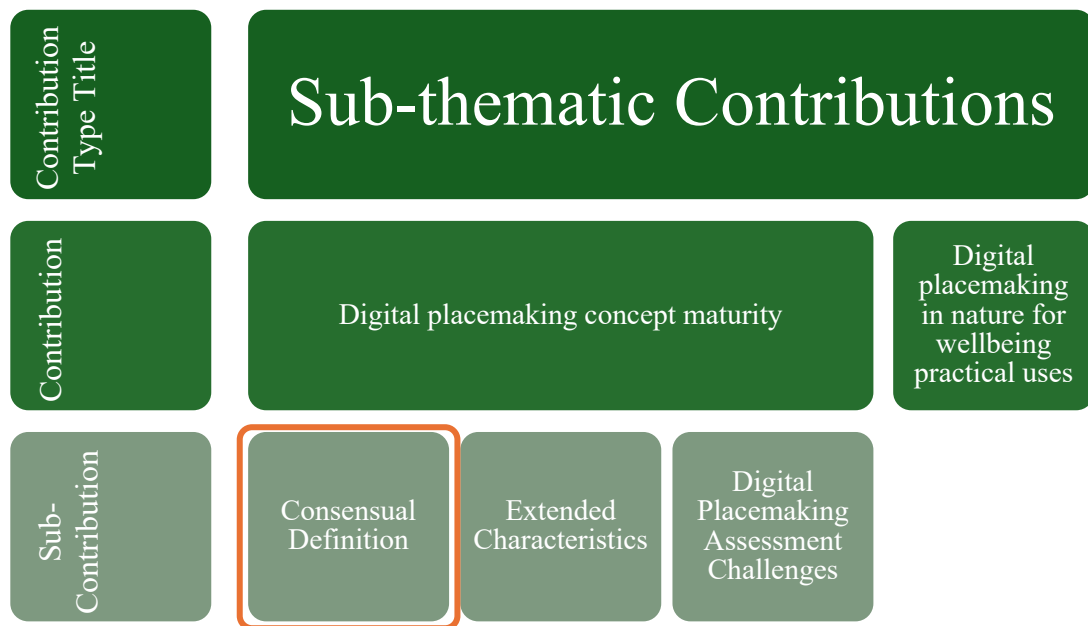


Figure 6.9: Summary of sub-thematic contributions – digital placemaking concept maturity – consensual definition.

Despite the main focus of this research on nature and wellbeing through digital placemaking, it is pertinent to consider the first consensual digital placemaking definition that was achieved (Figure 6.9). This contribution is the first consensus definition of the concept by a pool of experts and expanded experts in digital placemaking, describing the pertinent results that answer the interdisciplinary nature of the concept (see [Finding 5.15](#)) and further specify its nature.

As introduced in the final round of the Delphi study, several aspects achieved consensus in the category of digital placemaking definition. In this section, a discussion of each definition aspect is presented to further consider the contributions from the first consensual definition of digital placemaking.

Digital placemaking is an umbrella term that describes the process of facilitating community connection through a hybrid place experience that combines the

physical space with a digital layer, where the physical place acts as an anchor to the digital layer.

Specifically, the categorization of digital placemaking as an umbrella term achieved a 100% consensus in the final round of the questionnaire. The identification of the concept as an umbrella term and a process embraces the iterative dynamic of digital placemaking, which changes and adapts to the community and the place. This advanced previous studies (e.g., Amirzadeh & Sharifi, 2024; Chew et al., 2020; Fredericks et al., 2018; Głowczyński, 2022) that introduce a variety of technologies in digital placemaking and a broad understanding of the concept. In this programme of research, digital placemaking is defined as an umbrella term, which specifies how different terms might refer to the same concept (e.g., digital place-making, virtual placemaking, augmented placemaking, etc). Moreover, understanding the concept as a process refuted other approaches that only focus on multimedia platform use (Labayen & Gutierrez, 2021; Qi et al., 2021) virtual representation of place (Pavlovskaya, 2016), or social media (Latorre, 2011). The consensual identification of digital placemaking as a process contributed to reducing the confusion around digital placemaking in literature.

The consensual definition specified that digital placemaking facilitates community connection in place. The community element is essential and basic in any placemaking and digital placemaking conceptualization (e.g., Courage, 2021). Therefore, of all the basic characteristics identified in the systematic literature review (see [Chapter 2](#)) and confirmed in the first round of the modified Delphi study (see [Finding 5.12.1.2](#)), community connection and hybrid environment were the only characteristics that achieved consensus in the final round of the study (see [Finding 5.14](#)). This contribution extended the initial identification of the basic characteristic of community engagement to community connection. Community connection evolves community engagement into

creating a sense of community among individuals, which is highly connected with the social identity fostered through the digital placemaking experience. This finding advanced Kotus et al. (2022) discussion of the opportunities of digital placemaking to construct social or locational capital through connection to places. The engagement of the community members with the place and with others has transformed the concept into community connection.

Another key contribution is the differentiation of hybrid environments in the previous definitions of the concept. Some referred to the use of social media as the main and only digital tool (e.g., Latorre, 2011), whether other definitions described virtual representations of places on digital platforms without further description of the hybrid dimension (e.g., Bronsvoort & Uitermark, 2022; Devine, 2017). However, this hybrid space was mentioned previously to combine digital and physical elements (Clarke, 2021; Hardley & Richardson, 2021; Hespanhol, 2022; Pang et al., 2020b; Tomitsch et al., 2015). This research refined and advanced their studies by achieving a consensus definition where hybrid environments are understood as combining digital and physical elements, where the physical space acts as an anchor for the digital layer. These important considerations of digital placemaking as an enhancer of the experience and not a full replacement of the physical is validated with a 100% consensus in both rounds of questionnaires.

Other key aspects found in previous definitions and systematic reviews (e.g., Halegoua & Polson, 2021; Fernandez-Osso Fuentes et al., 2023b) included sense of place attachment, inclusion and accessibility. This programme of research has found these characteristics being explored in the first Delphi round (see [Finding 5.12.1.2](#)). However, only community connection and hybrid environment achieved consensus in the definition section of the final round, where inclusion and accessibility achieved this state in the

characteristic section, and sense of place attachment achieved consensus in a number of items in the specific place attachment section of the questionnaire. Therefore, the main basic elements of digital placemaking considered in the definition are hybrid environment and community connection, where inclusion and accessibility opportunities as well as the level of place attachment vary depending on these basic definitional elements. Extending Foth (2017a) criticism of digital placemaking projects lacking community purpose whose objectives are not for the benefit of the community, this research presented a conceptualization of digital placemaking. If the community connection promoted through the hybrid environment of digital placemaking does not genuinely aim to improve and benefit the community, the inclusion and accessibility opportunities as well as the sense of place attachment are elements that are irrelevant. This was also validated with a 100% consensus on the need for adaptability to the place and community characteristics of the digital placemaking experience in round three. Moreover, digital placemaking experiences that connect community members with the place through hybrid environments that are inclusive and accessible, adapted to the community needs, and focused on the aim and purpose can then foster belonging and communal attachment to the place as well as place identity. The adaptability is key for the promotion of place attachment, as the community connection and hybrid environment promote communal online attachment and place attachment.

6.5.2. Extended characteristics: ownership, meaning-making and storytelling.

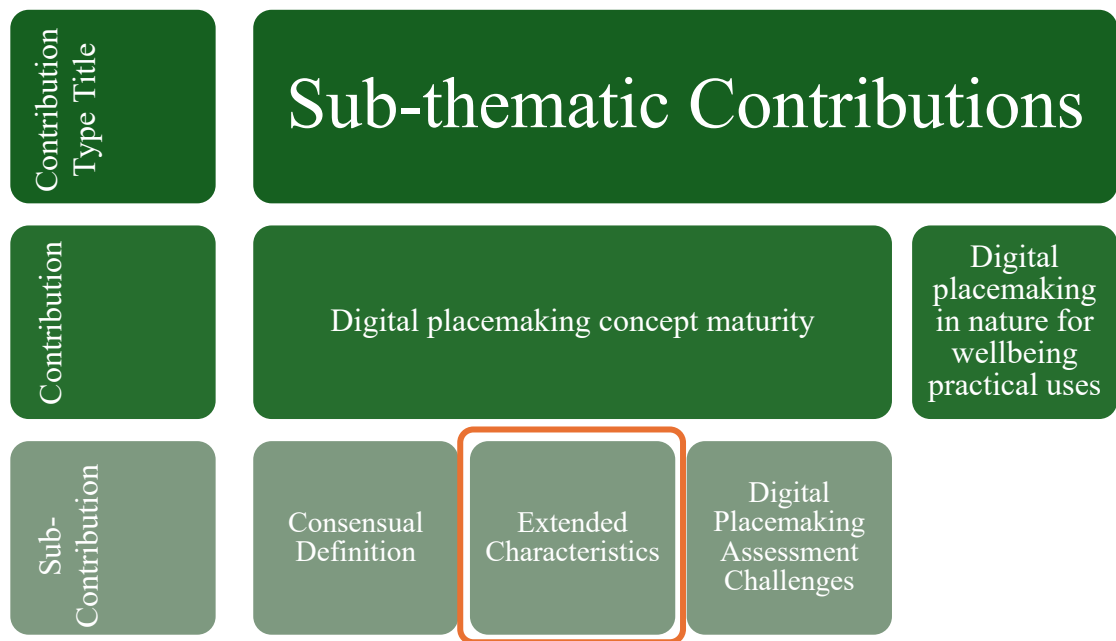


Figure 6.10: Summary of sub-thematic contributions – digital placemaking concept maturity – extended characteristics.

Delphi participants also explored extended characteristics of digital placemaking experiences, which overlapped with other aspects of the dynamics, such as ownership, meaning-making, and storytelling (Figure 6.10). These extended aspects advance and contribute to establishing digital placemaking as a concept and give clarity on how to develop stronger community connections and attachments to places.

The sense of ownership found in this programme of research relates to community engagement and connection, which is understood to benefit them by increasing the success of the project and its lifespan (see [Finding 5.12.1.2.1](#)). Kale (2019) categorises this sense of ownership as a benefit, which also increased the community identification with and belonging to place. Thus, the sense of ownership developed can facilitate collective sense of belonging and identification of ‘neighbours’ (Makri et al., 2021; Tajfel & Turner, 1986). The ownership and social identification are key aspects in Social Identity Theory. This research contributed by extending this understanding to digital placemaking, where a Social Identity Theory lens is applied to understand how

community engagement and connection promote a sense of ownership with the place and the community, which helps foster feelings of belonging and identity (see [Finding 5.7](#)). In this creation of sense of belonging and group membership (Makri et al., 2021; Tajfel & Turner, 1986), technology can aid in building the social identity through the place identity which affects social identity (Harner et al., 2017). Moreover, this research advanced Kale's (2019) understanding of the involvement of the sense of ownership in place attachment that leads to social belonging, by introducing digital placemaking as a process that uses digitally mediated place experiences to foster social belonging, membership and ownership in place experiences.

The sense of ownership was also found to be connected within place branding and storytelling (see [Finding 5.12.2.1](#)), where participatory place branding provides a sense of agency and ownership to the community (see [Finding 5.12.2.3](#)). The inclusion of locals and place consumers in the place branding process not only provides feelings of pride and belonging (Zenker & Erfgen, 2014), but also brand commitment (Hatch & Schultz, 2009). This research built upon their explorations by identifying sense of ownership as a state that can be developed through digital placemaking as a bottom-up process, specifically connected to community engagement and connection. Moreover, it was found also in relation to online place attachment and its benefits to wellbeing due to sense of ownership and safety in the place with others, and as a connector that improves wellbeing when in nature (see [Findings 5.12.3.1](#), [5.12.5.1](#)). Sense of ownership is a novel contribution to digital placemaking, as it is found to help support wellbeing in this research.

This programme of research found sense of ownership linked to behaviour change, which is connected to meaning-making (see [Finding 5.12.1.2.5](#)). Chen et al. (2022) explore digital placemaking in the city, where they connect behaviour change with meaning-making and the importance of having a call to action in the experience. Beyond behaviour

change being a key aspect of digital placemaking in nature for wellbeing, meaning-making was found as an extended characteristic of the concept. This finding refers to the creation of meaningful place experiences for the community, which play a crucial role in the development of place attachment, nature connectedness, and support for place branding (see [Findings 5.12.1.2.5.2](#), [5.12.3.2](#), and [5.12.5.1](#)). Norum and Polson (2021) define digital placemaking, including meaning-making, as interweaved with the place through a digital platform. Hespanhol (2018) explores individual and collective meaning-making as important aspects of digital placemaking. Pang et al. (2020a) describe meaningful opportunities for participation created using digital placemaking. Recent studies also allude to meaning-making as a powerful strategy in placemaking practices (Atteneder & Lohmeier, 2024; Naji & Rzeszewski, 2022; Razi & Ziminski, 2022). Specifically, Ebaid (2023) call to involve place branding and meaning-making in placemaking for the inclusion of all community members. Thus, the concept was broadened to understand how meaning-making empowers place attachment, nature connectedness, place branding, and social identity through a variety of technologies. The technology used can evolve and adapt, but the key goals and characteristics must remain to understand the experience of digital placemaking. This finding contributed to advancing knowledge by understanding the creation of meaningful experiences in place to be enhanced through digital placemaking, where additional meaning and strategies are embedded using a digital layer over the physical place experience.

Meaning-making had also been linked to gamification (Clowater, 2021), which was found to be one of the consensual key strategies that support creating meaningful place experiences in digital placemaking as well as storytelling. Storytelling resulted interweaved with inclusion, social identity, participatory place branding, online place attachment, and in nature for wellbeing (see [Findings 5.7](#), [5.12.1.2.4](#), [5.12.1.2.5.1](#),

[5.12.2.3](#), [5.12.3.2](#), [5.12.3.3](#), and [5.12.5.2](#)). In each round of the modified Delphi study, storytelling was described as connected to several dynamics and aspects of the concept. It achieved a 94% consensus as a characteristic of digital placemaking, also finding consensus related to place attachment (89%), place branding (100%), and nature (94% and 79%). Scholars have explored storytelling in corporate communication (Zins & Abbas Adamu, 2024), also involving digital tools for place connection and community development (Boros et al., 2024; Gonsalves et al., 2023; Heck & Tsai, 2022; Hudak, 2019; Imara et al., 2024; Klein, 2022; Stoica et al., 2022; Törnberg, 2022). However, a deeper understanding of storytelling in digital placemaking was scarce in the literature. Stokes et al. (2021) explore an adaptation to storytelling in digital placemaking's urban furniture, where it can sustain social capacity through gamification. Frith and Richter (2021) involve storytelling and digital placemaking as a counternarrative strategy in place for social justice, and Zhang and Gong (2021) apply digital storytelling and placemaking for migrant students that use new media technologies to engage. This study contributed to advancing the potential use of storytelling as a strategy in digital placemaking, where collective and individual processes, specifically combined with meaning-making and social identity, support the different dynamics involved in nature for wellbeing.

6.5.3. Digital Placemaking Assessment Challenges

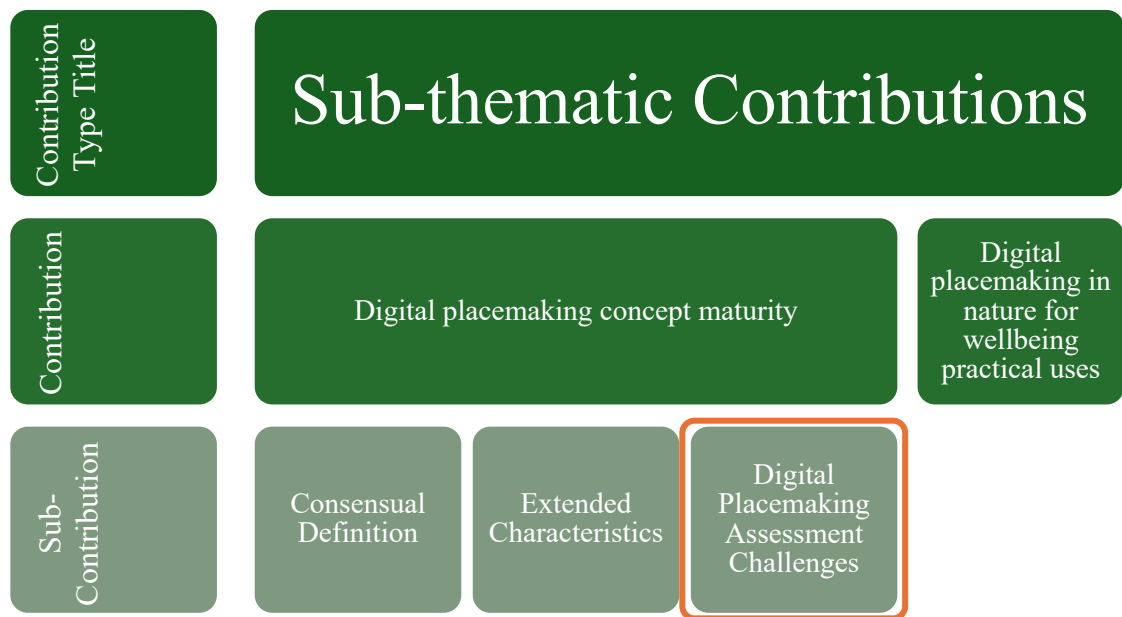


Figure 6.11: Summary of sub-thematic contributions – digital placemaking concept maturity – digital placemaking assessment challenges.

Lastly, a final key contribution to the exploration of the concept of digital placemaking refers to its assessment challenges (Figure 6.11). No previous study has specifically addressed the different methodological ways of evaluating and assessing a digital placemaking experience. This is the first study to find consensus on how digital placemaking should analyse the experience, what methods are relevant, and how to face the assessment of this process. This contribution answers the research question: How can the wellbeing impact of digital placemaking practices in nature be assessed?

Following the research questions of this PhD thesis, an exploration of the assessment tools and the role of analytics in digital placemaking was crucial to understanding the impact of digital placemaking on nature and wellbeing and providing theoretical and practical insights in this matter. Thus, participants were interviewed on how to measure a digital placemaking experience (see [Finding 5.12.1.3](#)). The results present a number of challenges that were subject to the iterative process of the Delphi rounds. At the end of

round three, only the importance of defining success (79%) and using the mixed method (78.9%) achieved consensus (see [Finding 5.14](#)).

Therefore, the interdisciplinary nature of digital placemaking as well as the broad spectrum of applications of the concept revealed the analysis of the experience impact as a challenge for the experience. The assessment of the results of the experience, however crucial for its implementation in cities providing with data that supports its use, is a complex process that needs to adapt to the community and place needs, focusing on what success means for them to then combine quantitative data analysis with in-depth qualitative data to inform a holistic approach to the concept. Therefore, this PhD thesis contributed to advancing the concept of digital placemaking by providing consensual assessment methods that will help defend the validity and use of it in cities for communities.

6.6. Sub-Thematic Contributions: Practical Uses and Strategies for Digital Placemaking in Nature

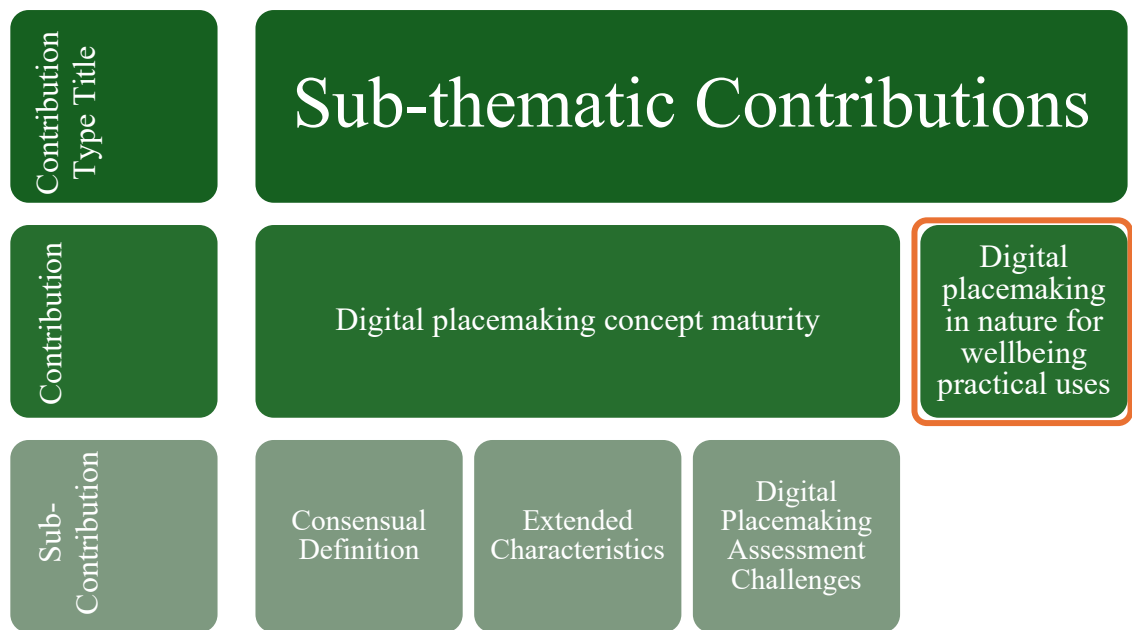


Figure 6.12: Summary of sub-thematic contributions – digital placemaking in nature for wellbeing practical uses

This section of the chapter discusses the practical uses and strategies for digital placemaking in nature for wellbeing findings (Figure 6.12). The different strategies explored through this finding provide insights into how to implement digital placemaking in nature for wellbeing. Through investigation of this, the findings demonstrated several uses that experts and expanded experts discuss as important and valuable for communities and cities (Table 6.1). The lack of guidance in the optimisation of nature involving technology and cities (e.g., Grace et al., 2020; Moss et al., 2021) and wellbeing (e.g., Van Houwelingen-Snippe et al., 2021), besides the scarce studies that deeply explore nature involvement in digital placemaking and wellbeing assessments (Fernandez-Osso Fuentes et al., 2023b), was advanced through this research. This contribution answers the research question: how can digital placemaking reframe the human-nature disconnection affecting urban consumers?

Practical Use	Round Three Consensus Achieved?
To connect with the real nature/world	Yes

Reconnect with nature	Yes
Meaning-making	No
Storytelling	Yes
To raise awareness	Yes
To take notice	Yes
To educate	Yes
To imagine futures	Yes
Wayfinding nature	Yes
Safety	Yes
Accessibility and inclusion	No
Climate Change	No
To collect data	No

Table 6.1: Practical uses found in the modified Delphi Round One and consensus status in Round Three.

In the final round of the study (see [Finding 5.14](#)), the use of digital placemaking in nature for wellbeing achieved a 100% consensus on using it to find, explore, and discover nature. Two additional items achieved consensus on this section, which focused on helping communities understand the wellbeing benefits of nature (84.2%) and to repurpose spaces to link them to nature, supporting wellbeing (73.7%). Therefore, this research contributed to present digital placemaking in nature for wellbeing as an information and communication tool that helps communities navigate their nature experience, which supports their wellbeing, educates them in understanding the wellbeing benefits of nature, and as a place branding tool that help repurpose spaces to rebrand the experience to be connected to nature, supporting wellbeing.

There is no previous report or research work that shares a number of strategies and uses of digital placemaking in nature for wellbeing. As part of the European Commission (Horizon 2020) project that funds this research, a guidance report informed by the two articles published from this research (Fernandez-Osso Fuentes et al., 2023b; 2024a) along with data from the project, was published. A detailed toolkit with uses, examples, advice and tools was reviewed and published by the European Commission in 2023 (Appendix

J). This demonstrated the relevance of this research study and the contribution to practice and policy making, disseminating the initial results of the study to the public, including place managers, placemakers, place branding experts and other relevant professionals that want to improve the human-nature relationship in cities through the innovative concept of digital placemaking. This also answers the call by Amirzadeh andn Sharifi (2024) on advancing research on the evolution of placemaking to prioritise the development of sustainable placemaking and creating guidelines.

Different applications of digital placemaking in nature for wellbeing were identified in the programme of research, providing a valuable roadmap of uses and strategies that should adapt to each place and community characteristic (also a consensual aspect of digital placemaking found in round three, [Finding 5.14](#)). The proposed forecast of digital placemaking in nature for wellbeing extended previous single examples of projects that implement digital placemaking for urban regeneration (Sanaeipoor & Emami, 2020a), narrative approaches for sustainable futures (Goudriaan et al., 2023), augmented placemaking for digitised romanticism of natural environments (Hespanhol, 2022), or immersive technology for nature connectedness (Brambilla et al., 2024). Advancing on ways to implement technology in nature-based solutions for nature connectedness (Tsekeri et al., 2022) and to foster inclusion as an augmented nature-based solution in green strategies (Mahmoud et al., 2024), this research contributed by proposing a pool of ways to integrate digital technology in nature-based solutions that aim to reframe the human-nature relationship in cities by employing hybrid place experiences. Moreover, the conceptual model tested through this study and the findings of this research extended Galle et al.'s (2019) Internet of Nature approach to technology in urban nature spaces by proposing digital placemaking as another concept that can augment human-nature connection by enhancing urban nature place experiences without replacing it. This

approach refuted Shih et al.'s (2021) understanding of digital placemaking in urban regeneration, where the increased use of technologies is demonised as disconnecting communities from places, affecting their identity formation negatively, and Edwards et al.'s (2020) concerns about technology use that decreases familiarity, awareness, and care for nature.

The proposal of using digital placemaking in nature for wellbeing provided crucial support for advancing the practical value of nature-based place brand experiences using digital tools in urban environments. This research offered specific guidance for urban planning, design and place branding, enabling professionals to select the appropriate digital intervention method based on the conceptual model presented and tested in this research. Moreover, this investigation considered the specific needs of public spaces, which created more attractive and interactive spaces in cities. The practical uses of digital placemaking in nature for wellbeing aid professionals in formulating relevant policies and management measures to promote the application of digital tools in community spaces, enhancing nature connection and wellbeing outcomes.

The different uses provided in this programme of research for digital placemaking in nature for wellbeing helped place managers, designers and researchers to understand the concept and its application, focusing on the community and space needs in which the experience will be developed and the need to include the local community as a co-creator and active participant in the process. Therefore, when future place experts need to develop a digital placemaking experience that involves nature and wellbeing they might refer to this conceptual model and set of uses to understand how they want to develop the experience according to the model developed and tested in this study.

6.7. A Conceptual Model of Digital Placemaking in Nature for Wellbeing

Therefore, four major contributions and subsequent sub-thematic contributions have been explained in this chapter, with specific references to how these contributions address the described research aims and questions of this PhD thesis. The development, testing and validation of the conceptual model described in this research is the major contribution to knowledge. The model contains four propositions that are modified from the research results, where key innovations are described: the introduction of social identity as a binding actor, the update place attachment and nature connectedness, and a demonstration of the potential of digital placemaking in nature for wellbeing.

The revised model is confirmed to be a bottom-up process informed by the described theories and constructs in Chapter 3, applying the four basic characteristics of digital placemaking identified in Chapter 2 in the hybrid and community dimensions (Figure 6.13). Advancing Amirzadeh and Sharifi's (2024) findings on the evolution of placemaking to include sense of place, being a bottom-up process and participation as fundamental, along with the constant connection with sustainability and the focus on attracting investments in place, this programme of research provides further knowledge on the fundamental aspects of digital placemaking with a shifted focus to the role of social identity formation to enhance the dynamics involved. These scholars call the future of placemaking to be inclusive, sustainable, flexible and to employ technology in innovative ways. Moreover, previous models that include hybrid sense of place involving hybrid environments are important in considering the impact of digital environments on people's belonging feelings (Dai & Liu, 2024) but lack a specific consideration of place attachment and its social identity effect when involving nature and technology. Therefore, the model presented a modification of the place attachment tripartite by Scannell and Gifford

(2010a) by including online place attachment (Schwartz, 2015) place branding (Hudak, 2019; Kavaratzis & Florek, 2021), nature connectedness (Basu et al., 2020; Mackay et al., 2021) and Social Identity Theory (Haslam et al., 2009; Tajfel, 1978) in digital placemaking (Freeman et al., 2019). This directed the review of the conceptualisation of four main propositions for Digital Placemaking in nature for wellbeing.

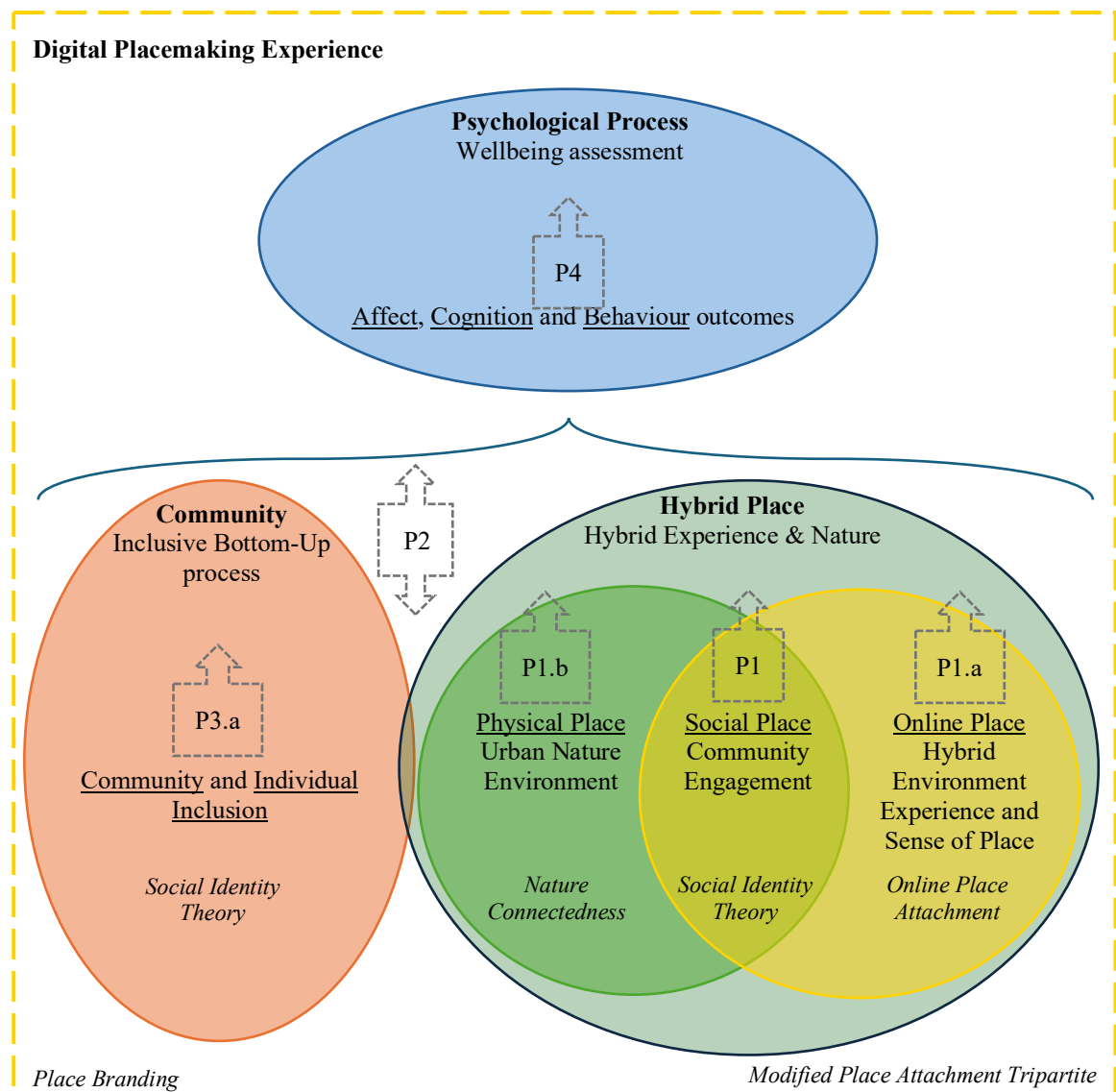


Figure 6.13: Digital Placemaking in Nature and Wellbeing Conceptual Model (final version). Developed from the extant literature, such as Scannell and Gifford (2010a), Schwartz (2015), Tajfel (1978), Haslam et al. (2009), Birnbaum et al. (2021), Mackay et al. (2021), Basu et al. (2020), Kavaratzis and Florek (2021), Hespanhol (2022), Hudak (2019), Breek et al. (2018), Dai and Liu (2024)

Digital placemaking hybrid place experiences (Hespanhol, 2022; Polson, 2015) are confirmed to promote sense of belonging and authenticity, creating meaningful experiences for consumer communities that impact their vision of a place, and the vision of them within that place. The first proposition (P1) was confirmed as digital placemaking is found to foster social identity and create place attachment or sense of place in a community. This proposition has been revisited to focus on social identity as it facilitates group belonging with the place and with others in the place, fostering group membership feelings (Heath et al., 2017; Tajfel, 1978). The found social identity link as a binding actor extended Qazimi (2014) result of place attachment and identity as substructures of social identity, Çöteli (2019) evolution into digital social identity, Özkul (2021) exploration of digital collective identities in placemaking, and Bouncken and Barwinski (2021) shared digital identity by providing knowledge on the use of digital placemaking's hybrid environment for communities. Previous studies exploring social identity and wellbeing through place attachment (Cole et al., 2021; Haslam et al., 2009; Maricchiolo et al., 2021) are advanced by presenting digital placemaking as a process that fosters these dynamics. The key aspects of social identity and community membership and belonging are crucial dynamics that are developed in digital placemaking which aid in the development of place attachment. The identity formation, modification and perception are advanced from an individual perception of place identity (Freeman et al., 2019). The novelty of the model resides in the social identity approach to digital placemaking.

P1. Digital placemaking fosters social identity as a binding actor which enhances place attachment between the community and the space where it is developed, facilitating group belonging and social identity among members and with the place.

Moreover, proposition P1.a was also confirmed, which refers to the broadening of online place attachment in digital placemaking experiences. The revaluation of the proposition resulted in deepening the understanding and role of online place attachment in digital placemaking. Scarce studies demonstrate how technology is found to facilitate place attachment processes (Birnbaum et al., 2021; Huang et al., 2022; Schwartz, 2015), specifically in digital placemaking (Razi & Ziminski, 2022). Thus, this research extended previous studies of online approaches to place attachment in public spaces (Dai & Liu, 2024; Razi & Ziminski, 2022; Rutha & Abbas, 2021), through hybrid environments in digital placemaking. Place attachment was also approached from a social identity lens, which answers previous critiques on the individualised focus of place attachment (Lewicka, 2011). This research deepened this understanding by extending Dandotiya and Aggarwal's (2023) study focusing on community processes through digital placemaking and the role of social identity in fostering place attachment among other dynamics.

P1.a. Digital placemaking experiences foster community online place attachment in hybrid environments, promoting authenticity and differentiating them from others.

Finally, P1.b which referred to nature connectedness and its connection with place attachment and social identity, was also confirmed in the research. The re-examination of the proposition culminated in the central role of nature connectedness through place attachment in digital placemaking experiences. Links between nature connectedness and place attachment in previous studies have been explored (Basu et al., 2020; Gosling & Williams, 2010; Jayakody et al., 2024). However, the involvement of digital media in these processes has been mainly focused on fully immersive experiences such as virtual reality (Litleskare et al., 2022). The social identity perspective to digital placemaking discussed previously also enhances the creation of nature connectedness with the

individual and the community, advancing previous studies of nature identity (Clayton & Opatow, 2003) and social identity of climate change (Mackay et al., 2021) aligned with the group identity shift in the human-nature relationship (Lengieza & Aviste, 2024). The confirmation of the development of nature connectedness in less immersive experiences through digital placemaking broadened Livingston's (2022) study on tour apps that promote pro-environmental behaviours, and Paraschivoiu and Layer-Wagner (2021) use of placemaking for urban sustainability.

P1.b. When applied in urban nature environments, digital placemaking fosters nature connectedness through place attachment with the urban nature, facilitating a community identification dimension of the concept and pro-environmental behaviours.

Digital placemaking follows a place branding perspective in the model, which was confirmed through the modified Delphi method. This proposition was revisited to allude to the social identity fostered through place branding. Answering previous calls on advancing place branding into the technological realm, the sustainability approach and the local focus of the concept (Ashworth et al., 2015; de San Eugenio-Vela et al., 2023; Graziano & Albanese, 2020; Kavaratzis & Florek, 2021), the study confirmed the benefits of the place branding dimension of digital placemaking through the development of social identity and group belonging feelings. Furthermore, the findings extended Hudak's (2019) application of participatory place branding and digital storytelling to building narratives of places by demonstrating the positive role of digital placemaking where place consumers are key drivers and actors in the process, also using storytelling as a key strategy for community engagement. The inclusion of nature, places, communities, and social identity is enhanced through the place branding dimension of digital placemaking.

In the model, digital placemaking is understood as a community of practice (Courage, 2021), where participation is essential to develop identity and social recognition.

P2. Digital placemaking facilitates place branding and consumer interactions through hybrid participation (online and offline) that fosters social identity and group belonging.

In the model, digital placemaking was approached from participatory place branding lens. However, no participatory place branding item achieved consensus in the final Delphi round of the study. Therefore, digital placemaking and participatory place branding achieved no consensus that supports the third proposition of the model (P3). Nonetheless, the use of place branding and digital placemaking to communicate stories of the place and the proposition P3.a achieved consensus in the final Delphi round. Proposition P3.a referred to the role of digital placemaking in including marginalised community members and creating a space for connection with others and with the place. Examining the proposition from the modified Delphi data, it focused on the inclusion and accessibility opportunities of digital placemaking, which were found in the research as crucial aspects. The findings advanced Breek et al., (2018) understanding of the multiple identities that have not been supported in equality, by proposing a social identity approach of digital placemaking where the multiple identities in the community can be promoted and respected, ensuring inclusion and accessibility of all. Additionally, storytelling is found as a key strategy in place branding to develop authenticity, co-creation processes and ultimately support wellbeing (Hudak, 2019; Stoica et al., 2022). Therefore, the new proposition embraces both the inclusion and accessibility potential of digital placemaking, extending the concepts to incorporate the multitude of identities that co-exist in a community, while also employing storytelling to empower and support them.

P3.a. Digital placemaking presents several opportunities for inclusion and accessibility of the multiple identities in a community, which enables excluded or marginalised members to connect with others and with the place, while employing storytelling as a key strategy.

The interconnections between digital placemaking, place attachment, place branding, Social Identity Theory and nature connectedness were confirmed in this research. The final proposition anew generated a deeper understanding on the interconnections among dynamics and the role of social belonging and identity supporting wellbeing. By extending previous research on the connections between place attachment, nature and wellbeing (Basu et al., 2020; Lewicka, 2011; Litleskare et al., 2022; Maricchiolo et al., 2021; Scannell & Gifford, 2017), digital placemaking was found to promote these dynamics which results in supporting consumer wellbeing. The creation of experiences that fosters feelings of belonging with others, with place and with nature is found to support wellbeing outcomes, when the experience aims to promote social change (Foth, 2017b) and civic pride (Evans, 2015). Previous studies have demonstrated the psychological benefits of place attachment (Scannell & Gifford, 2017) involving nature (Basu et al., 2020). This research deepened the community and social identity dimension of place attachment and nature by proposing digital placemaking as a process to foster these dynamics. Digital placemaking in nature for wellbeing broadened previous terms such as healthy placemaking (Ng, 2016), green placemaking (Cilliers et al., 2015) or sustainable placemaking (Amirzadeh & Sharifi, 2024) by uniting the inherent benefits of nature for wellbeing through hybrid environments where social bonds and identity enhances the dynamics explained.

P4. Consumers participating in digital placemaking nature-based place brand experiences for social change and civic pride can benefit from several wellbeing

outcomes, feeling social belonging and emotional attachment to the place, to the community and to nature.

These propositions have been revisited after the data analysis of the research to address each characteristic of digital placemaking and understand its use to enhance consumer wellbeing through nature-based place brand experiences. The conceptual model presented a comprehensive framework that leverages digital media to enhance physical experiences through digital layers of meaning. The confirmation of the conceptual model of this research is the major contribution of this PhD thesis. The hybrid environment created presents an innovative context for social cohesion, identity and belonging, which is found to support consumer wellbeing. Digital placemaking as a place branding strategy can create, modify or develop specific consumer community experiences and identity values.

6.8. Summary of Knowledge Gaps and Contributions to Knowledge

Table 6.2 illustrates the major themes and sub-themes in this research, highlighting their interrelations to help understanding the contributions of the programme of study.

Theme	Knowledge Gap Identified	Contributions which Address Knowledge Gap and Original/New Contribution	Relevant Definitions, Model and Frameworks
Major Theme 1: Social Identity Theory Is the Major Factor in Digital Placemaking	<ul style="list-style-type: none"> Existing literature on digital placemaking mainly focuses on individual aspects of place identity and attachment (Freeman et al., 2019; Lewicka, 2011). Community dimensions and social identity processes in digital placemaking for nature-based experiences are underexplored (Fernandez-Osso Fuentes et al., 2024a; Petrovski et al., 2024). Lack of integrated frameworks that incorporate Social Identity Theory into digital placemaking dynamics (Chen et al., 2022; Hespanhol, 2022; Razi & Ziminski, 2022). Analogue references to place identity and social identity (Kotus et al., 2022; Sacramento et al., 2022) and negative effects on social identity from digital placemaking (Törnberg, 2022) 	<p>Contributions which address knowledge Gap</p> <ul style="list-style-type: none"> Introduction of Social Identity Theory to digital placemaking, emphasizing its role in enhancing community identity and place attachment. Proposition and validation of a conceptual model that integrates digital placemaking, nature, and wellbeing, emphasizing community dynamics and social identity. <p>Original/new contributions</p> <ul style="list-style-type: none"> Establishment of how Social Identity Theory acts as a binding factor in digital placemaking, fostering community identity and enhancing place attachment. Definition of digital placemaking as a tool to develop social identity through technology-mediated experiences, influencing wellbeing and environmental behaviours. 	Conceptual model: integrates digital placemaking, nature, wellbeing, and Social Identity Theory to explain community dynamics and impacts. Advances understanding of digital placemaking's role in creating communal ties and enhancing spatial attachment through technology.
Sub-Thematic Contribution 1.A: Community	<ul style="list-style-type: none"> Existing literature lacks integration of place attachment theory with the contemporary digital media landscape (Birnbaum et al., 2021; 	Contributions which address knowledge gap	Hybrid place experience: blending physical and digital elements in a place experience, specifically referring to digital placemaking.

Online Place Attachment Is Fostered in Digital Placemaking	<p>Scannell & Gifford, 2010a; Schwartz, 2015).</p> <ul style="list-style-type: none"> • Limited exploration of community dimensions in online place attachment within digital placemaking (Hespanhol, 2022) • Scarce studies on the impact of hybrid environments combining online and offline interactions on place attachment (Dai & Liu, 2024; Rutha & Abbas, 2021). 	<ul style="list-style-type: none"> • Update on place attachment theory to include digital contexts and hybrid environments in urban settings. • Expansion of the understanding of place attachment by emphasizing community dynamics facilitated by digital placemaking. <p>Original/new contributions</p> <ul style="list-style-type: none"> • Introduction of a modified place attachment theory integrating digital media and community aspects. • Definition of digital placemaking as enhancing community hybrid place attachment through digital tools and storytelling strategies. 	<p>Community identity formation: highlights digital placemaking's role in fostering community identity through online and offline interactions.</p>
Sub-Thematic Contribution 1.B: Nature Connectedness Is Approached from A Community and Hybrid Dimension in Digital Placemaking.	<ul style="list-style-type: none"> • Limited exploration of nature connectedness in urban settings through digital placemaking (Gulsrud et al., 2018). • Scarce literature on integrating community dimensions and digital tools in enhancing nature connectedness (Brambilla et al., 2024; Litleskare et al., 2022; Loy et al., 2024; Mackay et al., 2021). • Dichotomic portrayal of technology and nature in existing research, with minimal focus on their synergistic potential (Kesebir & Kesebir, 2017). 	<p>Contributions which address knowledge gap</p> <ul style="list-style-type: none"> • Expansion of the understanding of nature connectedness by incorporating community and digital dimensions in urban settings. • Application of the Social Identity Theory to enhance community engagement and identity formation in digital placemaking for urban nature environments. <p>Original/new contributions</p> <ul style="list-style-type: none"> • Introduction of a model integrating digital placemaking, nature 	<p>Hybrid nature experiences: describes digital placemaking to blend physical urban environments with digital tools.</p>

		<p>connectedness, and community engagement, underpinned by Social Identity Theory.</p> <ul style="list-style-type: none"> • Definition of digital placemaking as a tool to augment place attachment and nature connectedness through community interactions in urban nature settings. 	
Major Theme 2: The Place Branding Dimension of Digital Placemaking Benefits Processes of Social Identity and Belonging	<ul style="list-style-type: none"> • Limited exploration of digital placemaking's role in enhancing group identity and belonging through place branding (Çöteli, 2019). • Scarce literature on integrating consumer interactions and social identity processes in digital placemaking for place branding (Ashworth et al., 2015; Törnberg, 2022). • Minimal focus on the use of digital tools to augment place experiences and community attachment in place branding strategies (Hudak, 2019; Stoica et al., 2022). • Calls to update place branding to the digital era, including advancing sustainability connections and local participation (Ashworth et al., 2015; de San Eugenio-Vela et al., 2023; Graziano & Albanese, 2020; Kavaratzis & Florek, 2021). 	<p>Contributions which address knowledge gap</p> <ul style="list-style-type: none"> • Enhancement of the understanding of place branding by integrating digital placemaking to foster community identity and belonging. • Introduction of the consumer interaction as a pivotal element in digital placemaking for place branding, emphasizing hybrid participation. <p>Original/new contributions</p> <ul style="list-style-type: none"> • Proposition of a model where digital placemaking enriches place branding through consumer interactions and community identity formation. • Definition of digital placemaking as a tool to augment place experiences, communicate narratives, and build authentic connections in urban settings. 	<p>Hybrid participation: blending online and offline engagement to enhance social identity and belonging.</p> <p>Consumer-centric approach: Highlights the role of consumer interactions in shaping place branding strategies through digital storytelling and community empowerment.</p>

Major Theme 3: The Inclusion and Accessibility Dimensions of Digital Placemaking are Key Factors and Opportunities for the Concept in Regard to the Multiple Identities in the Community.	<ul style="list-style-type: none"> • Limited exploration of inclusion and accessibility dimensions in digital placemaking (Fernandez-Osso Fuentes et al., 2023b; Hespanhol, 2022). • Insufficient focus on addressing barriers and enhancing accessibility through digital placemaking strategies (Clarke, 2021; Szaszák & Kecskés, 2020). • Few studies on the social benefits and challenges related to inclusion in digital placemaking initiatives (Gonsalves et al., 2021). 	<p>Contributions which address knowledge gap</p> <ul style="list-style-type: none"> • Enhancement of the understanding by highlighting inclusion and accessibility as integral aspects of digital placemaking. • Exploration of how digital placemaking can respect and include multiple identities within the community. <p>Original/New Contributions</p> <ul style="list-style-type: none"> • Introduction of a model where digital placemaking serves as a barrier-free platform for inclusive community engagement. • Definition of digital placemaking as a tool to lower entry barriers and foster connections among diverse community identities. 	<p>Inclusion and accessibility: describes digital placemaking as crucial for promoting inclusion and accessibility in community interactions.</p>
Major Theme 4: Digital Placemaking in nature for wellbeing Connects Consumers with Nature, with the Place and with Others Supporting	<ul style="list-style-type: none"> • Limited literature on the intersection of digital placemaking, nature, and wellbeing (Fernandez-Osso Fuentes et al., 2023b; Petrovski et al., 2024). • Lack of understanding on how digital placemaking can enhance wellbeing through nature-connected experiences (Cilliers et al., 2015; Ng, 2016). • Few studies exploring holistic frameworks combining digital 	<p>Contributions which address knowledge gap</p> <ul style="list-style-type: none"> • Advancement of the role of digital placemaking in promoting wellbeing through nature-connected experiences. • Integration of a conceptual model linking digital placemaking, nature, and wellbeing, addressing gaps in existing literature. <p>Original/new contributions</p>	<p>Nature and wellbeing: highlights digital placemaking as a tool to connect consumers with nature, fostering emotional attachment and wellbeing.</p> <p>Place branding perspective: explores digital placemaking as a nature-based place branding strategy, promoting community health and sustainability goals.</p>

their Wellbeing	<p>placemaking, nature connectedness, and wellbeing outcomes (Amirzadeh & Sharifi, 2024; Gulsrud et al., 2018).</p> <ul style="list-style-type: none"> • Calls to explore and assess the psychological effects of digital interventions (Chen et al., 2024). 	<ul style="list-style-type: none"> • Development of a model where digital placemaking facilitates nature-based experiences that enhance wellbeing. • Application of the Social Identity Theory to understand how digital placemaking fosters emotional place attachment and community-nature connectedness. 	
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Table 6.2: Summary of major themes and sub-themes to help understanding the contributions of this research.

6.9. Chapter Summary

This chapter compares, contrasts, and conceptualises the findings in relation to previous literature. An established exploration and discussion of the findings generated new insights while addressing gaps and extending prior knowledge. A discussion of the primary findings of the research in line with the corresponding literature is also presented in this chapter. This research discusses findings concerning each piece of literature presented in Chapter 2 and Chapter 3, identifying key contributions to knowledge and confirming the conceptual model of the programme of research of *Digital Placemaking in Nature for Wellbeing*, which is the major contribution of this research.

Chapter 7. Conclusion and Future Research Agendas

7.1. Introduction

This chapter concludes by summarising the entire thesis. It will revisit the literature review, methodology, findings and discussion of the thesis. Each research objective will be examined and the degree to which they have been met will be explored, providing an overview of the major contributions to knowledge. The chapter also outlines the limitations of this research project, suggesting future research that addresses these limitations. Then, implications for marketing practice and policy are identified.

Scholars have discussed the confusion and complexity around digital placemaking (Basaraba, 2021; Chen et al., 2022; Głównyński, 2022). Some have called to rethink how people engage with nature to include technology (Richardson et al., 2018; Riechers et al., 2021), since the positive benefit of nature on people's wellbeing has been thoroughly demonstrated (e.g., Bratman et al., 2019; Jimenez et al., 2021). However, technology tends to be attributed to the disconnection between people and nature (Kesebir & Kesebir, 2017; McLean et al., 2021). Digital nature exposure is an increased area of research lately (e.g., Brambilla et al., 2024; Litleskare et al., 2022). Yet, less immersive experiences using technology to enhance physical places in nature for wellbeing have not been considered. Interested in modifying and adapting a place's image, perception and identity to encourage its use in nature for wellbeing, a place branding approach is considered in this investigation. Specifically, scholars in place branding have called to refine the nature of place branding as opposed to tourism branding, connecting it with sustainability and the digital realm (Kavaratzis & Florek, 2021). Therefore, a proposed place branding

perspective of digital placemaking is presented to advance the place branding approach to the concept into a participatory perspective that would benefit the social identity of the community. The study addressed a gap in current knowledge to investigate the processes and outcomes of digital placemaking in nature for wellbeing.

Despite finding concepts such as sustainable placemaking (Amirzadeh & Sharifi, 2024), green placemaking (Gulsrud et al., 2018) and healthy placemaking (Ng, 2016), the combination of digital placemaking, nature and wellbeing has been overlooked in literature (Fernandez-Osso Fuentes et al., 2023b). An empirical investigation of specialist academic and practitioner approaches to digital placemaking in nature for wellbeing was a suitable lens for further understanding this phenomenon. A sample of twenty-six international experts and expanded experts were selected for data collection due to their proficiency and experience in the topic. This research explored the processes and outcomes of digital placemaking in nature for wellbeing, generating rich insights into this emergent field of practice. The study used a mixed method approach combining semi-structured interviews with questionnaires to ascertain the use of digital placemaking in nature for wellbeing. The results were thematically analysed in the first round, then analysing the questionnaires using descriptive statistics presented in Chapter 5. This culminates with the test of the conceptual model presented in Chapter 3, discussing a new version adapted from the results of the modified Delphi study, also in relation to literature, in Chapter 6.

The following sections will examine each research objective of the study by concluding how these were achieved. The findings which relate to each objective will be discussed in relation to the literature as well as outlining the respective contributions to knowledge.

7.2. Research Objectives Revisited

Research Objective 1: To review the various literatures for knowledge, theory and practice in: digital placemaking, nature and wellbeing.

Research Objective 1 provided the theoretical and practical foundations for this investigation by completing a comprehensive analysis of the extant literature in the field of digital placemaking involving nature and wellbeing. This review was presented in Chapter 2 through a published paper, and the update between the year of publication of the article (2023) and the year of thesis submission, which presented the outcome of the review of the literature.

The review paper presented in Chapter 2 Part A (Fernandez-Osso Fuentes et al, 2023b) examined the knowledge and theory relating to digital placemaking, health and wellbeing, and nature-based solutions. Due to the interdisciplinary nature of the concept (Basaraba, 2021), broad technology usage (Chen et al., 2022) and definitional dilemma (Główczyński, 2022), grounding in the previous literature provided a foundation for this research to investigate the concept of digital placemaking in greater detail. The systematic review found a lack of agreement in the literature, identifying four key or basic characteristics of the concept, as well as a generally incomplete approach to its wellbeing impact and nature connection. Despite the increase of studies approaching the concept recently (Basaraba, 2021), scholars are still unclear on how to implement the concept, what terminology to use and how to define it. Few studies have considered the mental health and wellbeing effects of digital placemaking (Najafi et al., 2021, Shankardass et al., 2019; Wright, 2021), or actively considered nature spaces (Edwards et al., 2020; Gulsrud et al., 2018; MacIntyre, 2019). The scarce knowledge in this area led the researcher to explore the concept of digital placemaking, its application to nature spaces

and wellbeing impact. In doing so, the basic four characteristics of the concept emerged from the literature review analysis: community engagement, inclusion, sense of place attachment and hybrid reality – which later will be renamed as hybrid environment. These four characteristics were extended by additional aspects only present in some studies which advances the knowledge of digital placemaking for specific purposes: smart city, co-creation and social media. From this point, the review critically discussed the benefits and challenges for communities (e.g., Chen et al., 2022; Foth, 2017b; Hespanhol, 2022; Y. Li & Alencar, 2022) and the overall positive approach of digital placemaking in literature.

The review then argued the mental health and wellbeing approach to digital placemaking. Despite some evidence on the physical effect of digital placemaking on mental health and wellbeing (Clark & Lupton, 2021; El Khafif et al., 2021), the literature review found a lack of application of specific health indicators and the specific study of the wellbeing impact of digital spaces (MacIntyre et al., 2019; Shankardass et al., 2019). The overall analogue approach to wellbeing of placemaking was found, where Shankardass et al. (2019) called to further explore the wellbeing impact of digital and physical place interactions including geosocial data, health and social planning interventions.

Finally, the review considered the nature space in digital placemaking, where a lack of blue space studies was evident. A general misconception of nature as only green spaces was found in the literature, neglecting the potential of blue spaces supporting community wellbeing. Specifically exploring nature-based solutions and digital placemaking, it was described to benefit climate resilience in cities and to benefit urban design (Boros & Mahmoud, 2021; Gulsrud et al., 2018; MacIntyre, 2019). However, the main approach to digital placemaking and nature was found to be described as a passive context, where a project is developed or partially happens with no specific allusion to how the space is

enhanced using technology or what characteristic is augmented. Scholars discussed the potential benefit of technology and nature in digital placemaking, specifically in smart cities (Grace et al., 2020; Moss et al., 2021).

The updated review described in Chapter 2 Part B confirms the four basic characteristics of digital placemaking as well as the overall lack of application of specific indicators for wellbeing or nature characteristics enhanced through digital placemaking. The updated review demonstrated the growing interest in the concept of digital placemaking and its involvement in nature for wellbeing, confirming Part A findings. The nature misconception of only green spaces was also found in the updated review with only one study presenting a novel approach to shift nature-as-subject in their approach to placemaking. In the study describing the evolution of placemaking by Amirzadeh and Sharifi (2024), the future of the concept was called to emphasize inclusion, technology implementation and the creation of resilient cities. This direction of placemaking is aligned with the presented findings of digital placemaking in nature for wellbeing.

In reporting the results of the systematic literature review, the thematic constructs of digital placemaking in nature for wellbeing were identified for this study: digital placemaking, nature space, green space, blue space, wellbeing, sense of place attachment, hybrid reality/environment, inclusion, community engagement, challenges, benefits, technology and digital media. Thereby, the study was equipped with prior knowledge in this area and was able to research these constructs in digital placemaking practices, which also framed the modified Delphi study through the interview protocol for the semi-structured interviews (round one), and questionnaire creations (round two and three).

The findings of this study supported these thematic constructs and their relevance to digital placemaking, as well as clarity on the areas that needed further research when involving nature and wellbeing and the main basic characteristics of the concept.

Therefore, the first research objective has been met as the relevant literature on digital placemaking, nature and wellbeing has been critically reviewed. This study has provided key information on the concept and its application in nature for wellbeing as well as the identification of gaps in the current literature. The outcome of the Research Objective 1 was fundamental in informing the next Research Objective.

Research Objective 2: To investigate how digital placemaking as a place branding strategy can promote place attachment processes, foster community nature connectedness, and support consumer wellbeing.

Building on Research Objective 1, the constructs and concepts identified framed data collection. Research Objective 2 initiated the study's investigatory phase. Before outlining the study's methodological approach, Chapter 4 presented the research's philosophical perspective. A mixed-method approach to the modified Delphi method was determined to be the most appropriate in the investigation of digital placemaking due to the concept's complexity and interdisciplinary nature. This followed the study's exploratory aim, and the characteristic of forecasting uses in nature for wellbeing. The literature review identified key constructs in the current knowledge informing the Delphi rounds, both qualitative round one through the interview protocol and thematic analysis of the data, and the questionnaire round two and three. Through semi-structured interviews with key informants, rich information was collected relating to the concept of digital placemaking, place attachment and branding, and its use in nature for wellbeing. Thematic analysis was applied to the data to generate insights which then informed rounds two and three of questionnaires to achieve consensus.

The key aspects of digital placemaking definition, characteristics, challenges and measurements, as well as implications for place branding and place attachment, and uses in nature for wellbeing emerged in round one analysis. Then, these initial results were

sent back to the panel of participants as a questionnaire for them to rate their agreement or disagreement with the statements. Due to the volume of items, and following this research method criteria, agreed statements were carried over from round two to the final round three to consolidate consensus on the themes identified. The research proposed a number of dynamics that explain how digital placemaking as a place branding strategy can promote place attachment and community nature connectedness to support consumer wellbeing. The final consensual statements were unique findings in the digital placemaking arena, which provide valuable consensus from experts and expanded experts on applying digital placemaking in nature for wellbeing.

In identifying the constructs which elaborate digital placemaking in nature for wellbeing, the modified Delphi revealed a number of challenges and risks. Through the initial qualitative round of semi-structured interviews, challenges involving each of the themes were identified. In particular, challenges derived from the digital element of digital placemaking emerged as significant factors to risk consumers, such as privacy concerns, technology reliance or disconnection to place. Specific challenges involving assessment methods were also identified due to the complexity of the concept. Findings revealed issues with assessing the impact of digital placemaking such as the absence of an agreed method, lack of funding and time, and economic goals overcoming community goals.

While Research Objective 1 outlined the known components of digital placemaking and initial uses in nature for wellbeing in literature, Research Objective 2 investigated the interconnection among dynamics. This stage of the research identified processes of digital placemaking in nature for wellbeing. The majority of constructs identified in the literature review were confirmed by participants, while additional elements such as the role of social identity were identified through the analysis of findings.

Consequently, the findings of this study presented the results of the investigation of digital placemaking in nature for wellbeing. Research Objective 2 has been accomplished by performing an empirical-based study of digital placemaking in nature for wellbeing. The processes and outcomes revealed by the findings represented the extent to which this objective is achieved. Knowledge in relation to digital placemaking in nature for wellbeing has been provided, addressing the gaps in the current literature identified in Research Objective 1. Thus, the outcomes of Research Objective 2 were vital to the next objective, which aims to provide strategies and solutions to reframe the human-nature disconnection enhancing urban nature experiences.

Research Objective 3: To understand the interconnected dynamics of digital placemaking in nature for wellbeing, generating the core components for the development and test of a conceptual model.

Research Objective 3 aimed to conceptualise the outcomes of Research Objectives 1, and 2 by providing an empirically grounded conceptual framework of the processes and dynamics of digital placemaking in nature for wellbeing. The outcome of Research Objective 3 was to gain a deeper understanding of the dynamics involved in digital placemaking in nature for wellbeing, and how they are interconnected and affect place consumers. Thereby, the study confirmed constructs of digital placemaking in nature for wellbeing identified in the literature, as well as identifying the Social Identity Theory connection with digital placemaking, which is crucial. The study accomplished Research Objective 3 as it produced a conceptual model of digital placemaking in nature for wellbeing (see Chapter 3), which was tested through the modified Delphi method (see Chapter 6). The elements of the model have emerged from the prior literature and refined through the Delphi rounds. Thus, in achieving Research Objective 3, the study has

produced a framework grounded in the constructs of the literature and confirmed by analysis of primary data, collected from expert informants.

This research has advanced knowledge of digital placemaking in nature for wellbeing by offering insights into its application to urban nature spaces supporting wellbeing and the impact of hybrid place experiences beyond the realm of fully immersive technology. Scarce studies have provided models and frameworks on digital placemaking. This study has addressed this gap in the literature by providing an original contribution to knowledge in this area. The model contributed to reframing the human-nature relationship beyond generalised commercial outcomes of place branding strategies to understand hybrid place experiences in nature. Moreover, the study advanced previous scarce frameworks in digital placemaking by addressing their gaps in nature and wellbeing. This study provided insights to practitioners unpacking the dynamics involved in digital placemaking in nature for wellbeing. Finally, the conceptual model presented in this research contributes to the debate about the role of technology in place experiences for consumers, where technology is an enhancer of place experiences while rejecting the replacement of nature through digital media.

The conceptual model presented in Chapter 3 was tested through the modified Delphi method. Out of the four main propositions, only one proposition was not confirmed. However, its sub-proposition was confirmed through the consensual process, presenting how the four propositions of the conceptual model have found confirmation. Proposition P1 demonstrated that digital placemaking can promote social identity as a binding actor enhancing place attachment between the community and the space, facilitating group belonging and social identity among members and with the place. As part of this proposition, proposition P1.a confirmed the promotion of online place attachment in hybrid environments to promote authenticity and differentiation, while proposition P1.b

corroborated the transformative potential of digital placemaking in nature connectedness through place attachment by facilitating a community identification dimension of the concept and pro-environmental behaviours. Proposition P2 referred to place branding and its opportunities through hybrid environments that foster social identity and group belonging both online and offline. Despite proposition P3 not being confirmed, proposition P3.a was demonstrated as per the opportunities for inclusion and accessibility in digital placemaking, which enables excluded or marginalised individuals to connect with the place and with others while employing storytelling as a key strategy. Finally, proposition P4 validated the use of digital placemaking in nature-based place brand experiences for social change and civic pride to support consumer wellbeing, facilitating social belonging and emotional attachment to the place, to the community and to nature. These revised propositions were presented at the end of Chapter 6, with improved details on the Digital Placemaking in Nature for Wellbeing model from the modified Delphi study. The model explained the interconnection among dynamics and their role in nature for wellbeing through digital placemaking.

The accomplishment of Research Objective 3 was a significant contribution to knowledge in the area of digital placemaking, with clear gaps in literature and practice. Specifically, the conceptual model offered scholars a rich understanding of the nuances of digital placemaking in nature for wellbeing, providing stages of implementation as part of the creation of the deliverable for the GoGreenRoutes digital placemaking toolkit (Appendix J), which marketers may adopt in practice. Thus, Research Objective 3 has been met by this study through the conceptual model presented and tested in this research. It was noteworthy that these processes concur with elements of the prior literature. However, no studies to date have produced an overarching framework that combines digital placemaking, place attachment, Social Identity Theory, nature connectedness and place

branding for wellbeing. Specifically, the social identity element was the main innovation and contribution from this study.

Research Objective 4: To provide strategies and solutions to reframe the human-nature disconnection and enhance urban nature experiences.

Research Objective 4 gathered results from the previous objectives to provide strategies and solutions to reframe the human-nature disconnection in cities through digital placemaking, enhancing urban nature experiences. The outcome of Research Objective 4 was to provide practitioners and scholars with a set of strategies and solutions that aim to close the gap in the human-nature relationship in urban environments. In doing so, this study explored a number of opportunities and contexts for the application of digital placemaking in nature for wellbeing through the modified Delphi method, found in both qualitative and quantitative rounds.

The scarce understanding and guidance for nature experience optimisation using technology in cities (e.g., Grace et al., 2020; Moss et al., 2021) and its wellbeing opportunities (Van Houwelingen-Snippe et al., 2021), specifically the gap described in Chapter 2 in digital placemaking literature, is addressed in this study. The contributions described in Chapter 6 as a result from the data collection and analysis position digital placemaking as an information and communication tool that helps communities navigate their natural experience supporting wellbeing. The place branding perspective was found to help repurpose spaces and rebrand experiences to be connected with nature supporting wellbeing. The findings of the study served as a roadmap of uses and strategies whose initial aim was to adapt to each place and community's characteristics, to then advanced single case studies published providing several ways to implement technology in nature-based solutions for nature-connectedness and wellbeing through digital placemaking. This innovation, which informed the European Commission's (Horizon2020) digital

placemaking toolkit for the cultivating cities of GoGreenRoutes (Appendix J), presented the relevance of this research.

This programme of research advanced knowledge in digital placemaking applications in nature for wellbeing, offering guidelines and insights into how to reframe the human-nature disconnection in cities. Addressing the literature gap on digital placemaking in nature for wellbeing, a proposed set of strategies and uses are described in this investigation. Therefore, this research offered an innovative approach to digital placemaking as an augmented nature-based solution tool that advances previous scarce studies with empirical evidence from experts and expanded experts in the field. A set of strategies are described in the research findings, which can be adapted to each place and community's needs in order to optimise the use of digital placemaking promoting place attachment, social identity and nature connectedness to support consumer wellbeing. Technology was presented as a tool and a medium to help enhance the physical nature experience and bring accessibility and inclusion opportunities to all community members, facilitating social cohesion and identity formation.

The achievement of this Research Objective was a significant contribution to knowledge and practice in an area that has been overlooked previously. In this thesis, a rich set of uses and strategies of digital placemaking in nature for wellbeing that extends and refutes previous studies are presented. Therefore, Research Objective 4 has been accomplished, extending the understanding of technology applications in nature for wellbeing and its potential benefits and challenges in reframing the human-nature relationship in cities.

Research Objective 5: To advance assessment methods on digital placemaking in nature for wellbeing

Finally, Research Objective 5 gathered the results from the previous Research Objectives to advance the assessment methods on digital placemaking in nature for wellbeing. The outcome of research objective 5 was to gain a deeper understanding of the assessment challenges and opportunities of digital placemaking, which helps understanding the impact of digital placemaking. In doing so, the study explored several assessment approaches that extend the analysis of digital placemaking experiences through the modified Delphi results. Both the interview stage and final consensus achieved provided a number of possibilities for assessing digital placemaking experiences adapted to the definition of success of each project.

No previous studies have specifically analysed the evaluation of digital placemaking experiences, which was crucial for the assessment impact of the practice and its maturity as a concept. Providing data that supports the claims of the benefits and challenges of digital placemaking will help the concept consolidate its use in nature-based solutions in cities. The findings of this study supported this notion by presenting an array of opportunities for analysing the impact of digital placemaking in general, and specifications for nature and for wellbeing. This original empirical evidence of the value and number of analysis methods for digital placemaking is the first of its kind in evaluating digital placemaking, which is found to be a challenging matter.

Therefore, the study advanced knowledge in digital placemaking evaluation as well as offers insights into assessment methods and analysis techniques beyond the general approach of the concept. As few studies have examined the literature involving digital placemaking, specifically addressing analysis methods. This was addressed providing an original contribution to knowledge in this area. This PhD research offered a fresh perspective on digital placemaking in nature for wellbeing which extends the scarce previous literature from empirically based knowledge.

The achievement of Research Objective 5 was a significant contribution to knowledge in an area which has received little attention in research and practice. Specifically, this study offered scholars and practitioners a rich understanding of the assessment methods and opportunities for digital placemaking in nature for wellbeing, as well as a series of possibilities and options that adapt to the project's needs. Therefore, Research Objective 5 has been met by this study as it has advanced the analysis and assessment methods of digital placemaking in nature for wellbeing.

7.3. Advancements/Contributions to Knowledge

This study has advanced the collective knowledge of digital placemaking and its implications in nature for wellbeing from a place branding perspective. By applying the conceptual model created which employs place attachment theory, Social Identity Theory, place branding and nature connectedness as a theoretical framework guiding the analysis of the data, a number of innovative aspects involved in the dynamics of digital placemaking in nature for wellbeing are identified. No other research has considered the combination of digital placemaking, nature and wellbeing from a place branding viewpoint. Previous literature has explored marketing and tourism approaches to digital placemaking, but none have considered the specific place branding implications for social change and civic pride of digital placemaking and a further understanding of its use in nature for wellbeing. The knowledge around this emergent concept is developing and studies are trying to conceptualise its use to achieve a deeper understanding of its implications (e.g., Amirzadeh & Sharifi, 2024; Basaraba, 2021; Chen et al., 2022). From a place branding perspective, this PhD thesis has responded to the call by Kavaratzis and Florek (2021) to explore the future of place branding addressing its relationship with sustainability, the use of digital means and the refinement of its nature as opposed to tourism branding. Moreover, this research answered de San Eugenio-Vela et al. (2023)

call to update place branding's impact on society due to the environmental challenge in cities. This thesis has extended the participatory place branding arena by proposing the use of digital placemaking to involve community members in fostering belonging feelings with the place and with others. The use of digital placemaking from a place branding perspective in nature for wellbeing acts as an augmented nature-based solution to help create sustainable cities (Mahmoud et al., 2024).

Specific contributions to knowledge have been outlined in Chapter 6. However, the following section summarises these contributions within theoretical, practical and methodological categories.

7.3.1. Theoretical contributions

This study comprised four main themes with their own theoretical contribution. The respective contributions will be discussed from the following four areas: digital placemaking's social identity, place branding, place attachment and nature connectedness. Therefore, these research contributions challenge, confirm and extend existing theories, adding depth to theoretical discussions by revealing hidden mechanisms and relationships that were previously overlooked. Aligned with the critical realism approach to the research, the reality explored is interpreted by the researcher when developing deeper levels of explanation of the phenomenon by identifying lived experiences or beliefs of social actors (Mcevoy & Richards, 2006).

7.3.1.1. Digital placemaking's social identity

Despite recent studies proposing frameworks for understanding digital placemaking implications in cities for communities (e.g., Chen et al., 2022; Hespanhol, 2022), no study has specifically addressed the formation of a social identity that permeates all the dynamics involved in digital placemaking. Social Identity Theory is found in this study

as a binding actor that empowers place attachment processes in digital hybrid environments, specifically enhancing nature connectedness and supporting wellbeing. This theoretical contribution advanced knowledge on digital placemaking, by connecting the community identity formed through digital placemaking as an additional characteristic. The Social Identity Theory dimension found in the research recognises the community dimension and relationships formed in a digital placemaking experience.

Through data collection with experts and expanded experts in digital placemaking, this programme of research offered valuable insight into the processes involved in digital placemaking. The identification of a social identity formed and modified through this concept was a key outcome of the investigation.

Furthermore, Social Identity Theory has been previously connected to health (Haslam et al., 2018), place attachment (Maricchiolo et al., 2021), and branding (Akram et al., 2022; Kuo & Hou, 2017). Other scholars referred to feelings of belonging with a group as psychological benefits from place attachment (Scannell & Gifford, 2017) and group belonging for nature connectedness (Mackay et al., 2021; Mayer et al., 2009). Recent studies mention digital placemaking to help building social identity but referring to analogue ways of fostering social identity (Kotus et al., 2022; Sacramento et al., 2022), or negative effects from digital tools (Törnberg, 2022). However, no investigations to date have produced a framework that combines digital placemaking and Social Identity Theory to affect the dynamics involved in the experience - place attachment, nature connectedness and place branding for wellbeing. The theoretical contribution advances knowledge in terms of an in-depth understanding of belonging processes in digital placemaking, emphasising the significance of social identity development that enhances the dynamics involved in the experience. In addition, a technological dimension of social identity was described in this research, where the hybrid environment affects the creation

and modification of the social identity in place and digitally. Moreover, the consensual contribution to digital placemaking's definition, characteristics, challenges and implications for place attachment, branding, nature and wellbeing, was the first expert agreement on the concept in literature, which advances the theoretical understanding of digital placemaking.

7.3.1.2. Place branding

The place branding literature has briefly addressed digital effects, specifically involving placemaking. Despite calls to rethink the place branding roots, specifically addressing its interdisciplinary nature, multiple stakeholders, and theoretical perspectives (Ashworth et al., 2015), no study has specifically referred to participatory place branding in digital placemaking. Particularly, in this research, place branding is found to connect with several digital placemaking elements that can lead to building different components of the place brand. Answering Ashworth et al. (2015) and Kavaratzis and Florek (2021) call, this research extended the place branding approach of digital placemaking by advancing the understanding of how they enrich each other. Digital placemaking acts as a tool to identify a common sense of place and communicate stories of place in urban nature spaces from a local perspective. Moreover, the iterative process of digital placemaking should be aligned with the iterative process of place branding, which conflicts with current place branding guidelines that describe strict and static processes. This investigation encouraged the understanding of placemaking and place branding as part of the place attachment trifecta (Keegan, 2021), by describing several benefits and communal points in enhancing place attachment through hybrid environments, sharing stories of the place and promoting the formation of a social identity.

The place branding approach found in the research advances previous scarce literature on the value of digital tools in participatory place branding (Hudak, 2019). Digital

placemaking is demonstrated to encourage the involvement and participation of the community in the experience, being crucial in the process. The social dimension of place branding in digital placemaking was an innovative proposal from the research. Previous studies have explored the impact of digital media on culture and identity (e.g., Çöteli, 2019; Pedeliento & Kavaratzis, 2019), which influence identity formation through digital social relationships (Razi & Ziminski, 2022). This research extended the value of place branding for digital placemaking due to its role in helping communities develop their identity and culture, the place brand perception and image. The unique contribution of the place branding approach to digital placemaking also resides in the participatory aspect of place branding that is inherently developed through digital placemaking.

Finally, this research advanced sustainability and place branding by answering Kavaratzis and Florek (2021) and de San Eugenio-Vela et al. (2023) call to rethink the future of place branding involving its relationship with sustainability, climate challenges and digital means. This research found digital placemaking from a place branding perspective to specifically connect with place attachment, nature connectedness and social identity, which supports sustainability goals and community needs. Therefore, this contribution's uniqueness resided in the involvement of sustainability in place branding through digital placemaking, where the community processes and dynamics also have effects on pro-environmental behaviours.

7.3.1.3. Place attachment

The systematic literature review points to the importance of sense of place in digital placemaking. This study has examined the influence of this relationship further in the specific context of digital placemaking. The significance of examining the influence of place attachment processes in digital placemaking experiences offered a unique environment to understanding belonging dynamics and potential impacts for the place

consumer in the media technology landscape. Therefore, this research extended the existing online place attachment knowledge by offering an in-depth understanding of the digital effect of media in place attachment. Moreover, this original finding indicated that community place attachment is fostered in digital placemaking.

The need to advance place attachment theory due to the change in the contemporary digital media landscape and technological context of urban environments was described in this research as a key contribution. Online place attachment has received scarce attention in the literature (e.g., Birnbaum et al., 2021; Huang et al., 2022; Rutha & Abbas, 2021), along with related concepts that combine sense of place and ICT (Dai & Liu, 2024), which has led this research to advance this area in understanding how the theory has evolved due to the change in the digital media context. A new paradigm that affects this change was presented, describing an in-depth understanding of online place attachment in digital placemaking. This brought a theoretically matured body of knowledge into the digital media landscape nowadays. Thereby, this research has addressed a distinct gap in the literature, which lacks references to the current modern technological context in which we interact with our surroundings. This thesis advanced place attachment through online place attachment, modifying the place attachment tripartite in consequence, to further instigate more research on the area.

Moreover, the importance of the community element in place attachment began with the traditional focus on individual processes in place attachment that was described in Chapters 2 and 3. The community basic characteristic of digital placemaking also affected this general individual approach to place attachment, enhancing the community dimension developed in the experiences. These theoretical contributions of this research to place attachment have been identified and investigated empirically within a digital placemaking context to highlight the role and importance of the community dimension in

this process. This research advanced the community dimension in place attachment through a digital technology perspective. The gap of community effects in online place attachment was addressed in the present thesis, found to enhance social aspects and identity formation. Therefore, a social dimension of online place attachment was also promoted and enhanced through this process in digital placemaking, where social identity is strengthened as a consequence. Therefore, another theoretical contribution of this part of the research was to advance the community dimension of place attachment theory in the modern digital era.

7.3.1.4. Nature connectedness

As presented previously, a gap in the nature connectedness literature when addressing technology and the community dimension has been addressed in the present research. An innovative approach to nature connectedness was found through the modified Delphi study in digital placemaking.

Previous studies on nature connectedness and technology have focused their explorations on immersive experiences (e.g., Litleskare et al., 2022), discussing the binary relationship between technology and nature (e.g., Kesebir & Kesebir, 2017). Prior works on less immersive technologies and their effect on fostering a connection to nature (e.g., Livingston, 2022), were extended by presenting digital placemaking as a concept that includes a variety of levels of immersion and focuses on hybrid environments, where the physical anchor is crucial for the digital layer (Costa et al., 2024). This digital dimension of nature connectedness was advanced in this research by empirically testing how it can foster a connection to nature, belonging to the place and emotional feelings that can lead to pro-environmental behaviours.

Similarly to place attachment, not only the online dimension of the theory was extended in this thesis, but the community aspect of nature connectedness was advanced through the modified Delphi method. The importance of the community approach in nature connectedness was found to develop social identity processes, advancing studies that have focused on a self and individual understanding of identity development with nature (e.g., Clayton & Opatow, 2003). This thesis added to and advances the literature on the collective approach to nature connectedness (Lengieza & Aviste, 2024; Mackay et al., 2021), by proposing a social identity lens to the construct, where the relationship between humans and nature was understood from a community level and not only from an individual self-conception level. This study found that group membership feelings between humans and other living creatures, as well as other humans in nature space, can be enhanced by the implementation of hybrid environments that combine technology and physical place experiences. All living actors in the place play a crucial role in the development of nature connectedness and social identity processes. Therefore, digital placemaking can promote nature connectedness to a community hybrid environment dimension to also support wellbeing.

7.3.2. Practical contributions

Alluding to practice benefits from this research, two main elements can be differentiated. The conceptual model created and tested through this investigation provides a foundation for strategy and analysis development of digital placemaking experiences in nature for wellbeing. Moreover, this research informed the creation of the Digital Placemaking Toolkit for All Cultivating Cities in the GoGreenRoutes project. Therefore, these research practical contributions change and inform practice by the deeper understanding of reality that is uncovered in this investigation. Aligned to critical realism, the practical

implications of this research are flexible and adaptable to the different contexts in which digital placemaking can be implemented.

7.3.2.1. Conceptual Model

The conceptual model created in this programme of research is valuable for practitioners. The digital placemaking in nature for wellbeing model modified the place attachment tripartite by Scannell and Gifford (2010a). The modified model included place branding, Social Identity Theory, nature connectedness and online place attachment. The three dimensions – community, hybrid place and psychological process – are interconnected to unpack how digital placemaking experiences in nature can support consumer wellbeing. The model described dimensions and elements to consider when designing a digital placemaking experience in nature to support wellbeing. It also provided the foundation for digital placemaking in nature and wellbeing, as well as advice on how to influence place branding and digital placemaking for cities.

The model will be useful to practitioners, students and academics as it highlights the different interconnections in digital placemaking and the importance of technology-mediated experiences in fostering place attachment, nature connectedness, social identity and place branding. By offering a conceptual model in the matter, guidance on the key dynamics in a digital placemaking experience in nature for wellbeing is described. Specifically, the model was tested through a modified Delphi method to provide a revisited conceptual model in Chapter 6, which integrated theoretical constructs with empirical data to give practitioners a framework for use in their daily work that is supported by research.

This study presented digital placemaking for nature to support wellbeing as a positive nature-based solution and strategy to implement in cities and urban environments.

However, this study also identified several challenges and risks related to digital placemaking from a place branding perspective. Some overarching challenges were described in the literature regarding digital placemaking (e.g., Chen et al., 2022; Foth, 2017b; Y. Li & Alencar, 2022). However, this investigation provided specific risks and details on the challenges of digital placemaking in nature for wellbeing, as practical complications that practitioners and decision-makers will face. In particular, challenges regarding digital placemaking characteristics when involving nature were described in Chapter 5. The identification of challenges when creating a digital placemaking experience in nature for wellbeing assists practice knowledge as well as outlines the benefits of the co-creation of the experience.

Participants shared their own experiences when developing placemaking, place branding and digital placemaking projects in specific locations, describing useful strategies for engaging with communities and creating meaningful experiences for consumers. They also pointed out how digital placemaking can bridge the gap when locating and finding information on nature spaces in the city, along with multiple other uses such as educational purposes. The potential of digital placemaking in nature for wellbeing has not been fully addressed in the literature, with scholars exploring sustainable and green placemaking (Amirzadeh & Sharifi, 2024; Gulsrud et al., 2018) or healthy placemaking (Ng, 2016). However, this study extended their work by advancing digital placemaking into its use in nature for wellbeing, studying the interconnections among technology, nature and health in place. In particular, participants have commented upon the lack of guidelines for both digital placemaking in nature and place branding, which impacts nature-based solutions that try to implement digital mediums and technology for community engagement. Despite the existence of placemaking frameworks in literature and guidelines by organisations such as Project for Public Space (<https://www.pps.org/>),

no specific digital placemaking framework involving nature and wellbeing exists. Furthermore, this study outlined the potential of interdisciplinary approaches to digital placemaking, where the different spheres of the conceptual model are interconnected and complement each other, clarifying their relationships and unpacking dynamics. This is crucial in the development of practical projects that include digital placemaking as these projects need to be interdisciplinary where the professionals act as facilitators with the community. Participants mentioned the importance of working for and with the community when addressing digital placemaking from a place branding approach.

The conceptual model also provided a guide of action for decision-making and problem-solving in digital placemaking in nature for wellbeing. It helps place branding, place marketers, place managers and placemaking practitioners to understand the complexity of the place and the community. It also helps identify the key dimensions to develop and the relationships among them to help predict outcomes. Thus, it facilitates informed and effective actions when developing digital placemaking in nature for wellbeing in a city.

The Social Identity Theory perspective included in the model was an innovative and improved perspective that can lead to innovation and enhancements in practice. The new insights relating to identity formation and creation with others, with place and with nature can enhance efficiency, effectiveness and support wellbeing outcomes. This new perspective was a key finding of the investigation that is crucial for practice. The place branding perspective on digital placemaking also relates to the formation and modification of the social identity of the group and the place, its perception and image, to ensure belonging feelings are fostered.

Finally, the framework offered insights into the evaluation and analysis of the digital placemaking experience, which is found to be scarce in the current literature. The structured conceptual model helps evaluate and assess the impact of the digital

placemaking experience and to identify areas of improvement. Therefore, it can be used by practitioners to assess their actions and align with the best practices suggested, evaluating the impact of the intervention. In order to analyse the impact of the digital placemaking experience, a thorough understanding of the dynamics involved is crucial to deciding the assessment method and analysis tools that are most accurate to the project. This study provides practitioners with an understanding of what elements needed to be analysed to comprehend the effects of digital placemaking in nature for wellbeing.

This study has generated insights into modern manifestations of digital placemaking in nature for wellbeing. Addressing the digital media landscape, the community-driven experience in digital placemaking appears to be crucial when developing the experience and strategies around it, as well as for evaluation purposes. The practical relevance of these findings suggests digital placemaking in nature for wellbeing has the potential to improve community engagement and relationships with others, with the place and with nature, supporting consumer wellbeing.

7.3.2.2. *GoGreenRoutes toolkit*

As part of the GoGreenRoutes project that has funded this PhD research, a Digital Placemaking Toolkit for All Cultivating Cities has been developed. This was part of deliverable 6.3 of the project, and the document has been reviewed by the European Commission and published on the GoGreenRoutes website (Appendix J). The toolkit was designed to address the specific challenges of digital placemaking in nature for wellbeing in each of the cultivating cities of the project – Burgas, Bulgaria; Umeå, Sweden; Versailles, France; Lahti, Finland; Limerick, Ireland; Tallinn, Estonia. It was also created to enhance the efficiency and effectiveness of practitioners within the field.

The toolkit is formed by three main sections: digital placemaking, marketing plan, and cultivating cities. The digital placemaking section introduces the concept with information from the systematic review published (Chapter 2) and a thorough explanation of technologies and examples. The digital placemaking in nature for wellbeing model is briefly introduced to then describe a unique set of three steps to apply the conceptual model into a guided instruction. The steps are adapted from Zenker and Erfgen's (2014) participatory place branding model, informed by the modification of the place attachment tripartite (Chapter 3) and Hespanhol's guidelines for augmented placemaking (2022). Moreover, the steps include tips and how-to sections to ensure the model is clear and easy to follow for practitioners. Finally, examples, benefits and challenges are also included in this section.

Following the digital placemaking section, a marketing plan section is also outlined with best practice principles, contextual marketing, and evaluation and monitoring to help users apply a communication and marketing model and to assist them in evaluating the experience.

Finally, each cultivating city is presented with their own toolkit, adapting the model and proposed digital placemaking in nature for wellbeing activities to the city, community needs and GoGreenRoutes intervention. Due to the project timeline and city capacity, the toolkit has been presented to the city and made available for them to implement once the project finishes.

The Digital Placemaking Toolkit for All Cultivating Cities of the project is an example of how the research has informed practical guidelines, adapted to each of the city's needs and peculiarities, translating the research and investigation into a clear and easy-to-understand toolkit with steps, tips and how to sections, full of examples. The investigation that informed the toolkit answers the call by Amirzadeh and Sharifi (2024) on advancing

research on sustainable placemaking and the creation of guidelines. This is the first toolkit on digital placemaking in nature for wellbeing published. By addressing real-world challenges, the toolkit provides actionable solutions that can drive long-term improvement in communities.

The toolkit aims to support and inform decision-making as it provides practitioners with clear guidelines and facilitates better strategy planning. It also helps foster knowledge sharing and collaboration among stakeholders due to its participatory place branding perspective. The collaborative approach leads to the creation of a cohesive community of practice and enhanced collective engagement and problem-solving.

Despite describing specific steps for implementing digital placemaking in nature for wellbeing, the toolkit aims to be a flexible tool and guide for cities and practitioners. The steps act as reflective points to ensure the experience is created with and for the community, promoting place attachment, nature connectedness, place branding and social identity. The evidence-based practice emphasised by the toolkit is crucial to enhance its credibility and reliability.

7.3.3. Methodological

This PhD research conducted a modification of the Delphi technique with academics and industry experts in digital placemaking, nature and wellbeing. Two significant aspects of the study are relevant for further researchers, which refer to the two modifications of the Delphi method. First, the participants of the study included placemaking practitioners and industry experts with vast experience in placemaking projects and projects that combine community engagement, nature, health, branding and/or technology – defined as expanded experts – as well as experts in digital placemaking, which included both academics and practitioners in the field. Therefore, this type of participant was most

suitable for studies of digital placemaking practices. The second modification of the Delphi method resided in the combination of a first qualitative round using semi-structured interviews with two rounds of quantitative questionnaires. This mixed-method approach was particularly useful for generating rich insights during the interview that are then subject to an interactive quantitative process through questionnaires.

7.3.3.1. Experts and Expanded Experts

Combining academics who have been researching and applying digital placemaking as a concept with experts in practice was a crucial and valuable approach to satisfying the aims and objectives of the research. Due to the interdisciplinary nature of the concept and the diverse nomenclature and the different approaches found in the literature (see Chapter 2), it was important to ensure they were addressed in the present research. Furthermore, no prior study has gathered a group of experts and practitioners in digital placemaking. Thus, this investigation examined academic and practitioner interpretation of digital placemaking in nature for wellbeing by exploring the definition, characteristics, uses and applications of the concept in said context. By including expanded experts in the sample, rich insights were collected which illustrated the application and uses of digital placemaking as well as interdisciplinary perspectives on the success and experiences of digital placemaking. Therefore, by exploring the concept of digital placemaking and its use in nature for wellbeing from both academic and practitioner perspectives, a better understanding of the mechanisms and nuances of the concept was provided. The exploration of the concept of combining academics and practitioners had revealed a number of strategies, characteristics and approaches that are new and unknown, such as the role of social identity in digital placemaking or the different uses in nature for wellbeing. Lastly, the inclusion of interdisciplinary participants in the exploratory study

provided generous descriptions of the processes, dynamics and outcomes of digital placemaking in nature for wellbeing, which is a valued contribution to future researchers.

7.3.3.2. Mixed-Methods Modification of the Delphi technique

The second modification of the Delphi method included an initial qualitative round that has demonstrated to be a valuable and rewarding step in this method due to the rich insights gathered. The characteristic of the first round as qualitative was relevant for conceptualising the processes associated with digital placemaking in nature for wellbeing with the proposed conceptual model. By exploring their own experience in digital placemaking and related areas through semi-structured interviews, participants provided a richer description of the topics discussed and raised other areas that would have not been approached in other methods. This modification of the method was particularly appropriate for the exploration of the concept and the interdisciplinary nature of digital placemaking. The semi-structured interviews allowed participants to explore their experiences and knowledge of the concept, raise crucial aspects for them and discuss other areas that they found relevant. This qualitative round supported flexible conversations with participants, which is valuable for encouraging richer discussion. Moreover, the qualitative approach to the first round of the study allowed processes and dynamics to be unpacked while interacting with the sample. This also supported contributions to the theoretical field.

7.4. Limitations of the study

The exploratory nature of this research also suggests a number of limitations that should be addressed, such as sample, methodology or time constraints.

The Delphi method relies on the expertise of participants. While efforts were made to include a diverse range of experts and expanded experts, the sample may not fully

represent all perspectives within digital placemaking. Despite achieving a mostly even division of experts and expanded experts, the sample size may limit the generalisability of the findings. Selection bias could be considered another limitation of the study. During the recruitment process, experts and expanded experts were chosen based on specific criteria. The perspective of users and other stakeholders is absent within the views expressed. Moreover, the selection criteria may have excluded relevant points, which can also influence the outcomes of the study. Inherent biases were observed from the participants and their field of expertise. The researcher was aware of such biases as well as the absence of the user perspective. However, the Delphi method has been used previously in placemaking studies with promising results (e.g., Buckley et al., 2017; Kumar & Nigam, 2023; Lak & Zarezadeh Kheibari, 2020). Further studies would benefit from including users and other important stakeholders whose perspectives are relevant to the research phenomenon.

The study had no geographical limitations, with participants from countries around the globe. This also helped overcome geographical biases of focusing on one specific country or region. The interdisciplinary nature of digital placemaking and the participant sample is found as a limitation in achieving consensus. Due to the variety of backgrounds within the participant panel and the different terminologies of the concept, the diversity of opinions can sometimes lead to difficulty in reaching a clear consensus. The interdisciplinary nature of the research can often lead to communication barriers which can influence the interpretation and integration of expert feedback. This was identified during the interview process and also during the first round of questionnaires. In order to overcome this limit, options to select N/A in the second questionnaire were included in the third round, and free-form comments box to express their thoughts were included in both rounds. In the third round, almost no comments regarding communication barriers

were collected. The reliance on expert opinion while valuable can be subjective. Expert perspectives are influenced by their own experiences and orientations, which may affect the objectivity of the study. To overcome this limit, expanded experts in related fields were included to broaden the perspectives and reality of the emergent concept of digital placemaking.

The method used to collect data poses its own limitations. Different sets of biases need to be solved by the researchers for the accuracy of the Delphi method, including final biased consensus, socially induced bias and researcher bias (Grime & Wright, 2016). To overcome these limits, information exchange was facilitated while anonymity in the process was crucial. Using standardised grading responses was also important, as well as the standardisation of the survey measures that reduce potential bias. Another limitation of this modification of the Delphi resides in dropout rates during the Delphi rounds and interview saturation, which was considered as a stopping criterion.

The modification of the Delphi method was included to suit the exploratory nature of the research. The adaptations were necessary to address the research aim and objectives but also introduce limitations related to the validity and reliability of the modified approach. However, the changes made to the method have been used in previous studies through the initial qualitative round (Avella, 2016; Hasson et al., 2000; Singh et al., 2022) and the inclusion of expanded experts (Ketwaroo et al., 2019).

The rich data collected and analysed in the first Delphi round was reduced and collated in the first questionnaire in round two. The simplification of qualitative data into questionnaire items presented another limitation of the study. Moreover, only agreed items were carried over round three which is also identified as a limitation of the study. Requiring multiple rounds of feedback and analysis can lead to participant fatigue, which may lead to lower response rates or less thoughtful contributions in later rounds. This

affects the quality and depth of the data collected. Therefore, due to item volume and to guarantee the questionnaire could be completed in less than 15 minutes to ensure participation rates were pertinent, data from round one had to be condensed. This may have resulted in losing nuances and details that were still relevant for the study. Similarly, only carrying over agreed items allowed to reduce questionnaire completion time which benefited the participant rate but also limited the study.

Another limit referred to the time constraints of the study. The study was conducted within a specific timeframe, that also occurred during holiday periods. This may have affected the exploratory study regarding sample availability and also the emergence of the concept studied. Emergent concepts evolve over time and the temporal constraints of a study could have affected the capture of the shifts and continuous evolution of digital placemaking. A longitudinal study may have been appropriate considering the rapidly changing nature of digital placemaking.

While these limitations present challenges to this research, they also provided avenues for future research. Addressing these limitations in subsequent studies can enhance the robustness and applicability of the findings, contributing to a more comprehensive understanding of digital placemaking in nature for wellbeing.

7.5. Areas for Further Research

This study addressed research gaps within the literature on digital placemaking, place branding and nature-based solutions. However, despite the range of findings presented and the richness of the insights analysed, several research gaps remain, most notably the analysis of a real case study where place attachment, nature connectedness, social identity and place branding elements can be assessed.

There is convincing evidence that digital placemaking in nature can promote place attachment, community nature connectedness, social identity and place branding, resulting in supporting consumer wellbeing. However, there is limited research assessing the impact of digital placemaking in nature for wellbeing in a case study. The findings from this research are of relevance in setting the initial parameters and mechanisms in digital placemaking in nature for wellbeing. This exploratory study deepened the understanding of the concept of digital placemaking in nature for wellbeing by gathering opinions and experiences from experts and expanding experts in the field. Findings refined the conceptual model that aimed to predict and explore the dynamics involved in digital placemaking in nature for wellbeing. The components derived from this research provided a starting point and structure. However, these results have not been applied in a real-life scenario with place consumers. Therefore, future studies should apply the digital placemaking in nature for wellbeing model and toolkit to a case study where user impact and effects regarding place attachment, nature connectedness, social identity and place branding can be assessed. A case study can further advance the concept of digital placemaking in nature for wellbeing by analysing the impact on place consumers and deepening the understanding of the benefits and challenges of this practice. Further studies should consider the effect and impact on consumers and other stakeholders. Moreover, the practical uses of digital placemaking in nature for wellbeing can also be tested in a real-life scenario for impact assessment with place consumers. To suggest a question, what are the effects of digital placemaking on nature and wellbeing of consumers?

Alluding to the key finding of this study, further understanding of the Social Identity Theory approach to digital placemaking will benefit further research. In this study, Social Identity Theory is found to act as the binding agent among dynamics in digital

placemaking in nature for wellbeing. Its use in other scenarios beyond nature spaces should be considered. The role of social identity in place attachment, nature connectedness and place branding are an area of study that would benefit from further reflection and investigation.

This research provides evidence of the variety of assessment approaches, and their challenges, in digital placemaking. The study explores the wellbeing impact of digital placemaking. However, further assessment opportunities and tests in projects of the most accurate analysis tool should be considered in future research. This investigation's results on assessment tools in digital placemaking are the first attempt to explore analysis and evaluation in digital placemaking in literature. Other approaches and perspectives in analysing digital placemaking experiences would benefit the broader understanding of digital placemaking's impact on consumers and places.

In order to achieve high-quality research, future digital placemaking studies must consider the challenges and drawbacks of the experience. A thorough understanding of the risks and challenges of digital placemaking will help minimise their impact on consumers and on the place in a case study. Previous studies have mentioned different challenges according to the type and aim of the project. This investigation provides a set of challenges and a final consensual list. However, a careful understanding of all risks involved in digital placemaking for consumers and for the place in a real-life project is essential to advance the knowledge of the concept. Interdisciplinary approaches to the challenges should be considered.

This study has advanced the consolidation of digital placemaking as a concept, providing deep information about its maturity state, basic characteristics and extended characteristics. The ethical considerations of placemaking have been previously explored, with recent calls to rethink and assess the ethical considerations in placemaking

(Amirzadeh & Sharifi, 2024; Gonsalves et al., 2023; Hespanhol, 2022; Klein, 2022; Najafi & Mohammadi, 2024). However, role of ethics in digital placemaking is an area for future research that will help the concept finally achieve a mature state.

The third proposition of the conceptual model presented in this study was not confirmed in the final Delphi round. Despite results describing the value of place branding for digital placemaking, the participatory place branding perspective of the concept did not achieve consensus. Further research on participatory place branding and digital placemaking will benefit the place branding perspective of the concept by focusing on the community engagement characteristic and the involvement of locals. Participatory place branding has employed strategies that are found in this study as essential in digital placemaking such as storytelling. Therefore, future research should be considered.

The value and active approach to nature in digital placemaking was one of the key findings of this study. Nature should be considered another valuable element in digital placemaking, and ensure the project enhances the nature experience using digital media. Actively analysing the natural space and how it is enhanced through digital was a key element in the results of this investigation. However, nature has been mostly focused in the literature on green spaces, with almost no references to blue spaces where digital placemaking has been developed. Future research should consider the implementation of digital placemaking in blue spaces such as riversides or seashores, among others, and the impact of these spaces on the overall experience and wellbeing of consumers. Future studies should explore a shift from a passive element to an active and nature-as-subject approach (Boros et al., 2024).

Study on specific groups that would benefit from digital placemaking should also be an area for future research. There have been studies exploring immersive digital nature in confined environments (Van Houwelingen-Snippe et al., 2021), or among the elderly

(Van Houwelingen-Snippe et al., 2021). Since this research was an exploratory study, the focus was on exploring the concept and its complexity for a general audience of local place consumers of a space. However, further investigation on specific community groups such as hospital patients, children or mobility-restricted individuals would benefit from less immersive digital nature experiences through digital placemaking. These further explorations will help refine the concept and advance its use in cities. Researchers may collaborate with community organisations and stakeholders to ensure these groups are driving the development of the experience, gaining insights into the needs and preferences of the target demographic, and tailoring the intervention.

7.6. Researchers' Reflection

The author of this thesis has learnt a great deal from the PhD process. This thesis illustrates the researcher's understanding of digital placemaking in nature for wellbeing through the themes of the study. In performing this study, the author appreciates the importance of digital placemaking and place branding as concepts to enhance urban nature experiences that can support consumer wellbeing. The definitions and conceptual models display the researcher's understanding of the themes of the study.

Regarding the conduction of the study, the researcher has benefitted greatly from the experience. First, the initial research question, aims and objectives have been subject to a refinement process to ensure feasibility. Considering the fast pace of digital placemaking, the study had to refocus the aims to encapsulate the influence of newer perspectives and studies. Therefore, one of the most important lessons from this process is to remain flexible in research and to focus on the end goal.

The second reflection resides in adaptability and resilience. During the modified Delphi process, the combination of the two modifications of the method was crucial to fully

achieve the research aim and objectives as well as to find a method that would fit best these requirements. It was important, as an exploratory study, to develop an initial qualitative round to gather meaningful and rich insights on the topic and then refine them through the questionnaire rounds. Therefore, another lesson from this study was to remain adaptable and resilient to evaluate the most appropriate method for the type of investigation.

The third lesson refers to the publishing process. Urged by the project that funded my research, submitting my work to scientific journals and conferences during the process of the PhD was a fantastic exercise that helped me shape the direction of my study and my communication skills. Specifically, I have become familiar with the peer review process of journals and responding to reviewers' comments. The peer review process has been very important and helpful in sharpening the research arguments and considering other perspectives. It is also important to mention the rejections received from journals during this process, which also served as a valuable lesson in resilience. Understanding rejection reasons and analysing journals to choose the most pertinent has been a very helpful exercise for my academic and personal growth. My communication skills have been refined during this process of presenting at international conferences and meetings. Being part of an international research project from the European Commission has provided valuable opportunities for disseminating my work, meeting other scholars and experts, and building collaborations. It has also helped me improve my own communication of the research, refining my arguments and contributions.

Patience can be identified as the fourth lesson from this study. Specifically, I learnt that the PhD is a marathon and so I had to remind myself to be patient and to ration my energies and efforts. The PhD process can be overwhelming, specifically when being part of a European Commission project that also requires other activities from you. Despite

the obstacles I have encountered during this process, I have learnt to be patient with others, with my journey and with myself.

Finally, one of the most important lessons from this process has been confidence in my skills. As a young scholar and a woman, imposter syndrome is a familiar state that tends to overwhelm me and boycott my opportunities. The PhD process has helped me gain confidence and trust in my skills. I hope to carry this through to future projects.

7.7. Summary of Chapter

This research, while limited in its context and exploration of digital placemaking in nature for wellbeing with experts and expanded experts, provided critical insights into the use of hybrid place brand experiences in nature supporting consumer wellbeing, but also broader evidence of how digital placemaking embraces contemporary challenges in urban environments involving communities and nature spaces. The impact of this investigation contributes beyond the marketing field but broadens the understanding of the complex phenomena of human-nature-technology relationship through a critical realist perspective. The findings from this research revealed the theoretical and practical contributions of digital placemaking in nature for wellbeing, demonstrating how the independent reality outside of the researcher's knowledge is mediated by their understanding of it, affected by social and cognitive processes.

Overall, this programme of research provides the first detailed exploration of digital placemaking in nature for wellbeing. Key findings refer to the role of social identity in digital placemaking as a binding actor among dynamics, the enhancement of place branding through inclusion and accessibility and the promotion of wellbeing by bridging the urban nature disconnection and providing the first consensual definition of the concept. Building on this work, researchers could expand the conceptual model proposed

across diverse urban contexts, developing longitudinal studies on digital placemaking in nature for wellbeing and advancing knowledge on challenges, risks and assessment methods of digital placemaking. The results of this thesis could be applied to place branding, community engagement and participatory design, place management practices and urban planning and policy development.

The place branding perspective described in this programme of research enhances the development of a social identity in the community, which strengthens the creation of place attachment and nature connectedness processes in the digital placemaking experience. Specifically, the research found the Social Identity Theory to act as a binding agent that interconnects the different dynamics involved in the presented conceptual model, ultimately improving the wellbeing of place consumers. From the systematic literature review developed in Chapter 2, a conceptual model was presented to understand how the different dynamics involved in digital placemaking in nature can benefit the wellbeing of the consumers (Chapter 3). The systematic literature review not only served to synthesize the current contributions of scholars to the digital placemaking interdisciplinary research streams but also provided a roadmap for future research in this rapidly growing field, which presented the achievement of Research Objective 1.

Due to the peculiarities found in the review and the several gaps in defining and understanding the complexity of digital placemaking, a modified Delphi was the chosen method to explore the concept of digital placemaking in nature for wellbeing and test the model developed, achieving Research Objective 2. The modifications included in this Delphi method resided in the use of an initial qualitative round to gather insights into the use of digital placemaking in nature for wellbeing, and the inclusion of expanded experts as well as experts in digital placemaking. The initial qualitative round allowed an in the depth of knowledge gained on the concept and its complexity, as well as a deeper

understanding of the phenomenon. Experts in digital placemaking were catalogued as specialists in digital placemaking who have published on the topic or have spent years working in the field holding a position in an institution or programme. Expanded experts were specialists in related fields to digital placemaking in nature for wellbeing, including placemaking practitioners, technology, and public spaces scholars, among others. This second category helped overcome the homogenous profile of the digital placemaking expert and included practitioners and experts in related fields who have been implementing digital placemaking without acknowledging it. A total of twenty-six participants were part of the first qualitative round of the study, with two quantitative rounds of questionnaires to gain consensus on the research topic.

The results from this research met Research Objective 3 in the validation of the conceptual model presented in Chapter 3, which was adapted and empirically improved in Chapter 6. The conceptual model propositions were confirmed from the modified Delphi results (Chapter 5), where Social Identity Theory was found to act as a binding agent among the different dynamics involved, including place attachment, place branding and nature connectedness; the value of a place branding perspective in digital placemaking to consciously co-create a brand image, identity and perception with the place community; the inclusion and accessibility value of digital placemaking; and the role of digital placemaking in nature for wellbeing. Moreover, this programme of research developed a number of sub-thematic contributions from the research findings that resided in the maturity of the concept of digital placemaking through the first consensual definition, extended characteristics and assessment challenges, and the practical uses of digital placemaking in nature for wellbeing. Therefore, Research Objective 4 was accomplished as strategies and solutions to reframe the human-nature disconnection in

cities through digital placemaking and Research Objective 5 in the advancement of the assessment methods of digital placemaking described in Chapter 5.

Finally, the chapter then revisits the contribution to knowledge in terms of theory, practice and methodology. Limitations of the study are provided as well as topics for future research. Lastly, the researcher reflects upon the study to complete the chapter.

References

- Abdel-Aziz, A. A., Abdel-Salam, H., & El-Sayad, Z. (2016). The role of ICTs in creating the new social public place of the digital era. *Alexandria Engineering Journal*, 55(1), 487–493. <https://doi.org/10.1016/j.aej.2015.12.019>
- Abell, A., & Biswas, D. (2023). Digital Engagement on Social Media: How Food Image Content Influences Social Media and Influencer Marketing Outcomes. *Journal of Interactive Marketing*, 58(1), 1–15. <https://doi.org/10.1177/10949968221128556>
- Adams, W. C. (2015). Conducting Semi-Structured Interviews. In *Handbook of Practical Program Evaluation: Fourth Edition* (pp. 492–505). Wiley Blackwell. <https://doi.org/10.1002/9781119171386.ch19>
- Addas, A. (2023). Influence of Urban Green Spaces on Quality of Life and Health with Smart City Design. *Land*, 12(5). <https://doi.org/10.3390/land12050960>
- Agyekum, B., & Newbold, K. B. (2019). Sense of place and mental wellness amongst African immigrants in Canada. *Journal of Urbanism*, 12(2), 188–202. <https://doi.org/10.1080/17549175.2018.1552885>
- Aitken, R., & Campelo, A. (2011). The four rs of place branding. *Journal of Marketing Management*, 27(9–10), 913–933. <https://doi.org/10.1080/0267257X.2011.560718>
- Akram, M. S., Malhotra, N., Goraya, M. A. S., Shareef, M. A., Malik, A., & Lal, B. (2022). User engagement on global social networks: Examining the roles of perceived brand globalness, identification and global identity. *Technological Forecasting and Social Change*, 181. <https://doi.org/10.1016/j.techfore.2022.121771>
- Al-Mamun, A., Dharmasiri, D., Nadarajan, S., Hatta, Z. A., & Miah, M. S. (2024). Ethical Foundations and Axiological Frameworks in Social Work: Enhancing Community Welfare. In *Reviving and Re-Writing Ethics in Social Research For Commoning the Community* (pp. 33–53). IGI Global.
- Almqvist, A., Hedman, A., Clear, A. K., & Comber, R. (2023, April 19). Different Together: Design for Radical Placemaking. *Conference on Human Factors in Computing Systems - Proceedings*. <https://doi.org/10.1145/3544548.3581080>
- Alvarez, L., Borsi, K., & Rodrigues, L. (2017). The role of social network analysis on participation and placemaking. *Sustainable Cities and Society*, 28, 118–126. <https://doi.org/10.1016/j.scs.2016.06.017>
- Amirzadeh, M., & Sharifi, A. (2024). The evolutionary path of place making: From late twentieth century to post-pandemic cities. *Land Use Policy*, 141. <https://doi.org/10.1016/j.landusepol.2024.107124>
- Antonić, B., Dimelli, D., Rotondo, F., Delgado Jiménez, A., & Economou, A. (2023). Placemaking within Urban Planning: Open Public Space between Regulations, Design and Digitalization. In C. Smaniotto Costa, M. Fathi, & J. García- Esparza (Eds.), *Placemaking in Practice. Experiences and Approaches from a Pan-European Perspective* (Vol. 1, p. 99). BRILL. Leiden.
- Aronczyk, M. (2013). *Branding the nation: The global business of national identity*. Oxford University Press.
- Aronczyk, M. (2020). Brands and the Pandemic: A Cautionary Tale. *Social Media and Society*, 6(3). <https://doi.org/10.1177/2056305120948236>
- Aronczyk, M., & Espinoza, M. I. (2021). *A strategic nature: Public relations and the politics of American environmentalism*. Oxford University Press.

- Ashworth, G. J., Kavaratzis, M., & Warnaby, G. (2015). The need to rethink place branding. In *Rethinking Place Branding: Comprehensive Brand Development for Cities and Regions* (pp. 1–11). Springer International Publishing. https://doi.org/10.1007/978-3-319-12424-7_1
- Atteneder, H., & Lohmeier, C. (2024). Digital placemaking and its discontents: Exploring practices, power relations, and socio-spatial dynamics in Salzburg's 'Andräviertel'. *Convergence*. <https://doi.org/10.1177/13548565241274749>
- Avella, J. R. (2016). Delphi panels: Research design, procedures, advantages, and challenges. *International Journal of Doctoral Studies*, 11, 305–321. <http://www.informingscience.org/Publications/3561>
- Balsas, C. (2021). From Place-Marketing to Place-Making, Examining Boston's Case of Global Transformation. *Local Development & Society*, 1–21. <https://doi.org/10.1080/26883597.2021.1930575>
- Bansard, J. (2022, April 28). *Pathways to sustainable cities*. International Institute for Sustainable Development. Retrieved October 29, 2024, from <https://www.iisd.org/articles/deep-dive/pathways-sustainable-cities>
- Barragan-Jason, G., Cauchoux, M., Diaz-Valencia, P. A., Syssau-Vaccarella, A., Hemet, S., Cardozo, C., Skevington, S. M., Heeb, P., & Parmesan, C. (2024). Human–nature connectedness and sustainability across lifetimes: A comparative cross-sectional study in France and Colombia. *People and Nature*. <https://doi.org/10.1002/pan3.10749>
- Bartoli, C., Nosi, C., Mattiacci, A., & Bertuccioli, F. (2023). Consumer–brand relationship in the phygital age: a study of luxury fashion. *Italian Journal of Marketing*, 2023(4), 429–450. <https://doi.org/10.1007/s43039-023-00081-4>
- Basaraba, N. (2021). The emergence of creative and digital place-making: A scoping review across disciplines. In *New Media and Society*. SAGE Publications Ltd. <https://doi.org/10.1177/14614448211044942>
- Bashan, D., Colléony, A., & Shwartz, A. (2021). Urban versus rural? The effects of residential status on species identification skills and connection to nature. *People and Nature*, 3(2), 347–358. <https://doi.org/10.1002/pan3.10176>
- Basu, M., Hashimoto, S., & Dasgupta, R. (2020). The mediating role of place attachment between nature connectedness and human well-being: perspectives from Japan. *Sustainability Science*, 15(3), 849–862. <https://doi.org/10.1007/s11625-019-00765-x>
- Bazeley, P. (2009). Analysing qualitative data: More than 'identifying themes'. *THE MALAYSIAN JOURNAL OF QUALITATIVE RESEARCH*, 2. <https://www.researchgate.net/publication/237458922>
- Beam, J., Nawari, N. O., & Tilson, B. (2018). Mental Health & Resiliency: Designing Participatory Nature Dependent Environments and Communities for a Sustainable Future. *Journal of Sustainable Development*, 11(3), 234. <https://doi.org/10.5539/jsd.v11n3p234>
- Bedford, L., Mann, M., Foth, M., & Walters, R. (2022). A Post-Capitalocentric Critique of Digital Technology and Environmental Harm: New Directions at the Intersection of Digital and Green Criminology. *International Journal for Crime, Justice and Social Democracy*, 11(1), 167–181. <https://doi.org/10.5204/ijcjsd.2191>
- Beery, T., Stahl Olafsson, A., Gentin, S., Maurer, M., Stålhammar, S., Albert, C., Bieling, C., Buijs, A., Fagerholm, N., Garcia-Martin, M., Plieninger, T., & M. Raymond, C. (2023). Disconnection from nature: Expanding our understanding of human–nature relations. *People and Nature*. <https://doi.org/10.1002/pan3.10451>
- Bell, E., Bryman, A., & Harley, B. (2010). *Business research methods*. Oxford University Press.

- Berger, P., & Luckmann, T. (2016). The social construction of reality. In *Social theory re-wired* (pp. 110-122). Routledge.
- Besek, J. F. (2021). On the Interactive Nature of Place-Making: Modifying Growth Machine Theory to Capture the Spatial and Temporal Connections that Spawned the Asian Carp Invasion. *Sociological Quarterly*, 62(1), 121–142.
<https://doi.org/10.1080/00380253.2020.1715307>
- Bhaskar, R. (1978). *A Realist Theory of Science*. (2nd Ed.). Harvester Press.
- Bhaskar, R. (2008). *A Realist Theory of Science*. Routledge.
- Bicquelet-Lock, A. (2021). Enabling healthy placemaking: overcoming barriers and learning from best practices. *Cities & Health*, 1–5.
<https://doi.org/10.1080/23748834.2021.1899356>
- Bilandzic, M., & Johnson, D. (2013). Hybrid placemaking in the library: Designing digital technology to enhance users' on-site experience. *Australian Library Journal*, 62(4), 258–271. <https://doi.org/10.1080/00049670.2013.845073>
- Birkeland, J. (2022). Nature Positive: Interrogating Sustainable Design Frameworks for Their Potential to Deliver Eco-Positive Outcomes. *Urban Science*, 6(2), 35.
<https://doi.org/10.3390/urbansci6020035>
- Birnbaum, L., Wilhelm, C., Chilla, T., & Kröner, S. (2021). Place attachment and digitalisation in rural regions. *Journal of Rural Studies*, 87, 189–198.
<https://doi.org/10.1016/j.jrurstud.2021.09.015>
- Black, N., Murphy, M., Lamping, D., Mckee, M., Sanderson, C., Askham1, J., & Marteau, T. (1966). Consensus development methods: a review of best practice in creating clinical guidelines. *ABI Journal of Health Services Research & Policy*, 4, 236–248.
www.soton.ac.uk/i-hta.
- Blaxter, L., Hughes, C., & Tight, M. (2010). *How to research*. McGraw-Hill Education.
- Bloemsmma, L. D., Wijga, A. H., Klompmaker, J. O., Hoek, G., Janssen, N. A. H., Lebret, E., Brunekreef, B., & Gehring, U. (2022). Green space, air pollution, traffic noise and mental wellbeing throughout adolescence: Findings from the PIAMA study. *Environment International*, 163. <https://doi.org/10.1016/j.envint.2022.107197>
- Boffi, L. (2021). Designing for place-making in XR: The process of the Co-Drive stops and its atlas. *ACM International Conference Proceeding Series*, 210–214.
<https://doi.org/10.1145/3469410.3469434>
- Bonthoux, S., & Chollet, S. (2024). Wilding cities for biodiversity and people: A transdisciplinary framework. *Biological Reviews of the Cambridge Philosophical Society*, 99(4), 1458–1480. <https://doi.org/10.1111/brv.13076>
- Boros, J., & Mahmoud, I. (2021). Urban Design and the Role of Placemaking in Mainstreaming Nature-Based Solutions. Learning From the Biblioteca Degli Alberi Case Study in Milan. *Frontiers in Sustainable Cities*, 3.
<https://doi.org/10.3389/frsc.2021.635610>
- Boros, J. Z., Shevchenko, V., Cay, D., & Gualtieri, G. (2024). A Framework for More-than-human Placemaking with Data Storytelling. *Journal of Digital Landscape Architecture*, 2024(9), 235–252. <https://doi.org/10.14627/53775202>
- Bottero, M., Caprioli, C., Foth, M., Mitchell, P., Rittenbruch, M., & Santangelo, M. (2022). Urban parks, value uplift and green gentrification: An application of the spatial hedonic model in the city of Brisbane. *Urban Forestry and Urban Greening*, 74.
<https://doi.org/10.1016/j.ufug.2022.127618>
- Bouncken, R., & Barwinski, R. (2021). Shared digital identity and rich knowledge ties in global 3D printing—A drizzle in the clouds? *Global Strategy Journal*, 11(1), 81–108.
<https://doi.org/10.1002/gsj.1370>

- Bowe, M., Gray, D., Stevenson, C., McNamara, N., Wakefield, J. R. H., Kellezi, B., Wilson, I., Cleveland, M., Mair, E., Halder, M., & Costa, S. (2020). A social cure in the community: A mixed-method exploration of the role of social identity in the experiences and well-being of community volunteers. *European Journal of Social Psychology*, 50(7), 1523–1539. <https://doi.org/10.1002/ejsp.2706>
- Bowler, D. E., Buyung-Ali, L., Knight, T. M., & Pullin, A. S. (2010). Urban greening to cool towns and cities: A systematic review of the empirical evidence. In *Landscape and Urban Planning* (Vol. 97, Issue 3, pp. 147–155). Elsevier. <https://doi.org/10.1016/j.landurbplan.2010.05.006>
- Bradford, T. W., Grier, S. A., & Henderson, G. R. (2017). Weight Loss Through Virtual Support Communities: A Role for Identity-based Motivation in Public Commitment. *Journal of Interactive Marketing*, 40, 9–23. <https://doi.org/10.1016/j.intmar.2017.06.002>
- Brady, S. R. (2015). Utilizing and Adapting the Delphi Method for Use in Qualitative Research. *International Journal of Qualitative Methods*, 14(5). <https://doi.org/10.1177/1609406915621381>
- Brambilla, E., Petersen, E., Stendal, K., Sundling, V., MacIntyre, T. E., & Calogiuri, G. (2022). Effects of immersive virtual nature on nature connectedness: A systematic review protocol. *Digital Health*, 8. <https://doi.org/10.1177/20552076221120324>
- Brambilla, E., Petersen, E., Stendal, K., Sundling, V., MacIntyre, T. E., & Calogiuri, G. (2024). Effects of immersive virtual nature on nature connectedness: A systematic review and meta-analysis. In *Digital Health* (Vol. 10). SAGE Publications Inc. <https://doi.org/10.1177/20552076241234639>
- Bratman, G. N., Anderson, C. B., Berman, M. G., Cochran, B., De Vries, S., Flanders, J., Folke, C., Frumkin, H., Gross, J. J., Hartig, T., Kahn, P. H., Kuo, M., Lawler, J. J., Levin, P. S., Lindahl, T., Meyer-Lindenberg, A., Mitchell, R., Ouyang, Z., Roe, J., ... Daily, G. C. (2019). Nature and mental health: An ecosystem service perspective. In *Sci. Adv* (Vol. 5).
- Braun, E., Kavaratzis, M., & Zenker, S. (2013). My city - my brand: The different roles of residents in place branding. *Journal of Place Management and Development*, 6(1), 18–28. <https://doi.org/10.1108/17538331311306087>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101. doi:10.1191/1478088706qp063oa
- Braun, V., & Clarke, V. (2012). Thematic analysis. In *APA handbook of research methods in psychology, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biological*. (pp. 57–71). American Psychological Association. <https://doi.org/10.1037/13620-004>
- Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology*, 18(3), 328–352. <https://doi.org/10.1080/14780887.2020.1769238>
- Breek, P., Eshuis, J., & Hermes, J. (2021). Sharing feelings about neighborhood transformation on Facebook: online affective placemaking in Amsterdam-Noord. *Journal of Urbanism*, 14(2), 145–164. <https://doi.org/10.1080/17549175.2020.1814390>
- Breek, P., Hermes, J., Eshuis, J., & Mommaas, H. (2018). The Role of Social Media in Collective Processes of Place Making: A Study of Two Neighborhood Blogs in Amsterdam. *City and Community*, 17(3), 906–924. <https://doi.org/10.1111/cico.12312>
- Briciu, V. A., Rezeanu, C. I., & Briciu, A. (2020). Online place branding: Is geography ‘destiny’ in a ‘space of flows’ world? *Sustainability (Switzerland)*, 12(10). <https://doi.org/10.3390/SU12104073>

- Bronsvort, I., & Uitermark, J. L. (2022). Seeing the street through Instagram. Digital platforms and the amplification of gentrification. *Urban Studies*.
<https://doi.org/10.1177/00420980211046539>
- Brunnberg, L., & Frigo, A. (2012). Placemaking in the 21st-century city: introducing the funfair metaphor for mobile media in the future urban space. *Digital Creativity*, 23(2), 113–125. <https://doi.org/10.1080/14626268.2012.709943>
- Bryman, A. (2016). *Social research methods*. Oxford University Press.
- Buckley, P. H., Belec, J., & Anderson, A. D. (2017). Modeling cross-border regions, place-making, and resource management: A Delphi Analysis. *Resources*, 6(3).
<https://doi.org/10.3390/resources6030032>
- Burrell, G., & Morgan, G. (2017). *Sociological paradigms and organisational analysis : elements of the sociology of corporate life*. Ashgate.
- Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. In *Neurological Research and Practice* (Vol. 2, Issue 1). BioMed Central Ltd.
<https://doi.org/10.1186/s42466-020-00059-z>
- Busse, B. (2021). Practices of discursive urban place-making in Brooklyn, New York: (Hidden) digital and embodied discourse. *Text and Talk*, 41(5–6), 617–641.
<https://doi.org/10.1515/text-2021-0003>
- Cabote, C., Salamonson, Y., Ramjan, L., Maneze, D., Trajkovski, S., & Montayre, J. (2024). The Synergy of Critical Realism and Case Study: A Novel Approach in Nursing Research. *International Journal of Qualitative Methods*, 23.
<https://doi.org/10.1177/16094069241254010>
- Calderon, S., & Takeshita, E. (2021). A future of creative placemaking. In *The Routledge Handbook of Placemaking* (pp. 38–44). Routledge.
- Cameron, R. (2020). Constructing Authenticity: Location Based Social Networks, Digital Placemaking, and the Design of Centralized Urban Spaces. In P. R. Lakshmi & D. O. NexHapi (Eds.), *Mediated Identities in the Futures of Place: Emerging Practices and Spatial Cultures* (pp. 133–151). Springer. <http://www.springer.com/series/15693>
- Cameron, R., & Molina-Azorin, J. F. (2011). The acceptance of mixed methods in business and management research. *International Journal of Organizational Analysis*, 19(3), 256–271. <https://doi.org/10.1108/19348831111149204>
- Camp, J. L. (2004). Digital identity. *IEEE TECHNOLOGY AND SOCIETY MAGAZINE*, 3(23), 34–41.
- Capaldi, C. A., Dopko, R. L., Zelenski, J. M., Berman, M. G., Unsworth, S., & Sullivan, W. (2014). *The relationship between nature connectedness and happiness: a meta-analysis*.
<https://doi.org/10.3389/fpsyg.2014.00976>
- Capaldi, C. A., Passmore, H.A., Nisbet, E. K., Zelenski, J. M., & Dopko, R. L. (2015). Flourishing in nature: A review of the benefits of connecting with nature and its application as a wellbeing intervention. *International Journal of Wellbeing*, 5(4), 1–16.
<https://doi.org/10.5502/ijw.v5i4.1>
- Carrozzi, A., Chylinski, M., Heller, J., Hilken, T., Keeling, D. I., & de Ruyter, K. (2019). What's Mine Is a Hologram? How Shared Augmented Reality Augments Psychological Ownership. *Journal of Interactive Marketing*, 48, 71–88.
<https://doi.org/10.1016/j.intmar.2019.05.004>
- Castaldi, C., & Mendonça, S. (2024). Places as brands: charting the value of place-based intangibles. In *Regional Studies*. Routledge.
<https://doi.org/10.1080/00343404.2024.2355280>
- César de Lima Araújo, H., Silva Martins, F., Tucunduva Philippi Cortese, T., & Locosselli, G. M. (2021). Artificial intelligence in urban forestry—A systematic review. *Urban Forestry and Urban Greening*, 66. <https://doi.org/10.1016/j.ufug.2021.127410>

- Chamorro, A., Miranda, F. J., Rubio, S., & Valero, V. (2012). Innovations and trends in meat consumption: An application of the Delphi method in Spain. *Meat Science*, 92(4), 816–822. <https://doi.org/10.1016/j.meatsci.2012.07.007>
- Champion, E. (2015). *Experiential Realism and Digital Place--Making*.
- Chan, C. S., & Marafa, L. M. (2013). A review of place branding methodologies in the new millennium. *Place Branding and Public Diplomacy*, 9(4), 236–253. <https://doi.org/10.1057/pb.2013.17>
- Chaudhry, A. R., Rajput, B., & Mishra, R. (2019). Influence of IoT & AI in place making and creating Smart Cities. *10th International Conference on Computing, Communication and Networking Technologies (ICCCNT)*, 1–6.
- Chen, K., Guaralda, M., Kerr, J., & Turkay, S. (2022). Digital intervention in the city: a conceptual framework for digital placemaking. *Urban Design International*. <https://doi.org/10.1057/s41289-022-00203-y>
- Chen, K., Guaralda, M., Kerr, J., & Turkay, S. (2024). Playful digital interventions in placemaking: Constructing a typology for playable digital interventions in public spaces (PDIPS). *Technological Forecasting and Social Change*, 207. <https://doi.org/10.1016/j.techfore.2024.123623>
- Chew, L., Loke, L., & Hespanhol, L. (2020). A Preliminary Design Vocabulary for Interactive Urban Play: Analysing and Composing Design Configurations for Playful Digital Placemaking. *Pervasive Health: Pervasive Computing Technologies for Healthcare*, 11–24. <https://doi.org/10.1145/3441000.3441064>
- Cilliers, E. J., Timmermans, W., Van den Goorbergh, F., & Slijkhuis, J. (2015). Green Place-making in Practice: From Temporary Spaces to Permanent Places. *Journal of Urban Design*, 20(3), 349–366. <https://doi.org/10.1080/13574809.2015.1031213>
- Clark, G., & Gille, B. (2024, November 11). *The planet of cities: Peak population and urbanisation in the next 100 years*. RICS. Retrieved December 23, 2024, from <https://www.rics.org/news-insights/wbef/the-planet-of-cities-peak-population-and-urbanisation-in-the-next-100-years>
- Clark, M., & Lupton, D. (2021). Pandemic fitness assemblages: The sociomaterialities and affective dimensions of exercising at home during the COVID-19 crisis. *Convergence*, 27(5), 1222–1237. <https://doi.org/10.1177/13548565211042460>
- Clarke, P. (2021). Future Places Toolkit: Engaging communities through augmented reality and performance. *Research for All*, 5(2). <https://doi.org/10.14324/RFA.05.2.03>
- Clayton, S., & Opatow, S. (2003). Introduction: Identity and the Natural Environment. In S. Clayton & S. Opatow (Eds.), *Identity and the natural environment: The psychological significance of nature* (pp. 1–24). MIT Press.
- Clowater, V. (2021). Pokémon Go as palimpsest: Creating layers of meaning through augmented reality. *Loading... The Journal of the Canadian Game Studies Association*, 14(24), 104–121.
- Cole, L. B., Coleman, S., & Scannell, L. (2021). Place attachment in green buildings: Making the connections. In *Journal of Environmental Psychology* (Vol. 74). Academic Press. <https://doi.org/10.1016/j.jenvp.2021.101558>
- Colley, K., & Craig, T. (2019). Natural places: Perceptions of wildness and attachment to local greenspace. *Journal of Environmental Psychology*, 61, 71–78. <https://doi.org/10.1016/j.jenvp.2018.12.007>
- Cornax-Martín, M., de Salazar, N. N. G., Joséchamizo-Nieto, F., & Rosa-Jiménez, C. (2024). Natural environments of the city for sport activity: Case study of Malaga (Spain). *Journal of Infrastructure, Policy and Development*, 8(7). <https://doi.org/10.24294/jipd.v8i7.4956>

- Costa, C. S., García-esparza, J. A., & Kimic, K. (2024). Participatory Budgeting and Placemaking: Concepts, Methods, and Practices. *Urban Planning*, 9. <https://doi.org/10.17645/up.7162>
- Çöteli, S. (2019). The Impact of New Media on The Forms of Culture: Digital Identity and Digital Culture. *Online Journal of Communication and Media Technologies*, 9(2). <https://doi.org/10.29333/ojcm/5765>
- Courage, C. (2021). INTRODUCTION. What really matters- moving placemaking into a new epoch. In *The Routledge Handbook of Placemaking* (pp. 1–8). Routledge.
- Cox, D. T. C., Hudson, H. L., Shanahan, D. F., Fuller, R. A., & Gaston, K. J. (2017). The rarity of direct experiences of nature in an urban population. *Landscape and Urban Planning*, 160, 79–84. <https://doi.org/10.1016/j.landurbplan.2016.12.006>
- Crespo, C. F., Ferreira, A. G., & Cardoso, R. M. (2023). The influence of storytelling on the consumer–brand relationship experience. *Journal of Marketing Analytics*, 11(1), 41–56. <https://doi.org/10.1057/s41270-021-00149-0>
- Cresswell, T. (1996). *In place/out of place: geography, ideology and transgression*. Minneapolis: University of Minnesota Press.
- Creswell, J. W. (2007). *Qualitative Inquiry and Research Design*. Thousand Oaks: Sage Publications
- Creswell, J. W. (2013). *Research Design: Qualitative, Quantitative and Mixed Method Approaches*. (2nd ed). London: SAGE Publications
- Creswell, J.W., & Creswell, J.D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. (5th ed.). Thousand Oaks: Sage Publications.
- Creswell, J. W., & Plano Clark, V. L. P. (2017). *Designing and conducting mixed methods research*. Sage publications.
- Creswell, J.W., & Poth, C.N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. SAGE Publications
- Crisp, R. J. (2010). *The psychology of social and cultural diversity*. Wiley-Blackwell.
- Cunha, M. N., & Valente, P. (2019). Uso das Redes Sociais em Contexto Laboral. *Cadernos de Marketing e Publicidade, Percursos & Ideias*, 85-91.
- Dai, J., & Liu, F. (2024). Embracing the digital landscape: enriching the concept of sense of place in the digital age. *Humanities and Social Sciences Communications*, 11(1). <https://doi.org/10.1057/s41599-024-03200-4>
- Dandotiya, R., & Aggarwal, A. (2023). An examination of tourists’ national identity, place attachment and loyalty at a dark tourist destination. *Kybernetes*, 52(12), 6063–6077. <https://doi.org/10.1108/K-08-2021-0756>
- Dawadi, S., Shrestha, S., & Giri, R. A. (2021). Mixed-Methods Research: A Discussion on its Types, Challenges, and Criticisms. *Journal of Practical Studies in Education*, 2(2), 25–36. <https://doi.org/10.46809/jpse.v2i2.20>
- Debenedetti, A., Oppewal, H., & Arsel, Z. (2014). Place attachment in commercial settings: A gift economy perspective. *Journal of Consumer Research*, 40(5), 904–923. <https://doi.org/10.1086/673469>
- Delbecq, A., & Van de Ven, A. (2015). A Group Process Model for Problem Identification and Program Planning. *The Journal of Applied Behavioral Science*, 7(4), 466–492.
- Deloitte. (2021). *Digital Consumer Trends- The UK cut*. Deloitte United Kingdom. <https://www2.deloitte.com/uk/en/pages/technology-media-and-telecommunications/articles/mobile-consumer-survey.html#smartphone-adoption-stable-and-strengthening>
- de San Eugenio Vela, J., Fernández-Cavia, J., Nogué, J., & Jiménez-Morales, M. (2013). Characteristics and functions for place brands based on a Delphi method. *Revista Latina de Comunicacion Social*, 68, 656–675. <https://doi.org/10.4185/RLCS-2013-995en>

- de San Eugenio-Vela, J., Ginesta, X., Compte-Pujol, M., Frigola-Reig, J., & Fernández-Rovira, C. (2023). The Process of Implementing a Place Brand Based on a Multilevel Approach: The Case of the Municipality of Masquefa. *Sustainability*, 15(22), 15788. <https://doi.org/10.3390/su152215788>
- De Souza E Silva, A. (2006). From cyber to hybrid: Mobile technologies as interfaces of hybrid spaces. *Space and Culture*, 9(3), 261–278. <https://doi.org/10.1177/1206331206289022>
- De Souza e Silva, A. (2013). Location-aware mobile technologies: Historical, social and spatial approaches. *Mobile Media & Communication*, 1(1), 116–121. <https://doi.org/10.1177/2050157912459492>
- de Vaus, D. A. (2002). *Surveys in Social Research* (5th Edition). Allen & Unwin.
- Devine, K. (2017). Sense of place: The phenomenology of virtual heritage place. *Proceedings - 2017 21st International Conference Information Visualisation, IV 2017*, 332–335. <https://doi.org/10.1109/iV.2017.22>
- Dey, I. (1993) *Qualitative Data Analysis*. London: Routledge.
- Diamantopoulos, A. and Schlegelmilch, B.B. (1997) *Taking the Fear Out of Data Analysis*. London, Dryden Press.
- Dillman, D.A. (2000). *Mail and Internet Surveys: The Tailored Design Method*. (2nd ed.). New York: Wiley.
- Easton, G. (2002). Marketing. A critical realist approach. *Journal of Business Research*, 55, 103–109.
- Easton, G. (2010). Critical realism in case study research. *Industrial Marketing Management*, 39(1), 118–128. <https://doi.org/10.1016/j.indmarman.2008.06.004>
- Ebaid, M. A. (2023). Branding Small Cities through Placemaking: A Case Study on El-Burullus, Egypt. *INTERNATIONAL JOURNAL OF ARCHITECTURAL ENGINEERING AND URBAN RESEARCH*, 6(2), 83–108.
- Eckenwiler, L. (2021). Ethical placemaking for ecological subjects. In *The Routledge Handbook of Placemaking* (pp. 346–353). Routledge.
- Edwards, L., Darby, A., & Dean, C. (2020). From Digital Nature Hybrids to Digital Naturalists: Reviving Nature Connections Through Arts, Technology and Outdoor Activities. In R. Earnshaw, S. Liggett, P. Excell, & D. Thalmann (Eds.), *Technology, Design and the Arts-Opportunities and Challenges* (pp. 295–314). <http://www.springer.com/series/10481>
- Egffjord, K. F. H., & Sund, K. J. (2020). A modified Delphi method to elicit and compare perceptions of industry trends. *MethodsX*, 150. <https://doi.org/10.1016/j.techfore.2019.119787>
- El Khafif, M., Wibberly, K. H., Cleckley, E., Nguyen, T. H., & Divers, M. H. (2021). We Are Martinsville (WAM): Leveraging mobile gaming for community engagement and improving health. *International Journal of E-Planning Research*, 10(4). <https://doi.org/10.4018/IJEPR.20211001.0a4>
- Ellery, P. J., Ellery, J., & Borkowsky, M. (2021). Toward a Theoretical Understanding of Placemaking. *International Journal of Community Well-Being*, 4(1), 55–76. <https://doi.org/10.1007/s42413-020-00078-3>
- European Commission. (2015). *Towards an EU research and innovation policy agenda for nature-based solutions & re-naturing cities: Final report of the Horizon 2020 expert group*. Publications Office of the European Union.
- European Commission. (2016). *Nature-based solutions*. European Commission. https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en

- European Parliament. (2023). *Circular economy: definition, importance and benefits*. Retrieved February 20, 2024, from <https://www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits>
- Evans, G. (2015). Rethinking place branding and place making through creative and cultural quarters. In *Rethinking Place Branding: Comprehensive Brand Development for Cities and Regions* (pp. 135–158). Springer International Publishing. https://doi.org/10.1007/978-3-319-12424-7_10
- Everett, S. (2012). Production Places or Consumption Spaces? The Place-making Agency of Food Tourism in Ireland and Scotland. *Tourism Geographies*, 14(4), 535–554. <https://doi.org/10.1080/14616688.2012.647321>
- Farhat, R. R. (2019). What Brand Is This Place? Place-Making and the Cultural Politics of Downtown Revitalization. *Space and Culture*, 22(1), 34–49. <https://doi.org/10.1177/1206331217751778>
- Fernandez-Osso Fuentes, M., Keegan, B., Jones, M., & MacIntyre, T. (2022). How can digital placemaking impact health and wellbeing of citizens through green and blue space connections? A systematic literature review protocol. *PROSPERO.International Prospective Register of Systematic Reviews*, 1–5. https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022316039
- Fernandez-Osso Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. E. (2023a). Achieving consensus on digital placemaking for nature and well-being through a modified Delphi study: An abstract. *2023 World Marketing Congress*.
- Fernandez-Osso Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. (2023b). Digital placemaking, health & wellbeing and nature-based solutions: A systematic review and practice model. *Urban Forestry & Urban Greening*, 79, 127796. <https://doi.org/10.1016/j.ufug.2022.127796>
- Fernandez-Osso Fuentes, M. J., Keegan, B. J., Jones, M. V., & MacIntyre, T. E. (2024a). Conceptualizing digital placemaking in nature for wellbeing. *Technological Forecasting and Social Change*, 204. <https://doi.org/10.1016/j.techfore.2024.123440>
- Fernandez-Osso Fuentes, M., Keegan, B. J., Rowley, J., & Worboys, E. (2024b). Big trouble in little places: understanding the complexities of place micro-brands. *Journal of Place Management and Development*. <https://doi.org/10.1108/JPMD-07-2023-0077>
- Fielding, K. S., & Hornsey, M. J. (2016). A social identity analysis of climate change and environmental attitudes and behaviors: Insights and opportunities. In *Frontiers in Psychology* (Vol. 7, Issue FEB). Frontiers Research Foundation. <https://doi.org/10.3389/fpsyg.2016.00121>
- Fisher, J. A., Shangguan, L., & Crisp, J. S. (2018). Developing a Platform for Community-curated Mixed Reality Play Spaces. *CHI PLAY 2018 - Proceedings of the 2018 Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts*, 423–429. <https://doi.org/10.1145/3270316.3271513>
- Fleetwood, S. (2005). Ontology in organization and management studies: A critical realist perspective. *Organization*, 12(2), 197–222. <https://doi.org/10.1177/1350508405051188>
- Florek, M. (2011). Online City Branding. In K. Dinnie (Ed.), *City branding: Theory and cases* (pp. 82–90). Plaggrave Macmillan.
- Foth, M. (2017a). Lessons from urban guerrilla placemaking for smart city commons. *ACM International Conference Proceeding Series, Part F128532*, 32–35. <https://doi.org/10.1145/3083671.3083707>
- Foth, M. (2017b). Some thoughts on digital placemaking. In L. Hespanhol, M. Hank. Haeusler, Martin. Tomitsch, & Gernot. Tscherteu (Eds.), *Media architecture compendium : digital placemaking* (pp. 203–205). Avedition.

- Foth, M., Bilandzic, A., & Guaralda, M. (2021). The impact of peer-to-peer accommodation on place authenticity: A placemaking perspective. In *Shaping Smart for Better Cities: Rethinking and Shaping Relationships between Urban Space and Digital Technologies* (pp. 283–306). Elsevier. <https://doi.org/10.1016/B978-0-12-818636-7.00015-9>
- Foth, M., Caldwell, G., Fredericks, J., & Volz, K. (2018). Augmenting cities beyond bedazzlement: Empowering local communities through immersive urban technologies. *Workshop Proceedings of Augmenting Cities and Architecture with Immersive Technologies, Media Architecture Biennale (MAB-18)*, 1–4.
- Foth, M., & Caldwell, G. A. (2018). More-than-human media architecture. *ACM International Conference Proceeding Series*, 66–75. <https://doi.org/10.1145/3284389.3284495>
- Fredericks, J., Hespanhol, L., Parker, C., Zhou, D., & Tomitsch, M. (2018). Blending pop-up urbanism and participatory technologies: Challenges and opportunities for inclusive city making. *City, Culture and Society*, 12, 44–53. <https://doi.org/10.1016/j.ccs.2017.06.005>
- Freeman, G., Liu, S. Y., Bardzell, J., Lu, X., Bardzell, S., & Cao, D. (2019, May 2). Smart and fermented cities: An approach to placemaking in urban informatics. *Conference on Human Factors in Computing Systems - Proceedings*. <https://doi.org/10.1145/3290605.3300274>
- Frith, J., & Richter, J. (2021). Building participatory counternarratives: Pedagogical interventions through digital placemaking. *Convergence*, 27(3), 696–710. <https://doi.org/10.1177/1354856521991956>
- Fuchs, O., & Robinson, C. (2023). Operationalising critical realism for case study research. *Qualitative Research Journal*.
- Futerra (2022). *Branding biodiversity*. Retrieved January 10, 2024, from <https://www.wearefuterra.com/thinks/branding-biodiversity>
- Gallagher, M., Hares, T., Spencer, J., Bradshaw, C., & Webb, I. (1993). The Nominal Group Technique: A Research Tool for General Practice? *Family Practice © Oxford University Press*, 10(1). <http://fampra.oxfordjournals.org/>
- Galle, N. J., Nitoslowski, S. A., & Pilla, F. (2019). The Internet of Nature: How taking nature online can shape urban ecosystems. *Anthropocene Review*, 6(3), 279–287. <https://doi.org/10.1177/2053019619877103>
- Geng, S., Chau, H.-W., Jamei, E., & Vrcelj, Z. (2023). Understanding place identity in urban scale Smart Heritage using a cross-case analysis method. *International Journal of Tourism Cities*. <https://doi.org/10.1108/IJTC-10-2022-0244>
- Ghuri, P. N., & Grønhaug, K. (2010). *Research methods in business studies: a practical guide*. Pearson Education.
- Giachino, C., Pattanaro, G., Bertoldi, B., Bollani, L., & Bonadonna, A. (2021). Nature-based solutions and their potential to attract the young generations. *Land Use Policy*, 101. <https://doi.org/10.1016/j.landusepol.2020.105176>
- Giannarou, L., & Zervas, E. (2014). Using Delphi technique to build consensus in practice. In *International Journal of Business Science & Applied Management (IJBSAM)* Suggested Citation: Giannarou, Lefkothea; Zervas, Efthimios (Vol. 9, Issue 2). <http://hdl.handle.net/10419/190657><https://creativecommons.org/licenses/by/2.0/uk/>
- Ginesta, X., Cristòfol, F. J., Eugenio, J., & Martínez-Navarro, J. (2024). The Role of Future Generations in Place Branding: The Case of Huelva City. *Politics and Governance*, 12. <https://doi.org/10.17645/pag.7730>
- Globa, A., Wang, R., & Beza, B. B. (2019). SENSORY URBANISM AND PLACEMAKING Exploring Virtual Reality and the Creation of Place. *Intelligent & Informed, Proceedings of the 24th International Conference of the Association For Computer-Aided Architectural Design Research in Asia (CAADRIA)*, 737–746.

- http://papers.cumincad.org/cgi-bin/works/BrowseAZname=authors/Show?caadria2019_211
- Głowczyński, M. (2022). Toward User-Generated Content as a Mechanism of Digital Placemaking—Place Experience Dimensions in Spatial Media. *ISPRS International Journal of Geo-Information*, 11(4). <https://doi.org/10.3390/ijgi11040261>
- Gobbo, B., & Benedetti, A. (2021, July 11). Expressive digital place making as means of aggregation: A case study from the COVID-19 pandemic. *ACM International Conference Proceeding Series*. <https://doi.org/10.1145/3464385.3464731>
- Gong, C., Yang, R., & Li, S. (2024). The role of urban green space in promoting health and well-being is related to nature connectedness and biodiversity: Evidence from a two-factor mixed-design experiment. *Landscape and Urban Planning*, 245. <https://doi.org/10.1016/j.landurbplan.2024.105020>
- Gonsalves, K., Caldwell, G. A., & Foth, M. (2023). The praxis of radical placemaking. *Frontiers in Computer Science*, 5. <https://doi.org/10.3389/fcomp.2023.1193538>
- Gonsalves, K., Foth, M., Caldwell, G., & Jenek, W. (2021). Radical Placemaking: Immersive, Experiential and Activist Approaches for Marginalised Communities. *Connections: Exploring Heritage, Architecture, Cities, Art, Media*, 20(1), 237–252. <https://eprints.qut.edu.au/203188/>
- Gonsalves, K., Foth, M., & Caldwell, G. A. (2024). Liminality, Situated Digital Tales, and the Pandemic: Three Cases of Radical Placemaking in Australia. *Antipode*. <https://doi.org/10.1111/anti.13035>
- Gosling, E., & Williams, K. J. H. (2010). Connectedness to nature, place attachment and conservation behaviour: Testing connectedness theory among farmers. *Journal of Environmental Psychology*, 30(3), 298–304. <https://doi.org/10.1016/j.jenvp.2010.01.005>
- Goudriaan, Y., Prince, S., & Strzelecka, M. (2023). A narrative approach to the formation of place attachments in landscapes of expanding renewable energy technology. *Landscape Research*, 48(4), 594–607. <https://doi.org/10.1080/01426397.2023.2166911>
- Govers, R. (2020). Imaginative communities and place branding. *Place Branding and Public Diplomacy*, 16(1), 1–5.
- Grace, M., Scott, A. J., Sadler, J. P., Proverbs, D. G., & Grayson, N. (2020). Exploring the smart-natural city interface; re-imagining and re-integrating urban planning and governance. *Emerald Open Research*, 2, 7. <https://doi.org/10.35241/emeraldopenres.13226.1>
- Grassini, S., Segurini, G. V., & Koivisto, M. (2022). Watching Nature Videos Promotes Physiological Restoration: Evidence From the Modulation of Alpha Waves in Electroencephalography. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.871143>
- Graziano, T., & Albanese, V. E. (2020). Online place branding for natural heritage: Institutional strategies and users' perceptions of Mount Etna (Italy). *Heritage*, 3(4), 1539–1558. <https://doi.org/10.3390/heritage3040085>
- Grigsby, J. L., & Mellema, H. N. (2020). Negative Consequences of Storytelling in Native Advertising. *Journal of Interactive Marketing*, 52, 61–78. <https://doi.org/10.1016/j.intmar.2020.03.005>
- Grime, M. M., & Wright, G. (2016). Delphi Method. *Wiley StatsRef: Statistics Reference Online*, 1–6. <https://doi.org/10.1002/9781118445112.stat07879>
- Guba, E. G., & Lincoln, Y. (1994). Competing Paradigms in Qualitative Research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 105–117). Sage.
- Gulsrud, N. M., Hertzog, K., & Shears, I. (2018). Innovative urban forestry governance in Melbourne?: Investigating “green placemaking” as a nature-based solution. *Environmental Research*, 161, 158–167. <https://doi.org/10.1016/j.envres.2017.11.005>

- Halegoua, G., & Polson, E. (2021). Exploring 'digital placemaking'. *Convergence*, 27(3), 573–578. <https://doi.org/10.1177/13548565211014828>
- Halegoua, G. R. (2020). The digital city: Media and the social production of place. In *The Digital City*. New York University Press.
- Hanna, S., & Rowley, J. (2008). An analysis of terminology use in place branding. *Place Branding and Public Diplomacy*, 4(1), 61–75. <https://doi.org/10.1057/palgrave.pb.6000084>
- Hanna, S. A., & Rowley, J. (2015). Rethinking strategic place branding in the digital age. In *Rethinking Place Branding: Comprehensive Brand Development for Cities and Regions* (pp. 85–100). Springer International Publishing. https://doi.org/10.1007/978-3-319-12424-7_7
- Hardley, J., & Richardson, I. (2021). Digital placemaking and networked corporeality: Embodied mobile media practices in domestic space during Covid-19. *Convergence*, 27(3), 625–636. <https://doi.org/10.1177/1354856520979963>
- Harner, J., Knapp, K., & Davis-Witherow, L. (2017). 'The Story of Us': Place-Making through Public Interaction with Digital GeoHumanities in Colorado Springs. *International Journal of Humanities and Arts Computing*, 11(1), 109–125. <https://doi.org/10.3366/ijhac.2017.0181>
- Harrison, R. L. (2013). Using mixed methods designs in the journal of business research. *Journal of Business Research*, 66(11), 2153–2162. <https://doi.org/10.1016/j.jbusres.2012.01.006>
- Harrison, R. L., & Reilly, T. M. (2011). Mixed methods designs in marketing research. *Qualitative market research: an international journal*, 14(1), 7–26.
- Hartig, T., Mitchell, R., De Vries, S., & Frumkin, H. (2014). Nature and health. *Annual Review of Public Health*, 35, 207–228. <https://doi.org/10.1146/annurev-publhealth-032013-182443>
- Haslam, C., Jetten, J., Cruwys, T., Dingle, G., & Haslam, S. A. (2018). *The new psychology of health: Unlocking the social cure*. Routledge.
- Haslam, S. A., Jetten, J., Postmes, T., & Haslam, C. (2009). Social identity, health and well-being: An emerging agenda for applied psychology. *Applied Psychology*, 58(1), 1–23. <https://doi.org/10.1111/j.1464-0597.2008.00379.x>
- Hassan, M. M., Tedong, P. A., Mohd Khir, A., Shari, Z., Ponrahono, Z., & Sharifudin, M. P. (2023). Unveiling Optimal Urban Nature for Community Wellbeing: Finding Vital Key Indicators from Preceding Urban Studies. *International Journal of Academic Research in Business and Social Sciences*, 13(9). <https://doi.org/10.6007/ijarbss/v13-i9/18299>
- Hasson, F., Keeney, S., & McKenna, H. (2000). Research guidelines for the Delphi survey technique. *Journal of Advanced Nursing*, 32(2), 1008–1015.
- Hatch, M. J., & Schultz, M. (2009). Of Bricks and Brands: From Corporate to Enterprise Branding. *Organizational Dynamics*, 38(2), 117–130. <https://doi.org/10.1016/j.orgdyn.2009.02.008>
- Hauge, Å. L. (2007). Identity and Place: A Critical Comparison of Three Identity Theories. In *Architectural Science Review* (Vol. 50, Issue 1, pp. 44–51). <https://doi.org/10.3763/asre.2007.5007>
- Healey, M.J. & Rawlinson, M.B. (1994). Interviewing techniques in business and management research. In *Principles and Practice in Business and Management Research* (pp. 123–45). Aldershot: Dartmouth Publishing Companies.
- Heath, S. C., Rabinovich, A., & Barreto, M. (2017). Putting identity into the community: Exploring the social dynamics of urban regeneration. *European Journal of Social Psychology*, 47(7), 855–866. <https://doi.org/10.1002/ejsp.2296>

- Heck, E., & Tsai, M. (2022). Sharing therapeutic experiences of place: Co-creative digital storytelling as a way to explore connection to place. *Emotion, Space and Society*, 43. <https://doi.org/10.1016/j.emospa.2022.100879>
- Heckert, M., & Bristowe, A. (2021). Parks and the pandemic: A scoping review of research on green infrastructure use and health outcomes during covid-19. *International Journal of Environmental Research and Public Health*, 18(24). <https://doi.org/10.3390/ijerph182413096>
- Hennink, M. M., Kaiser, B. N., & Marconi, V. C. (2017). Code Saturation Versus Meaning Saturation: How Many Interviews Are Enough? In *Qualitative Health Research* (Vol. 27, Issue 4, pp. 591–608). SAGE Publications Inc. <https://doi.org/10.1177/1049732316665344>
- Her, J. J. (2021). Engaging locals in rural areas: value correspondence in placemaking through mobile augmented reality. *Digital Creativity*, 32(3), 215–233. <https://doi.org/10.1080/14626268.2021.1954955>
- Hernández, B., Carmen Hidalgo, M., Salazar-Laplace, M. E., & Hess, S. (2007). Place attachment and place identity in natives and non-natives. *Journal of Environmental Psychology*, 27(4), 310–319. <https://doi.org/10.1016/j.jenvp.2007.06.003>
- Hespanhol, L. (2018). Making Meaningful Spaces: Strategies for Designing Enduring Digital Placemaking Initiatives. *SAAN*. <https://www.researchgate.net/publication/334780244>
- Hespanhol, L. (2022). Augmented Placemaking: Urban Technologies, Interaction Design and Public Spaces in a Post-Pandemic World. *Interacting with Computers*. <https://doi.org/10.1093/iwc/iwac037>
- Hesse, M. (1980). The Hunt for Scientific Reason. *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association*, 2, 2–22.
- Hjorth, L., & Richardson, I. (2017). Pokémon GO: Mobile media play, place-making, and the digital wayfarer. In *Mobile Media and Communication* (Vol. 5, Issue 1, pp. 3–14). SAGE Publications Ltd. <https://doi.org/10.1177/2050157916680015>
- Holck, L., & Villesèche, F. (2024). Social identity theory. In *Encyclopedia of Equality, Equity, Diversity and Inclusion* (pp. 317–320). Edward Elgar Publishing.
- Holden, M. T., & Lynch, P. (2004). Choosing the Appropriate Methodology: Understanding Research Philosophy 4. *The Marketing Review*, 4, 397–409. www.themarketingreview.com
- Holstein, J., & Gubrium, J. F. (2003). *Inside interviewing: New lenses, new concerns*. SAGE Publication.
- Holt, D. B. (2002). Why Do Brands Cause Trouble? A Dialectical Theory of Consumer Culture and Branding. *Journal of Consumer Research*, 29(1), 70–90. <https://doi.org/10.1086/339922>
- Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., ... Pluye, P. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Education for Information*, 34(4), 285–291.
- Hornsey, M. J. (2008). Social Identity Theory and Self-categorization Theory: A Historical Review. *Social and Personality Psychology Compass*, 2(1), 204–222. <https://doi.org/10.1111/j.1751-9004.2007.00066.x>
- Houghton, K., Foth, M., & Miller, E. (2015). Urban Acupuncture: Hybrid Social and Technological Practices for Hyperlocal Placemaking. *Journal of Urban Technology*, 22(3), 3–19. <https://doi.org/10.1080/10630732.2015.1040290>
- Howell, A. J., Dopko, R. L., Passmore, H. A., & Buro, K. (2011). Nature connectedness: Associations with well-being and mindfulness. *Personality and Individual Differences*, 51(2), 166–171. <https://doi.org/10.1016/j.paid.2011.03.037>

- Huang, Y. (2019). Book review. *Urban Forestry & Urban Greening*, 43, 126388. <https://doi.org/10.1016/j.ufug.2019.126388>
- Huang, Y., Finsterwalder, J., Chen, N., & Crawford, F. R. L. (2022). Online student engagement and place attachment to campus in the new service marketplace: an exploratory study. *Journal of Services Marketing*. <https://doi.org/10.1108/JSM-04-2021-0148>
- Hudak, K. C. (2019). Resident stories and digital storytelling for participatory place branding. *Place Branding and Public Diplomacy*, 15(2), 97–108. <https://doi.org/10.1057/s41254-019-00117-7>
- Hunt, S. D. (1990). Truth in Marketing Theory and Research. *Journal of Marketing*, 54(3), 1–15.
- Hunter, M. G., Soro, A., Brown, R. A., Harman, J., & Yigitcanlar, T. (2022). Augmenting Community Engagement in City 4.0: Considerations for Digital Agency in Urban Public Space. *Sustainability (Switzerland)*, 14(16). <https://doi.org/10.3390/su14169803>
- Hurley, Z. (2023). #Dubailiving and Digital Placemaking on TikTok: Migrant, Domestic, and Service Workers' Affective Social Mediascapes. *Social Media and Society*, 9(3). <https://doi.org/10.1177/20563051231196897>
- Imara, I. D., Kagawa, T., & Furuya, K. (2024). Exploratory Analysis on the Livability of a City with Digital Placemaking in Jakarta Timur, Indonesia. *IOP Conference Series: Earth and Environmental Science*, 1384(1), 012037. <https://doi.org/10.1088/1755-1315/1384/1/012037>
- Intergovernmental Panel on Climate Change. (2022). *Climate change: A threat to human wellbeing and health of the planet. Taking action now can secure our future* — IPCC. IPCC. Retrieved October 29, 2024, from <https://www.ipcc.ch/2022/02/28/pr-wgii-ar6/>
- Jacobs, J. (1961). *The death and life of great American cities*. Random House.
- Jalali, S., & Wohlin, C. (2012). Systematic literature studies: Database searches vs. backward snowballing. *International Symposium on Empirical Software Engineering and Measurement*, 29–38. <https://doi.org/10.1145/2372251.2372257>
- Jang, Y. J., & Kim, E. (2024). How self-identity and social identity grow environmentally sustainable restaurants' brand communities via social rewards. *Journal of Hospitality & Tourism Research*, 48(3), 51. <https://doi.org/10.1177/10963480221140019>
- Jayakody, D. Y., Adams, V. M., Pecl, G., & Lester, E. (2024). What makes a place special? Understanding drivers and the nature of place attachment. *Applied Geography*, 163. <https://doi.org/10.1016/j.apgeog.2023.103177>
- Jimenez, M. P., Deville, N. V., Elliott, E. G., Schiff, J. E., Wilt, G. E., Hart, J. E., & James, P. (2021). Associations between nature exposure and health: A review of the evidence. In *International Journal of Environmental Research and Public Health* (Vol. 18, Issue 9). MDPI. <https://doi.org/10.3390/ijerph18094790>
- Johnstone, S., Choi, J. H. J., & Leong, J. (2016). Designing for diversity: Connecting people, places, and technologies in creative community hubs. *Proceedings of the 28th Australian Computer-Human Interaction Conference, OzCHI 2016*, 135–139. <https://doi.org/10.1145/3010915.3010971>
- Kahn, P. H. (1997). Developmental Psychology and the Biophilia Hypothesis: Children's Affiliation with Nature. In *DEVELOPMENTAL REVIEW* (Vol. 17).
- Kahn, P. H., Severson, R. L., & Ruckert, J. H. (2009). *The Human Relation With Nature and Technological Nature*.
- Kahneman, D., Diener, E., & Schwarz, N. (1999). *Well-Being: The Foundations of hedonic psychology*. New York: Russell Sage Foundation.

- Kalandides, A., Kavaratzis, M., & Boisen, M. (2012). From “necessary evil” to necessity: Stakeholders’ involvement in place branding. *Journal of Place Management and Development*, 5(1), 7–19. <https://doi.org/10.1108/17538331211209013>
- Kale, A. (2019). Building attachments to places of settlement: A holistic approach to refugee wellbeing in Nelson, Aotearoa New Zealand. *Journal of Environmental Psychology*, 65. <https://doi.org/10.1016/j.jenvp.2019.101315>
- Kamols, N., Foth, M., & Guaralda, M. (2021). Beyond engagement theatre: challenging institutional constraints of participatory planning practice. *Australian Planner*, 57(1), 23–35. <https://doi.org/10.1080/07293682.2021.1920993>
- Karge, T. (2018). Placemaking and urban gardening: Himmelbeet case study in Berlin. *Journal of Place Management and Development*, 11(2), 208–222. <https://doi.org/10.1108/JPMD-10-2017-0109>
- Kavaratzis, M. (2005). Place Branding: A Review of Trends and Conceptual Models. *The Marketing Review*, 5, 329–342. www.themarketingreview.com
- Kavaratzis, M., & Ashworth, G. J. (2005). City branding: An effective assertion of identity or a transitory marketing trick? *Tijdschrift Voor Economische En Sociale Geografie*, 96(5), 506–514. <https://doi.org/10.1111/j.1467-9663.2005.00482.x>
- Kavaratzis, M., & Florek, M. (2021). Special Section: The future of place branding. *Place Branding and Public Diplomacy*, 17(1), 63–64. <https://doi.org/10.1057/s41254-020-00197-w>
- Kavaratzis, M., Giovanardi, M., & Lichrou, M. (2017). Inclusive Place Branding. Critical Perspectives on Theory and Practice. In *Place Branding and Public Diplomacy* (Issue 2). Routledge. <https://doi.org/10.1057/s41254-018-0108-8>
- Kavaratzis, M., & Hatch, M. J. (2013). The dynamics of place brands: An identity-based approach to place branding theory. *Marketing Theory*, 13(1), 69–86. <https://doi.org/10.1177/1470593112467268>
- Kavaratzis, M., & Hatch, M. J. (2021). The Elusive Destination Brand and the ATLAS Wheel of Place Brand Management. *Journal of Travel Research*, 60(1), 3–15. <https://doi.org/10.1177/0047287519892323>
- Keegan, B. J. (2021). Keeping Pace with the Digital Transformation of Place. In D. Medway, G. Warnaby, & J. Byrom (Eds.), *A Research Agenda for Place Branding* (pp. 163–179). <https://www.elgaronline.com/view/edcoll/9781839102844/9781839102844.00019.xml>
- Keegan, B. J., & Schifanella, R. (2022). Social Media Data in Digital Placemaking. In *The SAGE Handbook of Social Media Marketing*.
- Kelemen, M. L., & Rumens, N. (2008). *An introduction to critical management research*. SAGE Publications
- Kent, F., & Madden, K. (2003). Creating Great Urban Parks: Project of Public Spaces. *Places*, 15(3).
- Kesebir, S., & Kesebir, P. (2017). A Growing Disconnection From Nature Is Evident in Cultural Products. *Perspectives on Psychological Science*, 12(2), 258–269. <https://doi.org/10.1177/1745691616662473>
- Ketwaroo, G., Sealock, R. J., Freedman, S., Hart, P. A., Othman, M., Wassef, W., Banks, P., Vege, S. S., Gardner, T., Yadav, D., Sheth, S., & Kanwal, F. (2019). Quality of Care Indicators in Patients with Acute Pancreatitis. *Digestive Diseases and Sciences*, 64(9), 2514–2526. <https://doi.org/10.1007/s10620-019-05674-8>
- Khamis, N., & El Harairy, Y. (2023). EMPLOYING EXTENDED REALITY (XR) TO EXPANDING NARRATIVES OF PLACE-MAKING, SPATIAL PRESENCE AND IMMERSIVE EXPERIENCE. *ASCAAD2023*, 21–26. https://doi.org/10.1007/978-3-031-30089-9_3

- Kirby, M., & Scott, A. (2023). *Green Blue Infrastructure Impacts on Health and Wellbeing: A Rapid Evidence Assessment*. <https://doi.org/10.17605/osf.io/c2xum>
- Klein, E. (2022). City Symphony. An Autoethnographic Case Study of Curation Protocols for Augmented Reality Community Placemaking. *M/C Journal*, 25(3). <https://doi.org/10.5204/mcj.2898>
- Kolotouchkina, O., Barroso, C. L., & Sánchez, J. L. M. (2022). Smart cities, the digital divide, and people with disabilities. *Cities*, 123. <https://doi.org/10.1016/j.cities.2022.103613>
- Kostopoulou, E., & Fatah gen Schieck, A. (2021). Designing for hyperlocal: The use of locative media to augment place narratives. In *Shaping Smart for Better Cities* (pp. 87–106). Elsevier. <https://doi.org/10.1016/b978-0-12-818636-7.00016-0>
- Kotus, J., Rzeszewski, M., & Olejniczak, A. (2022). Material and digital dimensions of urban public spaces through the lens of social distancing. *Cities*, 130, 103856. <https://doi.org/10.1016/j.cities.2022.103856>
- Kuchelmeister, V., Luz, F., & Neves, J. (2020). EXPERIENCE DESIGN FOR VIRTUAL REALITY. FROM ILLUSION TO AGENCY Peer review: EXPERIENCE DESIGN FOR VIRTUAL REALITY. FROM ILLUSION TO AGENCY. *INTERNATIONAL JOURNAL ON STEREO & IMMERSIVE MEDIA*, 4(1). <https://doi.org/10.24140/ijsim.v4.n1.08>
- Kumar, C. S., & Nigam, P. (2023). An Investigation of Placemaking Attributes for Cultural Tourism in Historic Port Cities: Using the Fuzzy Delphi Method †. *Engineering Proceedings*, 53(1). <https://doi.org/10.3390/IOCBD2023-15188>
- Kuo, Y.-F., & Hou, J.-R. (2017). Oppositional brand loyalty in online brand communities: Perspectives on social identity theory and consumer-brand relationship. *Article in Journal of Electronic Commerce Research*. <https://www.researchgate.net/publication/319098607>
- Kurniawaty, G., Horlanso, V., Aditama, M. Y., & Larasati, D. (2022). Digital Placemaking and Its Effect to the Architectural Development (Case Study: City of Dreams, Macau). *IOP Conference Series: Earth and Environmental Science*, 1058(1). <https://doi.org/10.1088/1755-1315/1058/1/012021>
- Labayen, M. F., & Gutierrez, I. (2021). Digital placemaking as survival tactics: Sub-Saharan migrants' videos at the Moroccan–Spanish border. *Convergence*, 27(3), 664–678. <https://doi.org/10.1177/1354856520982974>
- Lak, A., & Zarezadeh Kheibari, S. (2020). Towards a framework for facilitating the implementation of Tactical Urbanism Practices: Assessment Criteria in the Placemaking Approach in Iran. *Geoforum*, 115, 54–66. <https://doi.org/10.1016/j.geoforum.2020.07.003>
- Lambert, S. (2008). A Conceptual Framework for Business Model. *BLED 2008 Proceedings*. 24, 24. <http://aisel.aisnet.org/bled2008http://aisel.aisnet.org/bled2008/24>
- Latorre, D. (2011). *Digital placemaking-authentic civic engagement*. Project for Public Spaces. <https://www.pps.org/article/digital-placemaking-authentic-civic-engagement>
- Leal, M. M., Casais, B., & Proença, J. F. (2022). Tourism co-creation in place branding: the role of local community. *Tourism Review*, 77(5), 1322–1332. <https://doi.org/10.1108/TR-12-2021-0542>
- Leavell, M. A., Leiferman, J. A., Gascon, M., Braddick, F., Gonzalez, J. C., & Litt, J. S. (2019). Nature-Based Social Prescribing in Urban Settings to Improve Social Connectedness and Mental Well-being: a Review. In *Current environmental health reports* (Vol. 6, Issue 4, pp. 297–308). Springer. <https://doi.org/10.1007/s40572-019-00251-7>

- Lefebvre, H. (1996). *The right to the city, writings on cities*. (E. Kofman & E. Lebas, Eds.). Blackwell.
- Lengieza, M. L., & Aviste, R. (2024). Relationships between people and nature: Nature Connectedness and Relational Environmental Values. *Current Opinion in Psychology*, 101984. <https://doi.org/10.1016/j.copsyc.2024.101984>
- Leszczynski, A. (2015). Spatial media/ation. *Progress in Human Geography*, 39(6), 729–751. <https://doi.org/10.1177/0309132514558443>
- Leszczynski, A. (2018). Spatialities. In *Digital geographies* (pp. 13–23). SAGE Publications.
- Lew, A. A. (2017). Tourism planning and place making: place-making or placemaking? *Tourism Geographies*, 19(3), 448–466. <https://doi.org/10.1080/14616688.2017.1282007>
- Lewicka, M. (2011). Place attachment: How far have we come in the last 40 years? *Journal of Environmental Psychology*, 31(3), 207–230. <https://doi.org/10.1016/j.jenvp.2010.10.001>
- Li, J., & Nassauer, J. I. (2021). Technology in support of nature-based solutions requires understanding everyday experiences. *Ecology and Society*, 26(4). <https://doi.org/10.5751/ES-12838-260435>
- Li, Y., & Alencar, A. (2022). A tale of two cities: digital place-making and elderly Houniao migration in China . *Journal of Ethnic and Migration Studies*, 1–18. <https://doi.org/10.1080/1369183x.2022.2115630>
- Liao, G. Y., Pham, T. T. L., Cheng, T. C. E., & Teng, C. I. (2020). How online gamers' participation fosters their team commitment: Perspective of social identity theory. *International Journal of Information Management*, 52. <https://doi.org/10.1016/j.ijinfomgt.2020.102095>
- Liaros, S. (2022). A network of circular economy villages: design guidelines for 21st century Garden Cities. *Built Environment Project and Asset Management*, 12(3), 349–364. <https://doi.org/10.1108/BEPAM-01-2021-0004>
- Litleskare, S., & Calogiuri, G. (2022). Seasonal Variations in the Effectiveness of Immersive Virtual Nature. *Health Environments Research and Design Journal*. <https://doi.org/10.1177/19375867221127420>
- Litleskare, S., Fröhlich, F., Flaten, O. E., Haile, A., Kjøs Johnsen, S. Å., & Calogiuri, G. (2022). Taking real steps in virtual nature: a randomized blinded trial. *Virtual Reality*, 1–17. <https://doi.org/10.1007/s10055-022-00670-2>
- Livingston, A. S. (2022). Technology that Inspires a Connection to Nature: Reframing the Role of Technology in Outdoor Engagement and Conservation. *Journal of Outdoor Recreation, Education, and Leadership*, 14(1). <https://doi.org/10.18666/jorel-2022-v14-i1-11134>
- Loroño-Leturiondo, M., & Illingworth, S. (2023). Gender and placemaking: talking to women about clean air and sustainable urban environments in changing cities. *Journal of Place Management and Development*, 16(1), 91–104. <https://doi.org/10.1108/JPMD-04-2021-0035>
- Low, A., Turner, J., & Foth, M. (2022). Pla(y)cemaking With Care Locative Mobile Games as Agents of Place Cultivation. *Academic Mindtrek '22: Proceedings Of the 25th International Academic Mindtrek Conference*.
- Loy, L. S., Scheuermann, A., Prestele, E., & Reese, G. (2024). Cultivating connectedness: Effects of an app-based compassion meditation course on changes in global identity, nature connectedness, and pro-environmental behaviour. *Journal of Environmental Psychology*, 95. <https://doi.org/10.1016/j.jenvp.2024.102260>
- Lucarelli, A. (2018). Co-branding public place brands: towards an alternative approach to place branding. *Place Branding and Public Diplomacy*, 14(4), 260–271. <https://doi.org/10.1057/s41254-017-0085-3>

- Lumber, R., Richardson, M., & Sheffield, D. (2017). Beyond knowing nature: Contact, emotion, compassion, meaning, and beauty are pathways to nature connection. *PLoS ONE*, 12(5). <https://doi.org/10.1371/journal.pone.0177186>
- Lyle, P., Foth, M., & Choi, J. H. (2015). Design Patterns for Urban Gardening. In M. Foth, M. Brynskov, & T. Ojala (Eds.), *Citizen's Right to the Digital City. Urban Interfaces, Activism, and Placemaking*.
- Lynch, K. (1960). *The image of the city*. MIT Press.
- Ma, W., Schraven, D., de Bruijne, M., de Jong, M., & Lu, H. (2019). Tracing the origins of place branding research: A bibliometric study of concepts in use (1980-2018). *Sustainability (Switzerland)*, 11(11). <https://doi.org/10.3390/su11112999>
- Macias-Zambrano, L., Cuadrado, E., & Carpio, A. J. (2024). Factors that determine the connectedness with nature in rural and urban contexts. *PLoS ONE*, 19(8). <https://doi.org/10.1371/journal.pone.0309812>
- Maciej, G. (2024). Human–place–technology relations in the digital placemaking process. *Geoforum*, 149. <https://doi.org/10.1016/j.geoforum.2024.103950>
- MacIntyre, T. (2019). *Physical Activity in Natural Settings. Green and blue exercise*.
- MacIntyre, T. E., Gidlow, C., Nieuwenhuijsen, M., Collier, M., Gritzka, S., & Warrington, G. (2019). Nature-based solutions and interventions in cities: A look ahead. In A. Donnelly & T. MacIntyre (Eds.), *Physical Activity in Natural Settings: Green and Blue Exercise* (pp. 335–348). Routledge.
- Mackay, C. M. L., Schmitt, M. T., Lutz, A. E., & Mendel, J. (2021). Recent developments in the social identity approach to the psychology of climate change. *Current Opinion in Psychology*, 42, 95–101. <https://doi.org/10.1016/j.copsyc.2021.04.009>
- Magnani, G., & Gioia, D. (2023). Using the Gioia Methodology in international business and entrepreneurship research. *International Business Review*, 32(2). <https://doi.org/10.1016/j.ibusrev.2022.102097>
- Mahmoud, I., Morello, E., Bisello, A., & Kolokotsa, D. (2024). Embedding technologies for improving Nature-Based Solutions performance and fostering social inclusion in urban greening strategies: Augmented NBS for cities. *Urban Forestry and Urban Greening*, 93. <https://doi.org/10.1016/j.ufug.2024.128215>
- Makri, K., Papadas, K., & Schlegelmilch, B. B. (2021). Global social networking sites and global identity: A three-country study. *Journal of Business Research*, 130, 482–492. <https://doi.org/10.1016/j.jbusres.2019.11.065>
- Mao, C., Koide, R., Brem, A., & Akenji, L. (2020). Technology foresight for social good: Social implications of technological innovation by 2050 from a Global Expert Survey. In *Technological Forecasting and Social Change* (Vol. 153). Elsevier Inc. <https://doi.org/10.1016/j.techfore.2020.119914>
- Maricchiolo, F., Mosca, O., Paolini, D., & Fornara, F. (2021). The Mediating Role of Place Attachment Dimensions in the Relationship Between Local Social Identity and Well-Being. *Frontiers in Psychology | Www.Frontiersin.Org*, 1, 645648. <https://doi.org/10.3389/fpsyg.2021.645648>
- Markusen, A., & Gadwa, A. (2010). *Creative Placemaking*. <http://arts.gov/pub/pubDesign.php>.
- Marshall, G. (2021). Placemaking in the Ecology of the Human Habitat. In *The Routledge Handbook of Placemaking* (pp. 205–215). Routledge.
- Masiero, S., & Bailur, S. (2021). Digital identity for development: The quest for justice and a research agenda. *Information Technology for Development*, 27(1), 1–12. <https://doi.org/10.1080/02681102.2021.1859669>
- Mattijssen, T. J. M., van der Jagt, A. P. N., Buijs, A. E., Elands, B. H. M., Erlwein, S., & Laforteza, R. (2017). The long-term prospects of citizens managing urban green space:

- From place making to place-keeping? *Urban Forestry and Urban Greening*, 26, 78–84.
<https://doi.org/10.1016/j.ufug.2017.05.015>
- Maxwell, J. A., & Loomis, D. M. (2003). METHODOLOGICAL AND ANALYTICAL ISSUES An Alternative Approach. In *Handbook of Mixed Methods in Social & Behavioral Research*. Sage Publications, Thousand Oaks.
- Maxwell, J. A., & Mittapalli, K. (2011). Realism as a Stance for Mixed Methods Research. In *A Realist Approach to Qualitative Research*.
- Mayer, F. S., & Frantz, C. M. P. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology*, 24(4), 503–515. <https://doi.org/10.1016/j.jenvp.2004.10.001>
- Mayer, F. S., Frantz, C. M. P., Bruehlman-Senecal, E., & Dolliver, K. (2009). Why is nature beneficial?: The role of connectedness to nature. *Environment and Behavior*, 41(5), 607–643. <https://doi.org/10.1177/0013916508319745>
- McAllister, E., Bhullar, N., & Schutte, N. S. (2017). Into the woods or a stroll in the park: How virtual contact with nature impacts positive and negative affect. *International Journal of Environmental Research and Public Health*, 14(7).
<https://doi.org/10.3390/ijerph14070786>
- Mcarthur, I., & Xu, F. (2021). MetaPLACE: Co-designing Sino-Australian Urban Media for Participatory Placemaking. *ACM International Conference Proceeding Series*, 42–53.
<https://doi.org/10.1145/3469410.3469415>
- Mccarthy, E. J. (1960). *Basic Marketing: A managerial Approach*. R.D. Irwin.
<https://about.jstor.org/terms>
- Mcevoy, P., & Richards, D. (2006). A critical realist rationale for using a combination of quantitative and qualitative methods. *Journal of Research in Nursing*, 11(1), 66–78.
<https://doi.org/10.1177/1744987106060192>
- McGregor, S. L. T., & Murnane, J. A. (2010). Paradigm, methodology and method: Intellectual integrity in consumer scholarship. *International Journal of Consumer Studies*, 34(4), 419–427. <https://doi.org/10.1111/j.1470-6431.2010.00883.x>
- McKeown, A. (2021). THE SOLUTION IS IN THE PROBLEM. The art of turning a threat into an opportunity by developing resilience using a Creative Placemaking critical praxis. In *The Routledge Handbook of placemaking*. UK, Routledge.
- McLean, G., Al-Nabhani, K., & Marriott, H. (2021). 'Regrettable-escapism' the negative effects of mobile app use: A retail perspective. *Psychology and Marketing*, 39(1), 150–167. <https://doi.org/10.1002/mar.21584>
- Miles, M. B. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks: Sage Publications
- Miller, K. A., Collada, B., Tolliver, D., Audi, Z., Cohen, A., Michelson, C., & Newman, L. R. (2020). Using the Modified Delphi Method to Develop a Tool to Assess Pediatric Residents Supervising on Inpatient Rounds. *Academic Pediatrics*, 20(1), 89–96.
<https://doi.org/10.1016/j.acap.2019.07.012>
- Mkansi, M., & Acheampong, E. A. (2012). Research Philosophy Debates and Classifications: Students' Dilemma. *The Electronic Journal of Business Research Methods*, 10, 132–140. www.ejbrm.com
- Moher, D., Tsertsvadze, A., Tricco, A., Eccles, M., Grimshaw, J., Sampson, M., & Barrowman, N. (2008). When and how to update systematic reviews. *Cochrane Database of Systematic Reviews*, 2. <https://doi.org/10.1002/14651858.MR000023.pub3>
- Mommaas, J. T. (2002). City branding: The necessity of socio-cultural goals. In *City branding: Image building & building images* (pp. 32-48). NAI Uitgevers.
- Monaghan, L. F. (2023). Critical realism. In *Encyclopedia of Health Research in the Social Sciences* (pp. 65-70). Edward Elgar Publishing.

- Monno, V., & Khakee, A. (2012). Tokenism or Political Activism? Some Reflections on Participatory Planning. *International Planning Studies*, 17(1), 85–101. <https://doi.org/10.1080/13563475.2011.638181>
- Moodley, S., & Marks, M. (2023). Healing Places, Healing People: Insights on Spontaneous Critical Placemaking from the Bellhaven Harm Reduction Centre in Durban, South Africa. *South African Review of Sociology*, 53(1), 85–103. <https://doi.org/10.1080/21528586.2023.2183250>
- Morrison, J. (2021). *Digital Placemaking Guide*. CALVIUM. <https://calvium.com/resources/digital-placemaking/>
- Moss, T., Voigt, F., & Becker, S. (2021). Digital urban nature: Probing a void in the smart city discourse. *City*, 25(3–4), 255–276. <https://doi.org/10.1080/13604813.2021.1935513>
- Mukumbang, F. C. (2023). Retroductive Theorizing: A Contribution of Critical Realism to Mixed Methods Research. *Journal of Mixed Methods Research*, 17(1), 93–114. <https://doi.org/10.1177/15586898211049847>
- Murphy, C., MacCarthy, D., & Petersen, E. (2022). Emerging concepts exploring the role of nature for health and wellbeing Affiliation. In *The Palgrave Encyclopedia of Urban and Regional Futures*. Palgrave Macmillan, Cham (Springer International Publishing).
- Mutch, A. (2023). Critical realism in historical research. In *Handbook of Historical Methods for Management* (pp. 232–244). Edward Elgar Publishing.
- Naderifar, M., Goli, H., & Ghaljaie, F. (2017). Snowball Sampling: A Purposeful Method of Sampling in Qualitative Research. *Strides in Development of Medical Education*, 14(3). <https://doi.org/10.5812/sdme.67670>
- Najafi, P., & Mohammadi, M. (2024). Enhancing Public Familiarity in Semi-Public Spaces through Creative and Digital Placemaking: A Scoping Review of the Literature. In M. Mhammedi, L. van Buuren, & M. van der Logt (Eds.), *SHE2024 International Scientific Conference*. Eindhoven University of Technology.
- Najafi, P., Mohammadi, M., Le Blanc, P. M., & van Wesemael, P. (2022). Insights into placemaking, senior people, and digital technology: a systematic quantitative review. *Journal of Urbanism*. <https://doi.org/10.1080/17549175.2022.2076721>
- Najafi, P., Mohammadi, M., Le Blanc, P. M., & Van Wesemael, P. (2021, June 1). Experimenting a Healthy Ageing Community in Immersive Virtual Reality Environment: The Case of World's Longest-lived Populations. *2021 17th International Conference on Intelligent Environments, IE 2021 - Proceedings*. <https://doi.org/10.1109/IE51775.2021.9486595>
- Naji, J., & Rzeszewski, M. (2022). Digital Poetry as a Dublin City Data Inter-face. *Studi Irlandesi. A Journal of Irish Studies*, 12, 73–86. <https://doi.org/10.13128/SIJIS-2239>
- Nesshöver, C., Assmuth, T., Irvine, K. N., Rusch, G. M., Waylen, K. A., Delbaere, B., Haase, D., Jones-Walters, L., Keune, H., Kovacs, E., Krauze, K., Külvik, M., Rey, F., van Dijk, J., Vistad, O. I., Wilkinson, M. E., & Wittmer, H. (2017). The science, policy and practice of nature-based solutions: An interdisciplinary perspective. In *Science of the Total Environment* (Vol. 579, pp. 1215–1227). Elsevier B.V. <https://doi.org/10.1016/j.scitotenv.2016.11.106>
- Nevo, D., & Chan, Y. E. (2007). A Delphi study of knowledge management systems: Scope and requirements. *Information and Management*, 44(6), 583–597. <https://doi.org/10.1016/j.im.2007.06.001>
- Ng, M. K. (2016). The right to healthy place-making and well-being. *Planning Theory and Practice*, 17(1), 3–6. <https://doi.org/10.1080/14649357.2016.1139227>
- Ni, C.-C., & Say, D. (2022). Placemaking and Tourism to Build Resilience: A Quest for Sustaining Peripheral Island Communities in Taiwan. *Sustainability*, 15(1), 699. <https://doi.org/10.3390/su15010699>

- Nikšič, M., Wagenaar, C., Gesquiere, G., & Kimic, K. (2023). The Use of Digital Technologies in Improving the Quality of Life: ICT-Supported Placemaking in Urban Neighbourhoods. In *Placemaking in Practice Volume 1* (pp. 127–151). BRILL. https://doi.org/10.1163/9789004542389_009
- Nisa, C. F., Bélanger, J. J., & Schumpe, B. M. (2020). On solid ground: Secure attachment promotes place attachment. *Journal of Environmental Psychology*, 70. <https://doi.org/10.1016/j.jenvp.2020.101463>
- Nisbet, E. K., Zelenski, J. M., & Murphy, S. A. (2011). Happiness is in our Nature: Exploring Nature Relatedness as a Contributor to Subjective Well-Being. *Journal of Happiness Studies*, 12(2), 303–322. <https://doi.org/10.1007/s10902-010-9197-7>
- Noronha, M., Canuto da Silva, R., & Celani, G. (2023). Placemaking in the Design of Knowledge-Based Urban Developments. *Joelho Revista de Cultura Arquitectonica*, 14, 91–112. https://doi.org/10.14195/1647-8681_14_5
- Norum, R., & Polson, E. (2021). Placemaking ‘experiences’ during Covid-19. *Convergence*, 27(3), 609–624. <https://doi.org/10.1177/13548565211004470>
- Nursanty, E., Rusmiatmoko, D., & Widiyantara, I. W. A. (2024). Bridging traditions: Placemaking and authenticity in architecture for city branding. *Architecture Papers of the Faculty of Architecture and Design STU*, 29(3), 15–24. <https://doi.org/10.2478/alfa-2024-0014>
- Ochnik, D., Buława, B., Nagel, P., Gachowski, M., & Budziński, M. (2024). Urbanization, loneliness and mental health model - A cross-sectional network analysis with a representative sample. In *Scientific Reports* (Vol. 14, Issue 1). <https://doi.org/10.1038/s41598-024-76813-z>
- Onwuegbuzie, A. J., & Collins, K. M. T. (2007). A Typology of Mixed Methods Sampling Designs in Social Science Research. *The Qualitative Report*, 12(2), 281–316. <http://www.nova.edu/ssss/QR/QR12-2/onwuegbuzie2.pdf>
- Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organizations: Research approaches and assumptions. *Information Systems Research*, 2(1), 1–28. <https://doi.org/10.1287/isre.2.1.1>
- Ouda, M. (2022). Digital Placemaking: The Mechanism of Perceiving Meaningful Spaces through the Digital Environment. *Contingency Planning and Adaptive Urbanism International Hybrid Conference*. <https://www.researchgate.net/publication/359603577>
- Ozduzen, O., Korkut, U., & Ozduzen, C. (2021). ‘Refugees are not welcome’: Digital racism, online place-making and the evolving categorization of Syrians in Turkey. *New Media and Society*, 23(11), 3349–3369. <https://doi.org/10.1177/1461444820956341>
- Özkul, D. (2021). The algorithmic fix: Location intelligence, placemaking, and predictable futures. *Convergence*, 27(3), 594–608. <https://doi.org/10.1177/13548565211005644>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., & ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *The BMJ*, 372. <https://doi.org/10.1136/bmj.n71>
- Pancholi, S., Yigitcanlar, T., & Guaralda, M. (2019). Place making for innovation and knowledge-intensive activities: The Australian experience. *Technological Forecasting and Social Change*, 146, 616–625. <https://doi.org/10.1016/j.techfore.2017.09.014>
- Pang, C., Neustaedter, C., Moffatt, K., Hennessy, K., & Pan, R. (2020a). The role of a location-based city exploration game in digital placemaking. *Behaviour and Information Technology*, 39(6), 624–647. <https://doi.org/10.1080/0144929X.2019.1697899>

- Pang, C., Pan, R., Wong, S., Neustaedter, C., & Wu, Y. (2020b). The Design of a Location-Based Transit Game for Digital Placemaking. *CSCW '20 Companion, October 17–21, 2020, Virtual Event, USA47*, 47–51.
- Paquin, A. G. (2019). Public data art's potential for digital placemaking. *Tourism and Heritage Journal*, 1, 32–48. <https://doi.org/10.1344/thj.2019.1.3>
- Paraschivoiu, I., & Layer-Wagner, T. (2021). Placemaking for urban sustainability: Designing a gamified app for long-term, pro-environmental participation. *CHI PLAY 2021 - Extended Abstracts of the 2021 Annual Symposium on Computer-Human Interaction in Play*, 186–191. <https://doi.org/10.1145/3450337.3483482>
- Pavlovskaya, M. (2016). Digital place-making: Insights from critical cartography and GIS. In *Springer Geography* (pp. 153–167). Springer. https://doi.org/10.1007/978-3-319-40953-5_9
- Peacock, S., Puussaar, A., & Crivellaro, C. (2021). Sensing our streets. Involving children in making people-centred smart cities. In *The Routledge Handbook of Placemaking* (pp. 130–140). Routledge.
- Pedeliento, G., & Kavaratzis, M. (2019). Bridging the gap between culture, identity and image: a structurationist conceptualization of place brands and place branding. *Journal of Product and Brand Management*, 28(3), 348–363. <https://doi.org/10.1108/JPBM-01-2018-1735>
- Pensini, P., Horn, E., & Caltabiano, N. J. (2016). An Exploration of the Relationships between Adults' Childhood and Current Nature Exposure and Their Mental Well-Being. *Children, Youth and Environments*, 26(1), 125. <https://doi.org/10.7721/chilyoutenvi.26.1.0125>
- Pereira-Barboza, E., Cirach, M., Khomenko, S., Iungman, T., Mueller, N., Barrera-Gómez, J., Rojas-Rueda, D., Kondo, M., & Nieuwenhuijsen, M. (2021). Green space and mortality in European cities: a health impact assessment study. *The Lancet Planetary Health*, 5(10), e718–e730. [https://doi.org/10.1016/S2542-5196\(21\)00229-1](https://doi.org/10.1016/S2542-5196(21)00229-1)
- Perry, C., Riege, A., & Brown, L. (1999). Realism's role among scientific paradigms in marketing research. *Irish Marketing Review*, 12(2), 16–23.
- Petersen, E., Fiske, A. P., & Schubert, T. W. (2019). The Role of Social Relational Emotions for Human-Nature Connectedness. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.02759>
- Petrovski, A., Djukic, A., Maric, J., & Kazak, J. (2024). Digital tools and digital pedagogy for placemaking. In *Archnet-IJAR: International Journal of Architectural Research*. Emerald Publishing. <https://doi.org/10.1108/ARCH-01-2024-0036>
- Pocock, M. J. O., Hamlin, I., Christelow, J., Passmore, H. A., & Richardson, M. (2023). The benefits of citizen science and nature-noticing activities for well-being, nature connectedness and pro-nature conservation behaviours. *People and Nature*, 5(2), 591–606. <https://doi.org/10.1002/pan3.10432>
- Polson, E. (2015). A gateway to the global city: Mobile place-making practices by expats. *New Media and Society*, 17(4), 629–645. <https://doi.org/10.1177/1461444813510135>
- PPS. (2004, February 29). *The Placemaking Movement*. Retrieved October 6, 2022, from <https://www.pps.org/article/2003movement>
- Prescott, C. (2019). *Internet access – households and individuals, Great Britain: 2019*. Office for National Statistics. <https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/bulletins/internetaccesshouseholdsandindividuals/2019>
- Pritchard, A., Richardson, M., Sheffield, D., Mcewan, K., & Richardson, M. (2020). The Relationship Between Nature Connectedness and Eudaimonic Well-Being: A Meta-

- analysis. *Journal of Happiness Studies*, 21, 1145–1167. <https://doi.org/10.1007/s10902-019-00118-6>
- Project for Public Spaces, & MacKenzie, A. (2015). *Placemaking and place-led development*. Project for Public Spaces. Retrieved January 2, 2025, from <https://www.pps.org/article/placemaking-and-place-led-development-a-new-paradigm-for-cities-of-the-future>
- Proshansky, H. M. (1978). The city and self-identity. *Environment and behavior*, 10(2), 147–169. <https://doi.org/10.1177/0013916578102002>
- Qabshoqa, M. (2018). Virtual Place-Making-The Re-discovery of Architectural Places through Augmented Play A playful emergence between the real and unreal. *COLLABORATIVE & PARTICIPATIVE DESIGN*, 1, 451–458. http://papers.cumincad.org/cgi-bin/works/Show?ecaade2018_264
- Qazimi, S. (2014). Sense of place and place identity. *Online) European Journal of Social Sciences Education and Research*, 1(1).
- Qi, J., Shen, W., & Dai, K. (2021). From Digital Shock to Miniaturised Mobility: International Students' Digital Journey in China. *Journal of Studies in International Education*, 102831532110651. <https://doi.org/10.1177/10283153211065135>
- Razi, L., & Ziminski, D. (2022). Physical and Digital Placemaking in a Public Art Initiative in Camden, NJ. *Cosmopolitan Civil Societies: An Interdisciplinary Journal*, 14(2), 21–39. <https://doi.org/https://doi.org/10.5130/ccs.v14.i2.8201>
- Reed, M. (2005). Reflections on the 'realist turn' in organization and management studies. *Journal of Management studies*, 42(8), 1621–1644. <https://doi.org/10.1111/j.1467-6486.2005.00559.x>
- Reitsamer, B. F., & Brunner-Sperdin, A. (2021). It's all about the brand: place brand credibility, place attachment, and consumer loyalty. *Journal of Brand Management*, 28(3), 291–301. <https://doi.org/10.1057/s41262-020-00229-z>
- Relph, E. (2007). Spirit of Place and Sense of Place in Virtual Realities. *Techne: Research in Philosophy and Technology*, 10(3), 10(3), 17–25. http://www.cag-acg.ca/en/edward_relph.html or <http://www.geog.utoronto.ca/info/faculty/Relph.htm>
- Relph, E. (2021). Digital disorientation and place. *Memory Studies*, 14(3), 572–577. <https://doi.org/10.1177/17506980211010694>
- Reynolds, L., Peattie, K., Koenig-Lewis, N., & Doering, H. (2024). There's a time and place: Navigating omni-temporality in the place branding process. *Journal of Business Research*, 170. <https://doi.org/10.1016/j.jbusres.2023.114308>
- Richards, G. (2017). From place branding to placemaking: the role of events. *International Journal of Event and Festival Management*, 8(1), 8–23. <https://doi.org/10.1108/IJEFM-09-2016-0063>
- Richardson, M., Dobson, J., Abson, D. J., Lumber, R., Hunt, A., Young, R., & Moorhouse, B. (2020). Applying the pathways to nature connectedness at a societal scale: a leverage points perspective. *Ecosystems and People*, 16(1), 387–401. <https://doi.org/10.1080/26395916.2020.1844296>
- Richardson, M., Hussain, Z., & Griffiths, M. D. (2018). Problematic smartphone use, nature connectedness, and anxiety. *Journal of Behavioral Addictions*, 7(1), 109–116. <https://doi.org/10.1556/2006.7.2018.10>
- Riechers, M., Balázsi, Á., García-Llorente, M., & Loos, J. (2021). *Human-nature connectedness as leverage point*. <https://doi.org/10.1080/26395916.2021.1912830>
- Roccas, S., & Brewer, M. B. (2002). Social identity complexity. *Personality*
- Rogers, T., & Teehankee, B. (2020). Critical Realism: A Philosophy of Science for Responsible Business and Management Research. In *Responsible Research for Better*

- Business: Creating Useful and Credible Knowledge for Business and Society*, (pp. 17-34). Palgrave Macmillan.
- Rowe, G., & Wright, G. (1996). The impact of task characteristics on the performance of structured group forecasting techniques. In *International Journal of Forecasting* (Vol. 12).
- Rubin, H. J., & Rubin, I. S. (2011). *Qualitative interviewing: The art of hearing data*. SAGE Publications.
- Rutha, N. M. H., & Abbas, S. S. (2021). The Role of Technology in Enhancing Place Attachment in Public Place. *IOP Conference Series: Materials Science and Engineering*, 1094(1), 012034. <https://doi.org/10.1088/1757-899x/1094/1/012034>
- Ryan, R. M., & Deci, E. L. (2001). To be happy or to be self-fulfilled: a review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, 52, 141–166.
- Ryff, C. D., & Singer, B. H. (2008). Know thyself and become what you are: a eudaimonic approach to psychological well-being. *J. Happiness Stud.* 9, 13–39.
- Rzeszewski, M., & Naji, J. (2022). Literary placemaking and narrative immersion in extended reality virtual geographic environments. *International Journal of Digital Earth*, 15(1), 853–867. <https://doi.org/10.1080/17538947.2022.2061619>
- Sacramento, O., Challinor, E., & Silva, P. G. (2022). Here and elsewhere: multi-cited destinations and refugee place-making in rural and peri-urban Portugal. *Ager*, 34, 77–102. <https://doi.org/10.4422/ager.2022.08>
- Salzman, R., & Yerace, M. (2018). Toward understanding creative placemaking in a socio-political context. *City, Culture and Society*, 13, 57–63. <https://doi.org/10.1016/j.ccs.2017.10.004>
- Samus, A., Dickinson, K. J. M., Freeman, C., & van Heezik, Y. (2024). How to increase nature connectedness? Effectiveness and mechanisms of a gratitude journal intervention. *People and Nature*. <https://doi.org/10.1002/pan3.10735>
- Sanaeipoor, S., & Emami, K. H. (2020a). Smart [AR] Mini-Application: Engaging Citizens in Digital Placemaking Approach. *Proceeding of 4th International Conference on Smart Cities, Internet of Things and Applications, SCIoT 2020*, 84–90. <https://doi.org/10.1109/SCIoT50840.2020.9250208>
- Sanaeipoor, S., & Emami, K. H. (2020b). Smart City: Exploring the Role of Augmented Reality in Placemaking. *Proceeding of 4th International Conference on Smart Cities, Internet of Things and Applications, SCIoT 2020*, 91–98. <https://doi.org/10.1109/SCIoT50840.2020.9250204>
- Sandelowski, M. (2004). Using qualitative research. *Qualitative Health Research*, 14(10), pp. 1366-1386. <https://doi.org/10.1177/1049732304269672>
- Saunders, M., Lewis, P., & Thornhill, A. (2023). *Research Methods for Business Students* (9th Edition). Pearson Education.
- Saunders, M. N. K., Lewis, P., & Thornhill, A. (2007). *Research methods for business students*. Financial Times/Prentice Hall.
- Sayer, A. (1992). *Method in Social Science: A realist approach*. Routledge.
- Sayer, A. (2004). Why critical realism. In *Critical realist applications in organisation and management studies*, 11(6). Routledge
- Sayer, A. (2010). *Method in Social Science: A realist approach* (2ND Edition). Routledge.
- Scannell, L., & Gifford, R. (2010a). Defining place attachment: A tripartite organizing framework. *Journal of Environmental Psychology*, 30(1), 1–10. <https://doi.org/10.1016/j.jenvp.2009.09.006>
- Scannell, L., & Gifford, R. (2010b). The relations between natural and civic place attachment and pro-environmental behavior. *Journal of Environmental Psychology*, 30(3), 289–297. <https://doi.org/10.1016/j.jenvp.2010.01.010>

- Scannell, L., & Gifford, R. (2017). The experienced psychological benefits of place attachment. *Journal of Environmental Psychology*, 51, 256–269. <https://doi.org/10.1016/j.jenvp.2017.04.001>
- Schmalz, U., Spinler, S., & Ringbeck, J. (2021). Lessons Learned from a Two-Round Delphi-based Scenario Study. *MethodsX*, 8(101179). <https://doi.org/10.1016/j.techfore.2020.120096>
- Schwartz, R. (2015). Online place attachment. Exploring technological ties to physical places. In A. de Souza e Silva & M. Sheller (Eds.), *Mobility and Locative Media. Mobile communication in hybrid spaces* (pp. 85–100). Routledge.
- Seddon, N., Chaussou, A., Berry, P., Girardin, C. A. J., Smith, A., & Turner, B. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges. In *Philosophical Transactions of the Royal Society B: Biological Sciences* (Vol. 375, Issue 1794). Royal Society Publishing. <https://doi.org/10.1098/rstb.2019.0120>
- Sepe, M. (2015). Improving sustainable enhancement of cultural heritage: Smart placemaking for experiential paths in Pompeii. *International Journal of Sustainable Development and Planning*, 10(5), 713–733. <https://doi.org/10.2495/SDP-V10-N5-713-733>
- Sepe, M. (2016). Placemaking, urban identity and new technologies. *International Journal of Cultural Heritage*, 1, 55–64. <https://www.ias.org/iasar/filedownloads/ijch/2016/017-0007.pdf>
- Shankardass, K., Robertson, C., Shaughnessy, K., Sykora, M., & Feick, R. (2019). A unified ecological framework for studying effects of digital places on well-being. *Social Science and Medicine*, 227, 119–127. <https://doi.org/10.1016/j.socscimed.2018.09.022>
- Sharples, L., Fletcher-Brown, J., Sit, K., & Nieto-Garcia, M. (2023). Exploring crisis communications during a pandemic from a cruise marketing managers perspective: an application of construal level theory. *Current Issues in Tourism*, 26(19), 3175–3190. <https://doi.org/10.1080/13683500.2022.2109006>
- Sheffield, D., Butler, C. W., & Richardson, M. (2022). Improving Nature Connectedness in Adults: A Meta-Analysis, Review and Agenda. *Sustainability (Switzerland)*, 14(19). <https://doi.org/10.3390/su141912494>
- Shih, C. M., Treija, S., Zaleckis, K., Bratuškins, U., Chen, C. H., Chen, Y. H., Chiang, C. T. W., Jankauskaitė-Jurevičienė, L., Kamičaitytė, J., Koroļova, A., Lee, H. C., Lektauers, A., & Mlinkauskienė, A. (2021). Digital placemaking for urban regeneration: Identification of historic heritage values in Taiwan and The Baltic states. *Urban Planning*, 6(4), 257–272. <https://doi.org/10.17645/up.v6i4.4406>
- Šimůnková, K. (2019). Being hybrid: a conceptual update of consumer self and consumption due to online/offline hybridity. *Journal of Marketing Management*, 35(1–2), 40–74. <https://doi.org/10.1080/0267257X.2019.1573844>
- Singh, S., Nicely, A., Day, J., & Cai, L. A. (2022). Marketing messages for post-pandemic destination recovery- A Delphi study. *Journal of Destination Marketing and Management*, 23. <https://doi.org/10.1016/j.jdmm.2021.100676>
- Skinner, H. (2008). The emergence and development of place marketing's confused identity. *Journal of Marketing Management*, 24(9–10), 915–928. <https://doi.org/10.1362/026725708X381966>
- Skinner, H. (2021). Place Branding—The Challenges of Getting It Right: Coping with Success and Rebuilding from Crises. *Tourism and Hospitality*, 2(1), 173–189. <https://doi.org/10.3390/tourhosp2010010>

- Slingerland, G., Murray, M., Lukosch, S., McCarthy, J., & Brazier, F. (2022). Participatory Design Going Digital: Challenges and Opportunities for Distributed Place-Making. *Computer Supported Cooperative Work (CSCW)*, 1(32).
- Sobh, R., & Perry, C. (2006). Research design and data analysis in realism research. *European Journal of Marketing*, 40(11–12), 1194–1209. <https://doi.org/10.1108/03090560610702777>
- Soedarsono, W., Astuti, E. Y., Paramitasari, A. U., Asriana, N., Putri, D., & Zahra, A. (2021). *Placemaking in the Digital Era: A Case Study of M Bloc Space-Jakarta*.
- Stallone, V., Wetzels, M., Mahr, D., & Klaas, M. (2024). Enhancing Digital Advertising with Blockchain Technology. *Journal of Interactive Marketing*, 59(1), 76–98. <https://doi.org/10.1177/10949968231185543>
- Stoica, I. S., Kavaratzis, M., Schwabenland, C., & Haag, M. (2022). Place Brand Co-Creation through Storytelling: Benefits, Risks and Preconditions. *Tourism and Hospitality*, 3(1), 15–30. <https://doi.org/10.3390/tourhosp3010002>
- Stokes, B., Bar, F., Baumann, K., Caldwell, B., & Schrock, A. (2021). Urban furniture in digital placemaking: Adapting a storytelling payphone across Los Angeles. *Convergence*, 27(3), 711–726. <https://doi.org/10.1177/1354856521999181>
- Stokes, B., Baumann, K., & Bar, F. (2018). Placemaking across platforms: Playing to circulate stories in the smart city. *Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering, LNICST*, 215, 146–150. https://doi.org/10.1007/978-3-319-73062-2_13
- Sugangga, M., Paramitasari, A., Martokusumo, W., & Sarwo Wibowo, A. (2021). *Revitalization of Kota Lama Semarang and Early Signs of Digital Place Making Through Instagram*.
- Szaszák, G., & Kecskés, T. (2020). Universal Open Space Design to Inform Digital Technologies for a Disability-Inclusive Place-Making on the Example of Hungary. *Smart Cities*, 3(4), 1293–1333. <https://doi.org/10.3390/smartcities3040063>
- Tajfel, H. (1978). The social identity theory of intergroup behaviour. In J. Israel & H. Tajfel (Eds.), *The context of social psychology: A critical assessment* (pp. 69–119). Academic Press.
- Tajfel, H., & Turner, J. C. (1986). The social identity and intergroup behaviour. In S. Worchel & W. G. Austin (Eds.), *The psychology of intergroup relations* (pp. 7–24). Nelson-Hall.
- Tariq, S., & Woodman, J. (2013). Using mixed methods in health research. *JRSM Short Reports*, 4(6), 204253331347919. <https://doi.org/10.1177/2042533313479197>
- te Lintelo, D. J. H., Hernandez, K., & Lakshman, R. (2024). Migrant digital placemaking for wellbeing: a netnography of Facebook groups. *Wellbeing, Space and Society*, 100196. <https://doi.org/10.1016/j.wss.2024.100196>
- Terry, D. J. (2003). Social Identity and Diversity in Organizations. *Asia Pacific Journal of Human Resources*, 41(1), 25–35. <https://doi.org/10.1177/1038411103041001020>
- Thompson, S., Rahmat, H., Marshall, N., Steinmetz-Weiss, C., Bishop, K., Corkery, L., Park, M., & Tietz, C. (2023). Merging Smart and Healthy Cities to Support Community Wellbeing and Social Connection. *Encyclopedia*, 3(3), 1067–1084. <https://doi.org/10.3390/encyclopedia3030078>
- Thurston, W., Cove, L., & Meadows, L. M. (2008). Methodological congruence in complex and collaborative mixed method studies. *International Journal of Multiple Research Approaches*, 2(1), 2–14.
- Toland, A., Cate, M., & Worrall, J. (2020). DigitalXPlace. In D. Hes & C. Hernandez-Satin (Eds.), *Placemaking Fundamentals for the Built Environment* (pp. 253–274). Palgrave, Macmillan.

- Tomassini, L., & Cavagnaro, E. (2022). Circular economy, circular regenerative processes, agrowth and placemaking for tourism future. *Journal of Tourism Futures*, 8(3), 342–345. <https://doi.org/10.1108/JTF-01-2022-0004>
- Tomasso, L. P., Yin, J., Laurent, J. G. C., Chen, J. T., Catalano, P. J., & Spengler, J. D. (2021). The relationship between nature deprivation and individual wellbeing across urban gradients under covid-19. *International Journal of Environmental Research and Public Health*, 18(4), 1–20. <https://doi.org/10.3390/ijerph18041511>
- Tomitsch, M., McArthur, I., Haeusler, M. H., & Foth, M. (2015). The role of digital screens in urban life: New opportunities for placemaking. In *Citizen's Right to the Digital City: Urban Interfaces, Activism, and Placemaking* (pp. 37–54). Springer Singapore. https://doi.org/10.1007/978-981-287-919-6_3
- Toomey, A. H., Campbell, L. K., Johnson, M., Strehlau-Howay, L., Manzolillo, B., Thomas, C., Graham, T., & Palta, M. (2021). Place-making, place-disruption, and place protection of urban blue spaces: perceptions of waterfront planning of a polluted urban waterbody. *Local Environment*, 26(8), 1008–1025. <https://doi.org/10.1080/13549839.2021.1952966>
- Törnberg, P. (2022). Platform placemaking and the digital urban culture of Airbnbification. *Urban Transformations*, 4(1). <https://doi.org/10.1186/s42854-022-00032-w>
- Truong, S., Gray, T., & Ward, K. (2022). Enhancing urban nature and place-making in social housing through community gardening. *Urban Forestry and Urban Greening*, 72. <https://doi.org/10.1016/j.ufug.2022.127586>
- Tsekeri, E., Lilli, A., Katsiakalis, M., Gobakis, K., Mania, A., & Kolokotsa, D. (2022). *On the integration of nature-based solutions with digital innovation for health and wellbeing in cities*. 1–6. <https://doi.org/10.23919/splitech55088.2022.9854269>
- Tuan, Y. F. (1977). *Space and Place The Perspective of Experience*. University of Minesota Press.
- Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory*. Oxford: Basil Blackwell.
- UNFCCC. (2024). *How climate technology is being ramped up*. United Nations Climate Change (UNFCCC). Retrieved October 23, 2024, from <https://unfccc.int/news/how-climate-technology-is-being-ramped-up>
- United Nations. (2008). *UN forum examines positive impact of urbanization*. Retrieved January 20, 2022, from <https://news.un.org/en/story/2008/04/255242-un-forum-examines-positive-impact-urbanization-development>
- United Nations. (2018). *68% of the world population projected to live in urban areas by 2050, says UN*. United Nations Department of Economic and Social Affairs. <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>
- United Nations. (2020). *UN Secretary-General: "Making peace with nature is the defining task of the 21st century."* Retrieved December 30, 2024, from <https://unfccc.int/news/un-secretary-general-making-peace-with-nature-is-the-defining-task-of-the-21st-century>
- United Nations Development Programme. (2024). *United Nations Development Programme. Annual Report 2023*.
- United Nations Human Settlements Programme (UN-Habitat). (2020). *World Cities Report 2020. The Value of Sustainable Urbanization*. https://unhabitat.org/sites/default/files/2020/10/wcr_2020_report.pdf
- Vallicelli, M. (2018). Smart cities and digital workplace culture in the global European context: Amsterdam, London and Paris. *City, Culture and Society*, 12, 25–34. <https://doi.org/10.1016/j.ccs.2017.10.001>

- Vanderburg, W. H. (2000). *The labyrinth of technology*. University of Toronto Press.
- van Houwelingen-Snippe, J., van Rompay, T. J. L., & Allouch, S. B. (2020). Feeling connected after experiencing digital nature: A survey study. *International Journal of Environmental Research and Public Health*, 17(18), 1–16.
<https://doi.org/10.3390/ijerph17186879>
- Van Houwelingen-Snippe, J., Allouch, S.B., & Van Rompay, T. J. L. (2021). Virtual Reality Representations of Nature to Improve Well-Being amongst Older Adults: a Rapid Review. *Journal of Technology in Behavioral Science*, 6(3), 464–485.
<https://doi.org/10.1007/s41347-021-00195-6>
- Vaughan, J., Maund, K., Gajendran, T., Lloyd, J., Smith, C., & Cohen, M. (2021). Determining and representing value in creative placemaking. *Journal of Place Management and Development*, 14(4), 430–445. <https://doi.org/10.1108/JPMD-07-2019-0069>
- Veal, A.J. (2006). *Research Methods for Leisure and Tourism: A Practical Guide*. (3rd Edition). Pearson Education.
- von der Gracht, H. A. (2012). Consensus measurement in Delphi studies. Review and implications for future quality assurance. *Technological Forecasting and Social Change*, 79(8), 1525–1536. <https://doi.org/10.1016/j.techfore.2012.04.013>
- Waite, C. (2020). Making place with mobile media: Young people's blurred place-making in regional Australia. *Mobile Media and Communication*, 8(1), 124–141.
<https://doi.org/10.1177/2050157919843963>
- Walsh, M. (2019). *Conducting Semi-Structured Interviews*.
www.oxfam.org.uk/policyandpractice
- Wang, L., Zhang, Q., & Wong, P. P. W. (2024). Reexamination of consumers' willingness to stay at green hotels: rethinking the role of social identity theory, value-belief-norm theory, and theory of planned behavior. *Journal of Hospitality Marketing & Management*, 33(4), 547–581. <https://doi.org/10.1080/19368623.2023.2292639>
- Wang, W. (2019). A Study of Digitally Enhanced People–Space Interaction: A Place-Centric Perspective. *Space and Culture*. <https://doi.org/10.1177/1206331219881352>
- Wang, W. (2022). A Study of Digitally Enhanced People–Space Interaction: A Place-Centric Perspective. *Space and Culture*, 25(1), 65–76.
<https://doi.org/10.1177/1206331219881352>
- Warnaby, G., & Medway, D. (2015). Rethinking the place product from the perspective of the service-dominant logic of marketing. In *Rethinking Place Branding: Comprehensive Brand Development for Cities and Regions* (pp. 33–50). Springer International Publishing. https://doi.org/10.1007/978-3-319-12424-7_3
- White, M. P., Yeo, N. L., Vassiljev, P., Lundstedt, R., Wallergård, M., Albin, M., & Löhmus, M. (2018). *Neuropsychiatric Disease and Treatment Dovepress A prescription for 'nature'-the potential of using virtual nature in therapeutics*.
<https://doi.org/10.2147/NDT.S179038>
- White, S. C. (2016). Introduction. The Many Faces of Wellbeing 1. In *The many faces of wellbeing. Cultures of Wellbeing* (pp. 1–44). Palgrave MacMillan.
- WHO Regional Office for Europe. (2021). *Green and New Evidence and Perspectives for Action Blue Spaces and Mental Health*. <http://apps.who.int/bookorders>.
- Whyte, W. H. (1980). *The social life of small urban spaces*. Conservation Foundation.
- Wilken, R., & Humphreys, L. (2021). Placemaking through mobile social media platform Snapchat. *Convergence*, 27(3), 579–593. <https://doi.org/10.1177/1354856521989518>
- Williams, D. R. (2014). Making sense of “place”: Reflections on pluralism and positionality in place research. *Landscape and Urban Planning*, 131, 74–82.
<https://doi.org/10.1016/j.landurbplan.2014.08.002>

- Wilson, E. O. (1984). *Biophilia*. Harvard University Press.
- Witteborn, S. (2021). Digital placemaking and the datafication of forced migrants. *Convergence*, 27(3), 637–648. <https://doi.org/10.1177/13548565211003876>
- World Bank Group. (2023). *Sustainable cities must become central to climate change strategies*. Retrieved October 29, 2024, from <https://www.worldbank.org/en/news/feature/2023/06/26/sustainable-cities-must-become-central-to-climate-change-strategies>
- World Economic Forum. (2024). *Innovation and adaptation in the climate crisis: Technology for the new normal*. Retrieved October 23, 2024, from <https://www.weforum.org/publications/innovation-and-adaptation-in-the-climate-crisis-technology-for-the-new-normal/>
- World Health Organization (WHO). (2023). *Achieving well-being: A global framework for integrating well-being into public health utilizing a health promotion approach*. Retrieved January 2, 2025, from <https://www.who.int/publications/m/item/wha-76---achieving-well-being--a-global-framework-for-integrating-well-being-into-public-health-utilizing-a-health-promotion-approach>
- World Health Organization (WHO). (2024). *Health and climate change at the 77th World Health Assembly*. Retrieved October 23, 2024, from <https://www.who.int/news-room/events/detail/2024/05/27/default-calendar/climate-health-events-at-wha77>
- Wright, I. (2021). Integral Placemaking. A poiesis of sophrosynes? In *The Routledge Handbook of Placemaking* (pp. 322–332). Routledge.
- Wyckoff, M. A. (2014). DEFINITION OF PLACEMAKING: Four Different Types. *Planning & Zoning News*, 32(3). www.miplace.org.
- Yang, F. (2023). Window of the world: Transparency, digital placemaking, and Shenzhen Urbanism. *City, Culture and Society*, 34. <https://doi.org/10.1016/j.ccs.2023.100518>
- Yang, X. J., Zeng, L., & Zhang, R. (2012). Cloud delphi method. *International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems*, 20(01), 77–97. <https://doi.org/10.1142/S0218488512500055>
- Yin, R. K. (2009). *Case study research: Design and methods* (Vol. 5). SAGE Publications.
- Yoshida, Y., Matsuda, H., Fukushi, K., Takeuchi, K., & Watanabe, R. (2022). The missing intangibles: nature’s contributions to human wellbeing through place attachment and social capital. *Sustainability Science*, 17(3), 809–822. <https://doi.org/10.1007/s11625-021-01067-x>
- Zacher, H., & Rudolph, C. W. (2021). Individual differences and changes in subjective wellbeing during the early stages of the COVID-19 pandemic. *American Psychologist*, 76(1), 50.
- Zenker, S., & Braun, E. (2010, June). The Place Brand Centre-A Conceptual Approach for the Brand Management of Places. *39th European Marketing Academy Conference*.
- Zenker, S., & Erfgen, C. (2014). Let them do the work: A participatory place branding approach. *Journal of Place Management and Development*, 7(3), 225–234. <https://doi.org/10.1108/JPMD-06-2013-0016>
- Zenker, S., & Martin, N. (2011). Measuring success in place marketing and branding. *Place Branding and Public Diplomacy*, 7(1), 32–41. <https://doi.org/10.1057/pb.2011.5>
- Zhang, H., & Gong, Q. (2021). Migrant placemaking and authorship: digital storytelling by Chinese interprovincial students. *Continuum*, 35(4), 509–527. <https://doi.org/10.1080/10304312.2021.1932748>
- Zhang, S., Jiang, H., & Carroll, J. M. (2010). Social Identity in Facebook Community Life. *International Journal of Virtual Communities and Social Networking*, 2(4), 64–76. <https://doi.org/10.4018/jvcsn.2010100105>

- Zinkhan, G. M., & Hirschheim, R. (1992). Truth in Marketing Theory and Research: An Alternative Perspective. *Journal of Marketing*, 56, 80–88.
- Zins, A. H., & Abbas Adamu, A. (2024). Heritage storytelling in destination marketing: cases from Malaysian states. *Journal of Heritage Tourism*, 19(5), 669–681. <https://doi.org/10.1080/1743873X.2023.2232476>
- Zitcer, A. (2020). Making Up Creative Placemaking. *Journal of Planning Education and Research*, 40(3), 278–288. <https://doi.org/10.1177/0739456X18773424>

Appendices

Appendix A: Systematic Literature Review Protocol published in PROSPERO

How can digital placemaking impact health and wellbeing of citizens through green and blue space connections? A systematic literature review protocol

To enable PROSPERO to focus on COVID-19 submissions, this registration record has undergone basic automated checks for eligibility and is published exactly as submitted. PROSPERO has never provided peer review, and usual checking by the PROSPERO team does not endorse content. Therefore, automatically published records should be treated as any other PROSPERO registration. Further detail is provided [here](#).

Citation

Maria Fernandez de Osso Fuentes, Brendan Keegan, Marc Jones, Tadhg MacIntyre. How can digital placemaking impact health and wellbeing of citizens through green and blue space connections? A systematic literature review protocol. PROSPERO 2022 CRD42022316039 Available from: https://www.crd.york.ac.uk/prospERO/display_record.php?ID=CRD42022316039

Review question

What is the impact of digital placemaking on health and wellbeing through green and blue space?

Searches

Web of Science, Scopus, Emerald, ACM DL and Google Scholar.

2016-2021

Types of study to be included

Peer-reviewed publications.

Condition or domain being studied

Health and wellbeing indicators for urban communities.

Participants/population

Not applicable

Intervention(s), exposure(s)

Not applicable

Comparator(s)/control

Not applicable

Context

Studies based around digital placemaking, health and wellbeing, and green and blue spaces.

Exclusion criteria would be studies not in English, studies that are book reviews or thesis will be excluded as well as studies from disciplines that are not related to the three main topics of the research such as Law, Education or Textiles. Exceptional book chapters will be included as well as conference proceedings.

Main outcome(s)

The study is interested in digital placemaking practices and cases that have an impact in community's wellbeing when linking with green and blue space. We aim to find the connections among these three topics, such as successful case studies characteristics, specific placemaking practices, health indicators, green space characteristics, and wellbeing benefits. Any measure of engagement rates and improved health and wellbeing indicators were eligible for inclusion.

Additional outcome(s)

Not applicable

Measures of effect

Not applicable

Data extraction (selection and coding)

Data will be collected from each included report and will be checked by two independent reviewers (BK, MJ). Any discrepancies will be resolved through discussion. A standardised, pre-piloted form will be used to extract data from the included studies for assessment of study quality and evidence synthesis. Extracted information will include report author, year and source of publication, case study (if applicable), method/study design, sample characteristics, type of intervention, measure of performance, theoretical approach, key findings, and gap in literature for future research. In case of unclear information, authors of the reports will be contacted to provide further details.

Risk of bias (quality) assessment

The authors will assess the risk of bias and quality of evidence of the studies using the Mixed Method Appraisal Tool (MMAT) (Hong et al., 2018). This tool permits evaluation of the methodological quality of five categories of studies: qualitative research, randomized controlled trials, non-randomized studies, quantitative studies and mixed method studies.

Two reviewers (BK, MJ) will apply independently MMAT of included articles. In case of differences, a third reviewer (TM) will be included in this process.

Strategy for data synthesis

Since we have included a variety of related keywords as per the complexity of the term 'digital placemaking', it is expected that the nature of this review will be a descriptive synthesis of the impact of digital placemaking in health and wellbeing through green and blue space. Data from published studies will be collated and summarised following the Thematic Analysis method (Braun & Clarke, 2012). This method will aid our study to identify and organise data insights into patterns of meaning across the dataset collated. Meta-analysis could not be undertaken for this review due to the heterogeneity of the research and potential differences in outcomes.

Analysis of subgroups or subsets

Not applicable

Contact details for further information

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Organisational affiliation of the review

Maynooth University

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Review team members and their organisational affiliations

Miss Maria Fernandez de Osso Fuentes. Maynooth University

Dr Brendan Keegan. Maynooth University

Dr Marc Jones. Manchester Metropolitan University

Dr Tadhg MacIntyre. Maynooth University

Type and method of review

Systematic review

Anticipated or actual start date

01 July 2022

Anticipated completion date

01 September 2022

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State the funder, grant or award number and the date of award

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1st September 2020.

Conflicts of interest

Language

English

Country

Ireland

Published protocol

https://www.crd.york.ac.uk/PROSPEROFILES/316039_PROTOCOL_20220310.pdf

Stage of review

Review Ongoing

Subject index terms status

Subject indexing assigned by CRD

Subject index terms

Humans; Parks, Recreational; Residence Characteristics; Systematic Reviews as Topic

Date of registration in PROSPERO

10 April 2022

Date of first submission

10 March 2022

Stage of review at time of this submission

Stage	Started	Completed
Preliminary searches	Yes	No
Piloting of the study selection process	Yes	No
Formal screening of search results against eligibility criteria	Yes	No
Data extraction	No	No
Risk of bias (quality) assessment	Yes	No
Data analysis	No	No

The record owner confirms that the information they have supplied for this submission is accurate and complete and they understand that deliberate provision of inaccurate information or omission of data may be construed as scientific misconduct.

The record owner confirms that they will update the status of the review when it is completed and will add publication

details in due course.

Versions

10 April 2022

10 April 2022

Appendix B: Chapter 2 Part A: Published Manuscript.

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Contents lists available at ScienceDirect

Urban Forestry & Urban Greening

journal homepage: www.elsevier.com/locate/ufug



Review

Digital placemaking, health & wellbeing and nature-based solutions: A systematic review and practice model

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ARTICLE INFO

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Green space

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Nature-based solutions

Mental health

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ABSTRACT

Technology implementations in the urban environment have the potential to reshape how communities experience places, specifically providing a potential enhancer for nature-based solutions in the city. Urban spaces are facing a number of challenges from climate mitigation to negative effects on communities. In this context, nature-based solutions aim to promote nature as an answer to the current climate challenge, linking positive outcomes for society in a cost-effective way. Urban nature could benefit from the implementation of technology to enhance nature experiences and nature's impact on the community. This study aims to review and synthesise existing literature focusing on the associations between digital placemaking, mental health and wellbeing impact and the use of green and blue spaces while exploring successful case studies. Hundred and seventeen studies met the eligibility criteria, most of them used qualitative methods. The findings provide insights into the potential impact of digital placemaking practices for urban nature on citizens' wellbeing and mental health. Our results indicated an absence of agreement on the concept of digital placemaking, and a lack of blue space research while nature was presented as a context and passive element. Mental health and wellbeing are mostly approached without specifically examining health indicators or assessing the health impact of these practices. Our study proposes a model offering insights into the broad range of best practices for implementing digital placemaking for nature and wellbeing and represents a key contribution to understanding the innovative application of augmenting NBS through digital placemaking impacting the wellbeing of citizens.

1. Introduction

Surroundings impact a person's quality of life. The value and effect of public spaces have been broadly studied, especially by authors such as Gehl, Jacobs and Whyte who defended the importance of adopting a people-first approach to urbanism, which places people at the heart of the design of public spaces. These concepts are the foundation for placemaking (PPS, 2004). To promote connections with environments and create meaningful places, placemaking was first discussed in the 1960s (Abdel-Aziz et al., 2016). It seeks to improve the quality of public spaces for communities, which is imperative for increasing social bonds and wellbeing (Courage, 2021).

Placemaking has been applied to many different concepts and areas, from urban nature and community gardening (Truong et al., 2022), to participatory planning (Huang, 2019), tourism planning (Lew, 2017), as well as the shift from placemaking to place-keeping (Mattijssen et al.,

2017). Part of the debate around placemaking is the use of augmented technology and digital applications to improve communities' relationships with public spaces, specifically those that follow urban greening strategies and nature-based solutions (NBS) (Tsekeri et al., 2022).

Digital placemaking is the implementation of technology in placemaking practices, from using mobile games to explore the environment (Hjorth and Richardson, 2017; Qabshoqa, 2018) to the role of social media in allowing communities to connect in digital and analogue ways with their surroundings (Breek et al., 2018). Digital placemaking has the potential to benefit communities by adding value to public spaces, economic growth, cultural wealth, and overall better community life (Morrison, 2021). It could reconvert urban areas into community hubs, revitalising its heritage and experiences through social media and place branding (Soedarsono et al., 2021; Sugangga et al., 2021). This technological application to placemaking practices can enhance the impact in cities and public spaces, not only generating a stronger sense of place

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and belonging within communities (Halegoua and Polson, 2021) but also making spaces more accessible and inclusive to all (Bedford et al., 2022; Szaszák and Kecskés, 2020).

Despite the benefits of these practices, it is important to also address potential risks and impacts that have been reported on digital placemaking practices, such as gentrification (Bottero et al., 2022; Bronsvort and Uitermark, 2021), the environmental harm from e-waste (Bedford et al., 2022), exposing pre-existing inequalities and exclusions (Halegoua and Polson, 2021), light pollution (Foth and Caldwell, 2018), or projects not genuinely engaging and putting the community first (Foth et al., 2018; Kamols et al., 2021; Monno and Khakee, 2012).

Digital technology affects how we experience our surroundings. From a study by Prescott, (2019), almost all adults aged 16–44 years used the internet daily (99%) in the United Kingdom, while 87% of the population own smartphones (Deloitte, 2021). Most citizens interact with the environment through some type of digital device. Thus, digital placemaking has the potential to shape reality in urban spaces, potentially helping people connect with nature for example through augmented reality (Clowater, 2021). When applied to the management of urban nature spaces, it can benefit from measuring performances, supporting decision-making and connecting communities with the spaces in the world of the internet we are living in.

Specifically, digital placemaking could be a key approach to improving public spaces and urban nature environments, since sixty-eight per cent of the world's population will live in urban areas by 2050 (United Nations, 2018). Since the industrialisation process cities have suffered a loss of public spaces (Paquin, 2019), diminishing the opportunities for engagement with natural environments, which has potential negative impacts on communities' health (Bashan et al., 2021). Despite the positive effects of urban development on issues such as poverty or inequality (United Nations, 2008), urban environments' negative consequences on citizens' wellbeing (e.g., social isolation) have also been illustrated (Marshall, 2021). These concerns were amplified by the COVID-19 pandemic (Zacher and Rudolph, 2021), raising awareness of the importance of urban green spaces in peoples' mental health and wellbeing (Heckert and Bristowe, 2021; Tomasso et al., 2021). Nature is proposed to have a positive effect on citizens' health through increased opportunities for physical activity, greater social interaction, protection from pollutants and stress reduction (Bowler et al., 2010; Hartig et al., 2014). There is extensive empirical literature on the benefits of nature exposure for health (Bratman et al., 2019; Jimenez et al., 2021) however, the wellbeing impact of digital technology as a mediator between nature and citizens has not been fully addressed (van Houwelingen-Snippe et al., 2020).

The need for the inclusion of nature in cities has been highlighted for several years, most recently in a report by the WHO Regional Office for Europe (2021) presenting the beneficial impact on health and wellbeing of nature, specifically the crucial role of green and blue spaces for urban planning and climate change through NBS. The report differentiates green space and blue space, where green space is understood as "urban forests, parks, playgrounds, allotments and urban farming locations" (p. 8), and blue spaces are "coasts, lakes, ponds and pond systems, wadis systems, artificial buffer basins and water courses" (p. 24). Regarding NBS, these practices aim to promote nature as an answer to climate mitigation and adaptation (Nesshöver et al., 2017) in a cost-effective way. The implementation of NBS in international policy and business discourses is spreading and gaining relevance (Seddon et al., 2020). NBS promote the maintenance, restoration and enhancement of biodiversity and ecosystems as a way to address environmental challenges, while also being a design and planning tool (Giachino et al., 2021). Furthermore, they provide several benefits such as the health and wellbeing of citizens (European Commission, 2016). Recent studies have highlighted the value and importance of implementing digital technology in NBS, enriching their potential effects while increasing citizens' awareness (Tsekeri et al., 2022). These innovative and integrative tools could bridge the gaps and limitations of NBS while supporting

decision-making and governance (César de Lima Araújo et al., 2021). Smart technologies applied to NBS are proven to facilitate the management and awareness of these practices, but it is also crucial to address their potential risks (Li and Nassauer, 2021).

The incorporation of digital innovation in the citizens' wellbeing-nature equation would benefit from 'indirect interactions' with nature, which have beneficial evidence for communities increasing their wellbeing and reducing stress levels (Cox et al., 2017). Digital placemaking could assist in establishing these interactions by creating hybrid experiences in a place. Moreover, the increased attention to nature-based technologies and the implementation of digital tools to enhance design solutions for healthy environments (WHO Regional Office for Europe, 2021) support the potential synergies and benefits from the implementation of digital technologies as enhancers and facilitators of urban nature. Technology could act, not only as a tool within NBS but also as an enhancer of its long-term relationships and impacts on the community. Digital placemaking is presented in this study as a novel approach to NBS that could increase the environmental performance and social impact of these practices in the cities while supporting the mental health and wellbeing of their inhabitants. Aside from digital placemaking as an NBS tool, there is scope for it to create positive effects such as co-created activities that augment the sense of belonging within communities, as well as other key contributions that have not been explored yet.

With the present study, we are exploring how digital connectivity can help increase the sense of place in urban nature environments when introducing technology within NBS. Risks of digital solutions in urban greening strategies within NBS and the ability of this technology to connect communities are addressed. The study systematically review and synthesise the existing literature focusing on the impact of digital placemaking on mental health and wellbeing through green and blue space connections, offering an insight into the broad range of best practices of digital placemaking when enhancing the performance and impact of NBS. We introduce an innovative technique, that of digital placemaking, to augment the application of NBS, thus potentially impacting the wellbeing of citizens. A model for implementing digital placemaking for nature connections and psychological wellbeing in communities is also proposed, offering a thorough understanding of the potential of embedding technologies inside NBS to increase their performance, while fostering social inclusion and cohesion in bringing nature into the urban environment.

2. Materials and method

This systematic review was performed and is reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Page et al., 2021). The protocol for the review was registered with PROSPERO an international database of literature reviews created by the University of York (<https://www.crd.york.ac.uk/prospero/>) (registration number: 2022 CRD42022316039).

2.1. Search strategy & study identification

The literature review focuses on published articles in the following databases: Web of Science, Scopus, Emerald, ACM DL (Association for Computing Machinery Digital Library) and Google Scholar. An initial search was conducted between the 30th of November and the 1st of December 2021. The dataset was updated on the 5th of October 2022.

An initial search was conducted (Health and wellbeing AND digital AND "green space" AND placemaking) to create a keyword bank that informed our final search. The final search was grouped into three themes and two tiers (see Table 1). A number of synonyms of digital placemaking, mental health/wellbeing and green/blue space were included to ensure any relevant publications were not overlooked (Jalali and Wohlin, 2012).

The review process followed similar works in cognate disciplines.

Table 1
Search Strings grouped in Theme.

Theme	Search string	Google Scholar	Web of Science	Scopus	Emerald DL	ACM DL	PubMed	TOTAL							
Digital Placemaking	Tier 1	digital AND place OR placemaking OR place-making OR place making OR place marketing OR digital place* OR environmental placemaking OR environmental place-making OR environmental place making OR smart cities placemaking OR smart cities place-making OR smart cities place making practice OR digital placemaking practice OR digital place-making practice OR digital place making practice OR creative placemaking OR creative place-making OR creative place making OR social practice placemaking OR social practice place-making OR social practice place making OR digital placemaking and community development OR digital place-making and community development OR digital place making and community development						28400	591406	29800	82	628225	45014	694702	
	keywords used in tier1 phrase	Placemaking OR place-making OR place making OR digital AND placemaking OR digital AND place-making OR digital AND place making OR digital place-making OR digital place-making OR smart cities place-making OR smart cities place making practice OR smart cities place making practice OR creative placemaking OR creative place-making OR creative place making OR social practice placemaking OR social practice place-making OR social practice place making OR digital placemaking and community development OR digital place-making and community development OR digital place making and community development						694000	276803	63543	251000	549549	26515	1861410	
		Placemaking OR place-making OR place making OR digital AND placemaking OR digital AND place-making OR digital AND place making OR digital place-making OR digital place-making OR smart cities place-making OR smart cities place making practice OR smart cities place making practice OR creative placemaking OR creative place-making OR creative place making OR social practice placemaking OR social practice place-making OR social practice place making OR digital placemaking and community development OR digital place-making and community development OR digital place making and community development						1630000	7778	2078	45000	378033	410	2063299	
		Environmental placemaking OR environmental place-making OR environmental place making OR smart cities placemaking OR smart cities place-making OR smart cities place making practice OR smart cities place making practice OR creative placemaking OR creative place-making OR creative place making OR social practice placemaking OR social practice place-making OR social practice place making OR digital placemaking and community development OR digital place-making and community development OR digital place making and community development						1670000	34486	49709	46000	473934	11101	2285230	
		Smart cities placemaking OR smart cities place-making OR smart cities place making practice OR smart cities place making practice OR creative placemaking OR creative place-making OR creative place making OR social practice placemaking OR social practice place-making OR social practice place making OR digital placemaking and community development OR digital place-making and community development OR digital place making and community development						53400	29737	5484	77000	560667	4146	730434	
		Creative placemaking OR creative place-making OR creative place making OR social practice placemaking OR social practice place-making OR social practice place making OR digital placemaking and community development OR digital place-making and community development OR digital place making and community development						668	295	10000	554085	6	583054	6	583054
		Digital placemaking practice OR digital place-making practice OR digital place making practice OR digital placemaking and community development OR digital place-making and community development OR digital place making and community development						1860000	2815	1187	43000	565263	159	2472024	
		Digital Placemaking and community development OR digital place-making and community development OR digital place making and community development						3130	1086	461	36	565290	67	570090	
		Social practice placemaking OR social practice place-making OR social practice place making inclusive smart city OR participatory city making OR urban interaction design OR social media OR digital storytelling OR interaction design OR digital nature OR human-technology interaction						3260	252	89	35	581130	16	584762	
		Social practice placemaking OR social practice place-making OR social practice place making inclusive smart city OR participatory city making OR urban interaction design OR social media OR digital storytelling OR interaction design OR digital nature OR human-technology interaction						87000	8673	3499	142000	572097	1404	814673	
		Inclusive smart city OR participatory city making OR urban interaction design OR social media OR digital storytelling OR interaction design OR digital nature OR human-technology interaction						22400	669971	642178	929	614211	235242	2184931	
		Inclusive smart city						130000	490	404	2000	492390	43	625327	
		Participatory city making						912000	1801	1089	6000	590960	209	1512059	
		Urban interaction design						195000	8275	6205	25000	527834	2202	764516	
Health and Wellbeing	Tier 1	Health AND wellbeing OR health* OR well-being AND well-being health AND wellbeing Health* well-being AND well-being healthy environment OR community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						626000	7800347	6256914	164000	94476	5653872	20595609	
	keywords used in tier1 phrase	Health AND wellbeing OR health* OR well-being AND well-being healthy environment OR community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						781000	42015	56175	10000	3098	85256	977554	
		Health AND wellbeing OR health* OR well-being AND well-being healthy environment OR community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						650000	7793169	6244808	163000	93719	6356280	21300896	
		Healthy environment OR community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						534000	7186	35744	6000	3762	110027	680739	
	Tier 2	Healthy environment OR community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						18400	2030479	1901451	1000	566298	563576	3050725	
	keywords used in tier2 phrase	Healthy environment OR community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						1240000	66969	46891	28000	313103	60827	1755790	
		Community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						1930000	35459	33016	38000	475457	662555	3174487	
		Community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						715000	730091	503121	83000	188027	9208214	11427453	
		Community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						642000	833690	840440	102000	183665	9040928	11642723	
		Community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						701000	88281	90022	53000	493168	722084	2149555	
		Community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						43300	1844	2574	695	454927	72053	575393	
		Community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						63700	545670	617095	90000	407668	330973	2055106	
		Community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						26300	35564	26289	4000	569282	6792	668227	
		Community wellbeing OR community well-being OR community health OR public health OR social wellbeing OR social-well-being Or wellbeing and healing OR well-being and healing OR stress levels						1740000	11330	9744	8000	349011	1606	2119691	
Green and Blue Spaces	Tier 1	urban green space OR public green space OR blue space OR nature-based solutions						26300	35564	26289	4000	569282	6792	668227	
	keywords used in tier1 phrase	urban green space Public green space blue space Nature-based solutions public open space OR community gardens OR green gentrification OR environmental ecology OR sustainable development goals OR urban ecology						1740000	11330	9744	8000	349011	1606	2119691	
		Urban green space Public green space blue space Nature-based solutions public open space OR community gardens OR green gentrification OR environmental ecology OR sustainable development goals OR urban ecology						2260000	4994	3845	17000	396836	1652	2684327	
		Urban green space Public green space blue space Nature-based solutions public open space OR community gardens OR green gentrification OR environmental ecology OR sustainable development goals OR urban ecology						2290000	22018	14446	10000	342739	4190	2683393	
		Urban green space Public green space blue space Nature-based solutions public open space OR community gardens OR green gentrification OR environmental ecology OR sustainable development goals OR urban ecology						25300	1694	1649	620	555834	349	585446	
	Tier 2	public open space OR community gardens OR green gentrification OR environmental ecology OR sustainable development goals OR urban ecology						30400	236820	160225	2000	570315	141237	1140997	
	keywords used in tier2 phrase	Public open space Community gardens Green gentrification Environmental ecology Sustainable development goals Urban ecology						1960000	8931	6934	51000	447145	1566	2475576	
		Public open space Community gardens Green gentrification Environmental ecology Sustainable development goals Urban ecology						17900	9008	6109	9000	152152	3594	197763	
		Public open space Community gardens Green gentrification Environmental ecology Sustainable development goals Urban ecology						27100	268	185	359	57098	17	85027	
		Public open space Community gardens Green gentrification Environmental ecology Sustainable development goals Urban ecology						716000	177564	97384	11000	290001	131288	1423237	
		Public open space Community gardens Green gentrification Environmental ecology Sustainable development goals Urban ecology						1830000	33310	40635	47000	505789	4585	2461319	
		Public open space Community gardens Green gentrification Environmental ecology Sustainable development goals Urban ecology						1740000	22678	17815	5000	32183	9062	1826738	

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The process identified relevant articles through the following: (a) literature search in selected databases; (b) export of results into Microsoft Excel to store, remove duplicates and apply exclusion criteria; (c) results from b exported into Rayyan software (<http://rayyan.qcri.org>) for title and abstract screening; (d) review of conflicts from c by two team members; (e) full-text screening of articles identified as relevant through c and d by two team members; (f) review of conflicts from e by a third team member; (g) quality assessment applied by two team members independently; (h) review of conflicts from g by a third team member.

2.2. Eligibility criteria

Articles were considered eligible to be included in the review if they met the following criteria: (a) represented original research published in a peer-reviewed journal; (b) were published in the English language; (c) feature the use of digital placemaking (even if the term was not specifically mentioned but placemaking, location-based technology or digital technology of some sort was cited following our related keywords using in the search strategy); (d) disciplines related to the three main themes of research; (e) relevant book chapters and conference proceedings that are pertinent to our research question. This criterion was applied to all three themes datasets collected and results were compared among themes to remove all duplications. The dataset was updated between September and October 2022 to include the full-year range found during our data collection and analysis – initial landmark study from 2016 as a criterion was removed – and 2022 update during review process. The eligibility criteria process was applied to this data update. A final dataset of 117 records was selected for the systematic review (see Table 2).

2.3. Data extraction

The following data were extracted from eligible studies: report author, year and source of publication, case study (if available), method/study design, sample characteristics, type of intervention, measure of performance, theoretical approach, key findings and gap in literature for future research. Data extraction was completed using Microsoft Excel by one team member and checked by a second one (BK, MJ, TM). Disagreements were solved by a third team member.

2.4. Qualitative assessment

The quality of eligible studies was assessed using the Mixed Method Appraisal Tool (MMAT) (Hong et al., 2018). This qualitative assessment for risk of bias and quality of evidence of the studies permits an evaluation of the methodological quality of studies from five categories: qualitative research, randomized controlled trials, non-randomized studies, quantitative studies, and mixed-method studies. This tool was designed for the appraisal stage of systematic mixed studies reviews and allows us to appraise the quality of different methodological studies. The MMAT was applied independently by two team members to each paper and a third team member was included to solve disagreements. Quality assessment was conducted according to the MMAT guidelines for each paper, answering “yes”, “no” or “cant tell” to the methodological quality criteria. Each paper then received a score following a 5-point Likert scale, 5 being the maximum score. The majority of the results received 3 or 4 points (26%; n = 30 each), whereas 15% (n = 18) of results received the highest score (5 points) for high quality (Appendix A).

2.5. Data synthesis

Data from the studies were collated and summarised following the Thematic Analysis method (Braun and Clarke, 2012, 2021). This method allows us to identify and classify data insights into patterns of meaning across the dataset collected. A concept matrix which included the record information (title, author, year, source, and publisher), mention of digital placemaking, health & wellbeing, green & blue space, codes and

themes, research question, case study (if so, city and country), method of the study, sample characteristic, type of intervention, the measure of performance, theoretical approach, key findings, the gap in the literature found and MMAT score was developed. Codes and themes followed the thematic coding process: familiarisation with the data, generation of initial codes, search of themes, review of potential themes, defining and naming themes, and report production. Themes and codes along with the allocation of articles to themes were checked in roundtable discussions.

3. Findings

The thematic analysis of the dataset produced ten key themes as can be seen in Table 3. This section will discuss each of the themes providing further detail on the extant knowledge base, a deeper understanding of the characteristics of digital placemaking and their relationship to mental health/wellbeing and green/blue spaces.

3.1. General observations

The majority of studies were case studies (72%; n = 84). Qualitative methods were predominant (90%; n = 105), with a split of 4% (n = 4) of quantitative and 6% (n = 7) of mixed methods for the rest of the records. There was no consistency in publication sources with articles from environment to culture, technology, sustainability, or tourism, proving this concept as a multidisciplinary process with no specific area of concentration. Very few studies investigated the combined effects of digital placemaking, mental health/wellbeing and green/blue space as shown in Table 4.

3.2. Theoretical perspectives on digital placemaking

Despite being the most recurrent theme among all records (72%, n = 84), digital placemaking is found to be a complex term, with different terminologies and definitional discrepancies.

From our results, Relph (2007) compares virtual and real places alluding to virtual placemaking, but it would be Latorre (2011) who defined digital placemaking as the integration of social media in placemaking practices (see Table 5). However, Basaraba's review (2021) studied the multidisciplinary approach of the concept, which emerged as 'digital placemaking' in media studies in 2015. Digital placemaking is a complex concept that has been implemented in different fields without being tied to one specific piece of technology (Chen et al., 2022; Głowczyński, 2022). Yet, the first disagreement found in our results on the concept of digital placemaking is to understand if it is a type of placemaking itself or if it is a subcategory of creative placemaking.

Placemaking practices have been applied to a variety of disciplines evolving into different subgroups within the concept. However, the most cited classification is described by Wyckoff (2014) – standard placemaking as the universal term whose types are strategic, tactical, and creative placemaking. Some authors present digital placemaking as a subcategory of creative placemaking (Basaraba, 2021; Paquin, 2019; Sanaeipoor and Emami, 2020; Stokes et al., 2018), understanding it is the application of media to creative placemaking – defined by Markusen and Gadwa (2014) as the use of arts, creative and cultural thinking to improve the interest of a place. However, most authors identify digital placemaking as an independent category that could be defined as the implementation of technology in these practices that enables communities to interact with hybrid digital-physical places (Foth, 2017b; Fredericks et al., 2018; Halegoua and Polson, 2021; Labayen and Gutierrez, 2021; Pavlovskaya, 2016; Toland et al., 2020; Wang, 2019).

We have found terminology disagreements among different scholars, who do not mention digital placemaking itself but define 'applications' of placemaking that implement technology, understood as digital placemaking. Furthermore, some authors mention these terms in their work without defining them (Alvarez et al., 2017; Besek, 2021;

Table 2
Study selection chart.

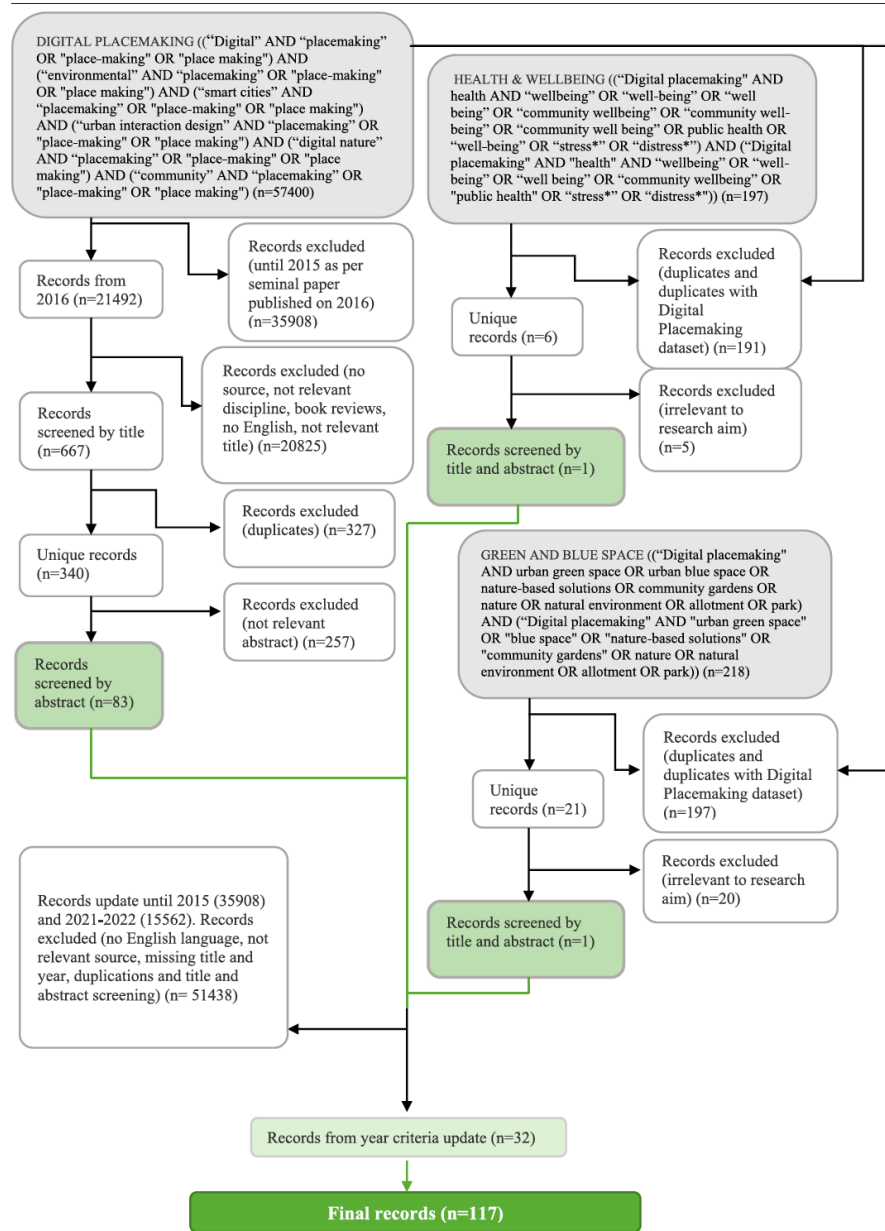


Table 3
Themes and codes from Thematic Analysis.

Theme	Times in dataset (TID)	%	Codes	TID
placemaking	84	71,79	digital placemaking	37
			placemaking	28
			creative placemaking	4
			virtual placemaking	3
			healthy placemaking	2
			smart placemaking	2
			green placemaking	2
			Radical placemaking	1
			ethical placemaking	1
			hybrid placemaking	1
			mobile placemaking	1
community engagement	54	46,15	community engagement	49
			community participation	3
			citizen engagement	2
			hybrid space	12
hybrid reality	39	33,33	augmented reality	9
			location-based mobile	6
			virtual reality	5
			geo-location	2
			immersive digital	2
			experience	1
			expanded reality	1
sense of place	38	32,48	experience	1
			digitalisation	1
			GIS	1
			sense of place	24
inclusion	12	10,26	identity	8
			place attachment	5
			place branding	1
			inclusion	9
social media	18	15,38	accessibility	2
			social justice	1
			social media	14
smart city	17	14,53	mobile media	2
			digital media	2
			smart city	11
co-creation	13	11,11	smart cities tech	6
			co-creation	11
			co-governance	2
wellbeing	17	14,53	wellbeing	4
			social wellbeing	3
			health indicators	2
			mental health	2
			place wellbeing	2
			community wellbeing	1
			wellness of city	1
			residents	1
			stress	1
			healthy living	1
nature in cities	14	11,97	nature in cities	4
			contrast tech-nature	2
			nature-based solutions	3
			Green planning	1
			Urban Agriculture	1
			therapeutic green	1
			space	1
			Green infrastructure	1
			Blue space	1

Bicquelet-Lock, 2021; Breek et al., 2018, 2021; Busse, 2021; Chaudhry et al., 2019; Cilliers et al., 2015; Clowater, 2021; Edwards et al., 2020; Globa et al., 2019; Gobbo and Benedetti, 2021; Harner et al., 2017; Houghton et al., 2015; Hunter et al., 2022; MacIntyre et al., 2019; Marshall, 2021; McArthur and Xu, 2021; Ozduzen et al., 2021; Rzeszewski and Naji, 2022; Soedarsono et al., 2021; Truong et al., 2022; Wright, 2021; Zhang and Gong, 2021). The absence of an explicit clarification of these concepts presented from the results of the analysis, as well as the different terms employed, emphasizes the confusion and lack of consensus on digital placemaking. Table 5 presents a variety of

Table 4
Studies by area of interest mentioned.

Areas of interest mentioned	n° articles
Digital placemaking	96
Health & Wellbeing	29
Green & Blue Space	25
No Digital Placemaking	21
No Health & Wellbeing	88
No Green & Blue Space	92
Placemaking, health & wellbeing, green & blue space	8
Digital placemaking, health & wellbeing, green & blue space	4

approaches and views on the concepts, collating the different definitions for placemaking, and its variations as described by the authors in the dataset. There are two sections, placemaking definitions, and digital placemaking definitions along with its concept variations found in the dataset.

Besides the term digital placemaking, our analysis of findings has produced two additional groups. One group links hybrid realities to placemaking such as virtual placemaking (Devine, 2017; Qabshoqa, 2018; Relph, 2007), radical placemaking (Gonsalves et al., 2021), hybrid placemaking (Bilandzic and Johnson, 2013), and smart placemaking (Najafi et al., 2021; Sepe, 2015), focusing on the creation of hybrid realities that could create a sense of immersion. The second group investigates social media use through mobile media in placemaking (Breek et al., 2018; Latorre, 2011; Polson, 2015; Waite, 2020).

Regarding theoretical contributions, Foth, (2017a,b) applied Lefebvre's theory of "the right to the city" (Lefebvre, 1996) to placemaking in the digital era as a way to bring social change and renew the urban environment, which proves the potential benefit of digital placemaking for social and behavioural change to create inclusive environments. Gulsrud et al. (2018) employ Tuan's theory, (1977) and Williams' theory, (2014) on emotional attachment to a place, placemaking potential to create diverse identity spaces to understand the use of technology to create climate resilience. Toland et al. (2020) re-evaluated the term *digital placemaking*, analysing the evolution of its definition to propose the term DigitalXPlace. Furthermore, scholars called for further research to understand sustainable ways of digital placemaking (Foth, 2017b) and detailed digital placemaking strategies that incorporate the community view and outcomes (Keegan, 2021).

3.2.1. Key characteristics

From our findings, digital placemaking is described as having a set of key characteristics and other additional characteristics (see Table 6).

The systematic review identified hybrid realities as a theme within the concept of digital placemaking, as the implementation of technology in urban environments allows citizens to experience physical-digital realities (Kostopoulou and Fatah gen Schieck, 2021; Wang, 2019). Location-based technology is found as an essential element of hybrid realities, which is also understood as a key characteristic of digital placemaking (Clarke, 2021; Keegan, 2021; MacIntyre et al. 2019; Pang et al., 2020; Witteborn, 2021). Results of the review showed that hybrid realities include location-based technology and games (Bilandzic and Johnson, 2013; Frith and Richter, 2021; Gobbo and Benedetti, 2021; Harner et al., 2017; Hjorth and Richardson, 2017; Pang et al., 2020; Pavlovskaya, 2016; Qabshoqa, 2018), augmented realities (Abdel-Aziz et al., 2016; Boffi, 2021; Clowater, 2021; Her, 2021; Hjorth and Richardson, 2017; Hunter et al., 2022; Sanaeipoor and Emami, 2020), immersive digital experiences (Globa et al., 2019), virtual reality (Kuchelmeister et al., 2020; Rzeszewski and Naji, 2022; van Houwelingen-Snippe et al., 2021), and digital pop-up artefacts (Fredricks et al., 2018). All of them help create realities that combine the physical and digital world with different intensities – virtual reality refers to a fully immersive experience in the digital environment, in contrast to digital pop-up artefacts that combine analogue and digital media for community engagement.

Table 5
Definitions of digital placemaking within the data set.

PLACEMAKING DEFINITIONS			
Authors	Own Definition?	Cited Author	Definition
Abdel-Aziz et al. (2016).	No	Project for Public Spaces, (2015)	Place-making is the act of creating great places by making a public space a living place
Biedermann and vande Moere, (2021)	No	Sweeney et al. (2018)	Placemaking describes the philosophy and the practical process of reshaping a neighbourhood, city or region with the aim to establish a sense of place within a community (Sweeney et al. 2018).
Boros and Mahmoud, (2021)	No	Wyckoff, (2014)	Placemaking is an inherently people-centered approach to the planning, designing and management of public spaces in cities, as it emphasizes the relationships between individuals, communities, and urban spaces (Wyckoff, 2014)
Brunnberg and Frigo, (2012)	No	Kent and Madden, (2003)	Visionaries within urban planning and design such as Jane Jacobs and William Whyte dedicated significant effort advocating the importance of lively and attractive public spaces in cities (Jacobs 1961, Whyte 1980). Their work is foundational for the concept of placemaking (Fred and Madden 2003). In urban planning, the practise of placemaking is an inclusive and community-driven approach for the design of human spaces, and it focuses on the entire process of creatin meaningful public places in urban environments.
Gilliers et al. (2015).	No	Project for Public Spaces, (2015)	Place-making is the process by which people transform the locations they inhabit into the places where they live (PPS (Project for Public Spaces)PPS, 2004). Place-making is a broad concept that includes various dimensions of development. It is mainly focused on public spaces, which are an extension of the community. When cities and neighbourhoods have thriving civic spaces, residents have a strong sense of community, therefore place-making aims to create places to socialize and interact.
Courage, (2021).	Yes		Placemaking is an approach and a set of tools that puts the community front and centre of deciding how their place looks and how it functions. There is a community imperative in placemaking.
Freeman et al. (2019).	No	(Pierce et al., 2011)	A common understanding of placemaking is "the set of social, political and material processes by which people iteratively create and recreate the experiences geographies in which they live.
Grace et al. (2020)	Yes		This space reflects where living, learning, working and recreating functions collectively meet to form more integrated smarter natural solutions centred around creating new places and also improving existing places.
Her, (2021)	Yes		Placemaking is one approach to revitalizing underused areas, whether rural, deprived, unused, or abandoned.
Houghton et al. (2015).	No	Friedmann, (2010)	A collaborative, people-centered, planning process as suggested in Friedmann's, (2010) discussion of placemaking.
Keegan and Schifanella, (2022)	No	Mateo-Babiano and Lee, (2020)	Placemaking concerns the continuous acts and functions of making places better. Moreover, scholars envisage an extension beyond physical locations and posit that places include socio-economic, ecological and political dimensions (Mateo-Babiano and Lee, 2020).
Kolotouchkina et al. (2021)	No	Lepofsky and Fraser, (2003)	Placemaking is an extension of the notion of citizenship, a mechanism allowing people to make claims on place, and to participate in the production of its meaning (Lepofsky and Fraser, 2003)
Latorre, (2011).	Yes		Placemaking is a sacred multi-faceted approach that capitalizes on a local community's assets, inspiration, and potential.
Peacock et al. (2021).	Yes		We collectively define placemaking as a practice of reimagining public spaces with the input of citizens.
Sepe, (2015)	No	Cabe, (2000)	Placemaking can be defined – paraphrasing the definition of urban design reported by Cabe – as ‘the art of making places for people. It includes the way places work and matters such as community safety, as well as how they look. It concerns the connections between people and places, movement and urban form, nature and the built fabric’.
Strydom et al. (2018)	No	Beza, (2016); Boeri, (2017)	Placemaking may be described as a collective effort by individuals living within a specific setting (Boeri, 2017, p. 2). A collective effort refers to the action of individuals/groups to re-inagine their surrounding environments (Beza, 2016, p. 245).
Tomitsch et al. (2015).	Yes		If deployed in modalities cognisant of local socio-cultural contexts and in ways that seek to be inclusive of the input of citizens, we may begin to see smartness reflected in rising levels of social wellbeing and connectedness. These are ultimately the crucial human components in placemaking. Such a holistic and responsive approach to embedding urban screens and media architecture is redolent of what we might describe as a more ecological framework for placemaking.
Toomey et al. (2021)	No	Williams, (2014); Cresswell, (2014); Toomey et al. (2020)	Place-making has been described as a type of “performance” of recreational, civic engagement, or livelihood-based activities enacted in a given place and can also be understood in relation with broader social, economic and political contexts beyond the localised scale (Cresswell, 2014; Williams, 2014; Toomey et al., 2020).
Wyckoff, (2014).	Yes		For the time being, the simplest definition will suffice: “Placemaking is the process of creating quality places that people want to live, work, play and learn in.” Later I will define “Strategic Placemaking,” “Creative Placemaking,” and “Tactical Placemaking” and explain how each differs from the standard “placemaking.”
DIGITAL PLACEMAKING DEFINITIONS			
Authors	Own Definition?	Cited Author	Type of placemaking
Keegan, (2021)	No	Calvium, (2018)	Digital placemaking
Bangratz and Förster, (2021)	No	Foth, (2017b)	Digital placemaking
Basaraba, (2021).	No	Richards and Duif, (2018)	Digital placemaking
			Definition
			Independent vs Subcategory of Creative placemaking
			N/A
			N/a
			Subtype CPM

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Table 5 (continued)

Bilandzic and Johnson, (2013).	Yes		Hybrid Placemaking	meanings (emotions) and creativity to capture public attention through narratives (Richards and Duif, 2018). We introduce the term hybrid placemaking to refer to an evolving future research area that combines the opportunities of social, spatial and digital means to facilitate social interaction, and regards those means as equally important, complementary factors for the design of interaction affordances in a space.	N/A
Boffi, (2021).	No	Tomitsch, (2016)	Digital placemaking	Tomitsch recently introduced the definition of “digital place-making” [Tomitsch, 2016] to highlight that acts of place-making can also be deployed through digital touchpoints or a mix of digital and physical ones. Representations of places on digital platforms are important in themselves as they shape the experience of place and define who belongs.	N/A
Bronsvort and Uitermark, (2022)	Yes		Digital placemaking	Creative placemaking is, at its core, about unleashing the unlimited power of arts and culture to advance community wellbeing.	N/a
Calderon and Takeshita, (2021)	Yes		Creative placemaking	Digital placemaking is a complex and multifaceted landscape (Caldwell and Fredericks 2017). It provides an outlet for creativity and for communities to appropriate and customize the urban environment. It has also been appropriated by government and designers to activate, rejuvenate, and engage people in public spaces (Foth 2017). Digital placemaking is constantly evolving and iterating in media studies since it is grounded on the continuous bursting and innovation of digital technology, from social media to immersive environments like virtual reality (Basaraba, 2021).	N/a
Chen et al. (2022)	No	Basaraba, (2021); Foth, (2017a); Caldwell and Fredericks, (2017)	Digital Placemaking	Therefore, digital placemaking looks at configuring and re-configuring the built environment with digital technology to support the meaningful interpretation of public space by individuals and for communities. (Foth et al., 2017; Fredericks et al., 2015; Hespanhol, 2018). With interactive urban play, we are then seeing to enrich the identity of places, with playfulness and playability as the means to advance the goals of digital placemaking.	N/A
Chew et al. (2020)	No	Foth, (2017); Fredericks et al. (2015); Hespanhol, (2018)	Digital placemaking	When linking green-planning interventions with place-making approaches, the natural environment is enhanced, and further contributes to sustainable development objectives. Place-making (focusing on social functions) and green planning (focusing on environmental functions) have a vice versa benefit, as illustrated in the case studies. Digital placemaking concerns the interplay between physical and digital worlds in public space. It considers places as hybrid physical-digital and addresses the ways in which offline and online spaces, the public realm and the private infosphere have become entangled. For Dr Jo Morrison, Director of Innovation and Research at mobile app developer Calvium, and consultant on the Pathfinder, digital placemaking is about ‘using location-specific digital technology to foster deeper relationships between people and the places they inhabit’. It involves the ‘augmentation of physical places with’ digital layers, ‘services, products or [interactive] experiences’, and has the potential to ‘enhance or even radically transform an individual’s experience of their time’ in a location.	N/A
Cilliers et al. (2015)	Yes		Green Placemaking	Virtual worlds are undoubtedly real places in their own right to the people who spend time in them, and virtual game worlds provide important practical examples of virtual place-making for heritage visualisers	N/A
Clarke, (2021).	No	Morrison, (2021)	Digital placemaking	Interpreted ethical placemaking – grounded in an ecological conception of persons – as a core component of an enabling, capabilities-oriented, conception of justice. The following is the most cited definition of creative placemaking: “In creative placemaking, partners from public, private, non-profit, and community sectors strategically shape the physical and social character of a neighborhood, town, city, or region around arts and cultural activities. Creative placemaking animates public and private spaces, rejuvenates structures and streetscapes, improves local business viability and public safety, and brings diverse people together to celebrate, inspire, and be inspired” (Markusen and Gadwa, 2010, p. 3).	N/A
Devine, (2017).	Yes		Virtual placemaking	The most genuine form of digital placemaking does not limit people to just providing feedback to city governments as part of conventional community consultation processes,	N/A
Eckenwiler, (2021).	Yes		Ethical placemaking		
el Khafif et al. (2021)	No	Markusen and Gadwa, (2010)	Creative placemaking		
Foth, (2017a)	Yes		Digital placemaking		Independent

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Table 5 (continued)

Fredericks et al. (2018).	No	Tomitsch, (2016)	Digital placemaking	it regards them as co-creators in a collaborative form of city making (.) Digital placemaking can play a role in facilitating a dialogue across citizens, communities, government, businesses, civic groups and non-profits. The use of digital technologies and media for shaping urban experiences that are citizen-centric, both in their conception and implementation, is also referred to as 'digital place-making' (Tomitsch, 2016)."	Independent
Frith and Richter, (2021)	No	Halegoua, (2020)	Digital placemaking	Digital placemaking – defined 'as the use of digital media in cultivating a sense of place for oneself and others' (Halegoua, 2020: 16)	N/a
Głównyński, (2022)	Yes		Digital Placemaking	Therefore, digital placemaking mechanisms are considered here as human- and data-driven processes mediated through spatial media and resulting in reshaping places under the conditions of digital platform ecosystems. It is both a positive process in terms of shaping digitally mediated sense of place, performing self-identity and a negative emphasizing of inequalities, relations of power, place control and struggle, especially with regard to data availability and visibility	N/A
Gonsalves et al. (2021).	Yes		Radical placemaking	Radical Placemaking sits at the confluence of people, place and technology to explore how marginalised communities can create hybrid digital-physical urban experiences.	N/A
Gulsrud et al. (2018).	No	Eggermont et al. (2015) Buizer et al. (2016) Kabisch et al. (2016)	Green placemaking	A green placemaking approach to UGI governance and climate resilience can be seen as integrating socio-cultural and scientific knowledge to successfully promote and achieve higher levels of urban biodiversity (Eggermont, 2015; Buizer et al., 2016; Kabisch et al., 2016).	N/A
Halegoua and Polson, (2021)	Yes		Digital placemaking	We propose that at its core 'digital placemaking' describes the use of digital media to create a sense of place for oneself and/or others – to embrace digital media affordances in order to cultivate or maintain a sense of attachment to place.	N/a
Hardley and Richardson, (2021)	Yes		Digital placemaking	Placemaking as a hybrid experience that coalesces digital and material worlds, perceptions, and negotiations of the public-private relation in domestic contexts and the corporeal intimacy of mobile phone use.	N/a
Karge, (2018).	No	Toolis, (2017)	Critical placemaking	Placemaking targets community building, life quality, empowerment and civic engagement. As an empowerment tool, placemaking can contribute to reclaiming the public space affected by privatization and is thus called critical placemaking by Toolis (2017).	N/A
Labayan and Gutierrez, (2021)	Yes		Digital placemaking	The term 'digital placemaking' mostly describes the use of multimedia platforms and digital apps that link urbanites' activities to a sense of belonging and the potential to intervene in urban development.	N/a
Latorre, (2011).	Yes		Digital Placemaking	We refer to this as Digital Placemaking. It's the integration of social media into Placemaking practices, which are community-centered, encouraging public participation, collaboration, and transparency.	N/A
Li and Alencar, (2022)	No	Halegoua and Polson, (2021)	Digital Placemaking	Digital place-making can be defined as the use of digital technology to build a sense of belonging and attachment to certain places for oneself and/or others (Halegoua and Polson, 2021, 573).	N/A
Markusen and Gadwa, (2014).	Yes		Creative Placemaking	In creative placemaking, partners from public, private, non-profit, and community sectors strategically shape the physical and social character of a neighbourhood, town, tribe, city, or region around arts and cultural activities. Creative placemaking animates public and private spaces, rejuvenates structures and streetscapes, improves local businesses viability and public safety, and brings diverse people together to celebrate, inspire, and be inspired.	N/A
Najafi et al. (2021).	No	Pavlovskaya, (2016)	Smart placemaking	Smart placemaking, defined as the augmentations of physical place with smart technologies, offers a range of powerful opportunities to add value to public spaces, in ways which can translate into health promotion in society and improved living environments for all [Pavlovskaya, 2016].	N/A
Ng, 2016	Yes		Healthy placemaking	Healthy place-making treats cities as an integral part of the natural landscape. Human settlements should "grow" naturally out of the ecosystem, providing their residents with plenty of opportunities to contact nature through a network of blue-green (water and open space) infrastructure.	N/A
Norum and Polson, (2021).	Yes		Digital placemaking	Interweaving of meaning-making in relation to place, occurring through social relations, communication, embodiment, and personal and shared experience enacted	N/a

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Table 5 (continued)

Pang et al. (2020)	No	Sun, (2015) Foth, (2017b) Sun et al. (2017) Peacock et al. (2018)	Digital placemaking	via a digitally mediated platform, that we explore here as digital placemaking. Digital placemaking augments physical places with location-specific services to create informal, playful, and meaningful opportunities for participation (Sun, 2015; Foth, 2017; Sun, McLachlan, and Naaman, 2017; Peacock, Anderson, and Crivellaro, 2018).	N/A
Pang et al. (2020)	No		Digital placemaking	Our design of City Explorer focused on digital placemaking by augmenting physical places with location-specific services to create informal, playful, and meaningful opportunities for participation.	N/A
Paquin, (2019).	No	Tomitsch, (2016)	Digital placemaking	Digital placemaking involves a redefinition of the notion of space, from the physical to an augmented one: it is a "process of using digital media or shaping experiences that are citizen-centric, in modes of "augmenting" and positively reinforcing urban place." (Tomitsch, 2016: 340).	Subtype CPM
Pavlovskaya, (2016).	Yes		Digital placemaking	Digital place making involves the production of place through its representations on the internet. In the age of information technologies, images of a place circulated on the internet acquire a particular importance.	Independent
Polson, (2015).	Yes		Digital Placemaking	Digital place-making, in that it allows for communication and behaviour expectations to be set up and connections to be made in advance, in the semi-private spaces where participants meet online, seems to open up opportunities for women to more comfortably and equitably access the corresponding offline spaces.	N/A
Polson, (2015).	Yes		Mobile Placemaking	If our experience of places are constituted more through relationships and communicative interactions than by geographic location, then online interfaces that both produce and manage offline interactions can be understood as platforms for mobile place-making.	N/A
Qabshoqa, (2018).	Yes		Virtual placemaking	A place can be constructed virtually. This place is not limited to a physical presence but can be formed and realised using digital technologies. Also, It triggers human insights and allows activities whether it is virtual or physical. The construction of this place is Virtual Placemaking. The virtual placemaking can be achieved in the urban environment through Gamification.	N/A
Qi et al. (2021)	No	Peacock and MacKenzie, (2016)	Digital placemaking	Digital placemaking refers to the use of extensive applications of digital and mobile technologies to reorganise urban spaces, and transform people's life experiences and modes of interactions within and across places (Peacock and Mackenzie, 2016).	N/A
Relph, (2007).	Yes		Virtual Placemaking	I have suggested that the real post-modern world poses serious difficulties for authentic place-making and perhaps the best that can be done is to develop physical settings that aim to encourage the emergence of different types of activities and meanings as the setting is lived and worked in. Something similar should apply to virtual place-making – establish a foundation or framework that can then be adapted and modified through participation to create a strong spirit of virtual place.	N/A
Sanaeipoor and Emami, (2020)	No	Halegoua, (2020)	Digital placemaking	Digital placemaking, as the intersectionality of placemaking practices with social media (Halegoua, 2020), is used to install digital technologies in the urban realm to enhance culture. Digital placemaking facilitates a range of public-related goals such as urban regeneration programs, sharing technology-based knowledge and running cultural events.	Subtype CPM
Sanaeipoor and Emami, (2020).	Yes		Digital placemaking	Digital placemaking by installing or utilizing digital technologies in the public space can enhance public awareness about their place (especially in environmental or social issues), facilitate urban regeneration programs, promote societal role of art in urban realm, and broad knowledge of civic participation in digital era.	Subtype CPM
Sepe, (2015)	Yes		Smart Placemaking	The use of technological tools serves the purpose of increasing the potential for innovation and regional competitiveness of Pompeii for both locals and visitors, and of avoiding simplification of information or marketing. I have illustrated the smart approach to placemaking, and the new DIV@TER multimedia platform currently being developed.	N/A
Sharma and Jaggi, (2022)	Yes		Digital Placemaking	Digital placemaking as a construct in this study. This definition is a deductive synthesis of our reading of the literature of digital placemaking cited in this article and aligning that reading with the theoretical perspectives of participatory communication. (...) The concept of digital	N/A

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Table 5 (continued)

Stokes et al. (2018)	No	Markusen and Gadwa, (2010)	Creative placemaking	placemaking can be understood as a process on digital communities involving an organic interaction among the digital placemakers as they participate towards a common cause of sustaining the local culture of geographic spaces while engaging through the key strategies towards the process	Subtype CPM
Stokes et al. (2021)	No	Halegoua and Polson, (2021); Halegoua, (2020); Tomitsch et al. (2015)	Digital Placemaking	Placemaking movement has expanded beyond branding and architecture to include creative activities that deepen our sense of place and attachment to it. Digital place-making can feel temporary, yet the goal is to create 'a sense of permanence, pause, or investment infinity within the forces and scapes that shape spatiality' (Halegoua, 2020: 5), and, as the editors explain in the introduction to this special issue, it involves digital practices to create 'emotional connections to place' (Halegoua and Polson, 2021). Forms of digital placemaking include large screens embedded in public space (Tomitsch et al., 2015), scavenger hunts with cellphones, and place-based storytelling	N/A
Sugangga et al. (2021).	Yes		Digital placemaking	The term of placemaking related to ICT is popularized as digital placemaking.	N/A
Toland et al. (2020).	No	Aurigi and De Cindio, (2008) Latorre, (2011); Fredericks et al. (2016)	Digital placemaking	The term is being used to describe ways in which digital technologies might be used to extend traditional placemaking strategies, such as expanding community engagement or enhancing collaboration and communication amongst stakeholders (Aurigi and De Cindio, 2008; Fredericks et al., 2016; Latorre, 2011), as well as crowdsourcing information and mobilising participation.	Independent
Vallicelli, (2018).	Yes		Digital placemaking	Digital placemaking shifts the design target from mere buildings to places, making digital work an urban practice that extends beyond the office or coworking environment.	N/A
Waite, (2020).	No	Frith, (2015); Licoppe, (2013)	Mobile media in placemaking	In the context of place, and place-making, however, a relevant genre of technologies are "locative media" (Frith, 2015). The term refers to mobile media that are networked, and which allow users to know the location of themselves and others in "mutual proximity" (Licoppe, 2013, p. 123).	N/A
Waite, (2021)	No	Waite, (2020)	Digital Placemaking	Digital place-making distills these ideas to extend the mutual construction of place advocated by Seamon and Massey to the digitally mediated, but ultimately territorially embedded, interactions that are routinely enacted online (see Waite, 2020).	N/A
Wang, (2019).	Yes		Digital placemaking	Digital technology is closely integrated into the process of how people and space interact and how people are socialized in the hybrid physical-digital environment.	Independent
Wang, (2022)	Yes		Digital Placemaking	Through systematically mediating ordinary people's placemaking actions across the temporal and spatial scales, digitally enforced placemaking as a medium and approach creates new forms of relations that gradually change the means we interact with the world.	N/A
Wilken and Humphreys, (2021).	No	Halegoua, (2020)	Digital placemaking	Halegoua, (2020) suggests that our persistent mobile use in fact leads to renewed forms of 'digital placemaking' – 'the use of digital media in cultivating a sense of place for oneself and for others' (p. 16). Halegoua refers to digital placemaking in urban contexts as forms of 're-placemaking the city'.	N/a
Witteborn, (2021).	Yes		Digital placemaking	Digital placemaking practices are repeated acts across time and space, mediated through technological devices, networks, and numerical entities that create and augment a digital, physical, social, and symbolic location for individuals and groups of people.	N/A

de Souza E Silva, 2006 on hybrid spaces was frequently cited to describe the digital overlay across the actual environment (Frith and Richter, 2021; Hjorth and Richardson, 2017; Wang, 2019, 2022). Qabshoqa (2018) and Kostopoulou and Fatah gen Schieck (2021) applied the idea of overlaying realities through urban gamification and local augmentation of memories respectively, with the potential to positively redefine public spaces (Abdel-Aziz et al., 2016). These technologies do not aim to replace reality (Her, 2021), but to enhance its experiences and renew the excitement for physical space engagement and connections (Clowater, 2021; Kostopoulou and Fatah gen Schieck, 2021; Wang, 2019). The proliferation of technology in our daily life has shaped how we come to know the physical world (Clowater, 2021; Frith and Richter,

2021). Potential risks and negative effects of hybrid realities are the possible cause of displacement (Kostopoulou and Fatah gen Schieck, 2021), private data collection (Hjorth and Richardson, 2017), or increasing disparities within communities (Birnbbaum et al., 2021).

The second key theme found is sense of place, in that individuals spend time living and emotionally interacting with space beyond being physically in it (Abdel-Aziz et al., 2016; Birnbbaum et al., 2021; Freeman et al., 2019). Scholars understand it as one of the objectives of placemaking (Chen et al., 2022; Fredericks et al., 2018; Rutha and Abbas, 2021), and it is usually presented as linked to place attachment (Birnbbaum et al., 2021; Freeman et al., 2019; Kale, 2019; Polson, 2015; Rutha and Abbas, 2021; Toomey et al., 2021) and identity (Agyekum and

Table 6
Key themes in digital placemaking.

Area	Theme	Identified as	N° times data
DIGITAL PLACEMAKING	Placemaking	KEY CHARACTERISTIC	84
	Community Engagement		54
	Hybrid Reality	ADDITIONAL CHARACTERISTICS	39
	Sense of Place		38
	Inclusion		12
	Smart City		17
	Co-Creation		13
	Social Media		18

Newbold, 2019; Breek et al., 2018; Harner et al., 2017; Relph, 2007; Soedarsono et al., 2021). Most authors referred to Tuan's theory (Basaraba, 2021; Devine, 2017; Gulsrud et al., 2018; Harner et al., 2017; Rutha and Abbas, 2021; Rzeszewski and Naji, 2022; Toomey et al., 2021), which studies the human emotions and relationships to a specific place (Tuan, 1977), also presented as one of the foundations of placemaking (Clark and Lupton, 2021; Devine, 2017). Sense of place layers the physical space with meaning and cultural symbols (Foth et al., 2021), bringing a variety of benefits to communities, such as enabling community building (Breek et al., 2018), creating sense of ownership and entitlement (Kale, 2019), and development of community and individual identity (Chen et al., 2022; el Khafif et al., 2021; Harner et al., 2017; Kale, 2019). Scholars have reflected on the creation of sense of place in digital environments, fostering emotional online connections to create meaningful locations (Clowater, 2021; Haleboua and Polson, 2021; Harner et al., 2017; Johnstone et al., 2016; Norum and Polson, 2021; Relph, 2007; Sanaeiipoor and Emami, 2020; Witteborn, 2021). There is evidence of the potential benefit of sense of place through digital placemaking in communities, especially when looking into how digital networked technologies could foster a sense of connectedness (Johnstone et al., 2016).

A third key theme was community engagement. Defined as a process of involving people to collaborate in decisions and outcomes to benefit their communities (Clarke, 2021; Foth, 2017b; Fredericks et al., 2018; Freeman et al., 2019), it is also described to empower communities (Fisher et al., 2018) and improve social cohesion among members (Najafi et al., 2021). It includes community participation (Alvarez et al., 2017; Courage, 2021; Harner et al., 2017; Toland et al., 2020; Witteborn, 2021; Zhang and Gong, 2021), and citizen engagement (Basaraba, 2021; Parashivoiu and Layer-Wagner, 2021). It is also defended by Sanaeiipoor and Emami (2020) as "necessary for placemaking strategies to succeed" (p. 91). Our findings showed studies that reflected how community engagement could benefit from technology (Abdel-Aziz et al., 2016; Bilandzic and Johnson, 2013; Breek et al., 2018; Clarke, 2021; Fisher et al., 2018; Harner et al., 2017; Parashivoiu and Layer-Wagner, 2021; Sanaeiipoor and Emami, 2020; Toland et al., 2020; Tomitsch et al., 2015), exploring the potential positive effect in easing the ability to connect communities and enhance engagement through bottom-up initiatives. Sanaeiipoor and Emami (2020) explored community engagement framed within smart city theory where participation is key, while Parashivoiu and Layer-Wagner (2021) applied citizen engagement theory with behaviour change through gamification to address climate change. However, we have found a lack of specifications regarding how to engage with communities successfully within the dataset, particularly when involving placemaking and active living projects for communities (Pang et al., 2020).

The final key theme identified through our thematic analysis is inclusion. Digital placemaking brings inclusivity to individuals with movement restrictions (Clarke, 2021; Karge, 2018; Szaszák and Kecskés, 2020), marginalized communities whose narratives have been ignored (Foth, 2017b; Gonsalves et al., 2021; Stokes et al., 2021), and facilitates general information accessibility (Her, 2021; Sugangga et al., 2021). It

allows citizens to connect with the same level of opportunities as the rest of the community. Therefore, inclusion is crucial for placemaking (Foth, 2017b) and the implementation of technology could open new barrier-free opportunities for communities (Clarke, 2021). Szaszák and Kecskés (2020) studied the implications of technology to create disability-inclusive placemaking in Hungary, showcasing a lack of digital replacement in less basic levels of the spatial Maslow pyramid. Even though inclusion is mentioned as an essential aspect of placemaking, studies tend to overlook it. This could be a consequence of targeting specific groups or economic activities which leads to a loss of diversity (Chen et al., 2022). There is a lack of exploration and tests of solutions and innovations to make nature accessible for those with limited access using other types of technologies rather than GPS or GIS as well as an exploration of the effects of different types of digital nature in older adults' wellbeing (van Houwelingen-Snippe et al., 2021).

3.2.2. Additional characteristics

From our results, we have found themes that were approached and described in the dataset understood as additional characteristics since they are not presented as essential to digital placemaking but enhance and benefit their application. These themes add potential value to digital placemaking practices.

Smart cities are found in our results as a theme linked to hybrid realities but expanded to cyberinfrastructures in cities (Freeman et al., 2019). Smart cities' final goal is to employ technology to benefit citizens' life (Wang, 2019), usually including ICTs in the urban environment (Chaudhry et al., 2019; Grace et al., 2020; Sanaeiipoor and Emami, 2020; Szaszák and Kecskés, 2020), and Internet of Things (IoT) (Freeman et al., 2019; Peacock et al., 2021; Sanaeiipoor and Emami, 2020). This theme could collect data from citizens through technology (Peacock et al., 2021; Sanaeiipoor and Emami, 2020; Vallicelli, 2018). Grace et al. (2020) combine the smart city paradigm with the biophilic city paradigm to create the smart-natural interface, constructed by five spaces: connectivity, vision, placemaking, monitoring and smart citizen-led. We have found smart cities are not a requirement for digital placemaking, but they would facilitate its development.

Co-creation as a theme is found to be highly linked with governance practice for consultation and planning decisions, which uses community participation as a tool. Some authors refer to it as co-governance (Gulsrud et al., 2018), collaboration in city-making processes (Bicquelet-Lock, 2021; Fredericks et al., 2018; Toomey et al., 2021), or co-design (Sanaeiipoor and Emami, 2020), as it describes bottom-up initiatives. This theme is linked to smart cities, as digital technologies embedded in the urban area are presented to include citizens' opinions and inputs in the decision-making. Therefore, technology is implemented as a tool to engage citizens in co-producing with organisations and institutions different solutions for their urban environment. Grace et al. (2020) described smart city governance to include co-creation processes and Bicquelet-Lock (2021) recognised collaboration and co-production with communities as a key step in healthy placemaking.

Social media is identified as an independent theme since it was the primary tool researched in digital placemaking to understand the community's sentiment toward a place. Described as an instrument to enable information exchange and social interactions, it increases the social relationships in communities (Breek et al., 2018). It has the potential to stimulate offline interactions through online relations (Breek et al., 2018; Waite, 2020). Recently, Keegan and Schifanella, (2022) presented how the contributions of social media to placemaking have received little attention in the literature. Some authors mentioned the negative effects of social media on wellbeing such as isolation (Shankardass et al., 2019), and the commodification of culture and gentrification (Bronsvort and Uitermark, 2021).

3.3. Mental health and wellbeing implications in digital placemaking

Only 15% (n = 17) of records are coded into the mental health and

wellbeing theme, referring to community wellbeing (Calderon and Takeshita, 2021; el Khafif et al., 2021; Marshall, 2021), wellness of city residents (Gulstrud et al., 2018), stress (Clark and Lupton, 2021), healthy living (Najafi et al., 2021) or place wellbeing (Kale, 2019). A specific type of placemaking that focuses on the health impact of public design (Bicquelet-Lock, 2021; Ng, 2016) is also found.

Wellbeing is the most common term used, usually impacted by pleasure and sensory engagement (Kale, 2019) or social isolation (Marshall, 2021). It is a broad concept that combines health, positive affective states, health behaviours, and social engagement, among other wellness indicators (Shankardass et al., 2019). Wright (2021) describes placemaking and wellbeing as aiming to benefit people in an integrative way.

We have identified three main categories in this theme: connected with nature and social resilience (Beam et al., 2018; Gulstrud et al., 2018; MacIntyre et al., 2019; van Houwelingen-Snippe et al., 2021), with sense of place and place engagement (Kale, 2019; Shankardass et al., 2019), and the physical and psychological benefits or social relationships (Courage, 2021).

Beam et al. (2018) referred to biophilia theory (Kahn, 1997) to understand the human need to bond with nature and the crucial benefits to health, wellbeing, and resilience. Regarding urban environments, Marshall, (2021) and Eckenwiler (2021) outlined the negative health impact on their citizens such as isolation, depression and mobility restriction. NBS could help mitigate the current climate challenges and negative effects of urban environments while bringing benefits to the health and wellbeing of communities (MacIntyre et al., 2019).

Looking into the potential benefits of technology for wellbeing, some authors aim to explore the effects of the increase of digital networks in individuals' lives through digital innovation but without alluding to digital placemaking (Clark and Lupton, 2021; el Khafif et al., 2021; Shankardass et al., 2019; van Houwelingen-Snippe et al., 2021). Furthermore, natural environment digitalization and its potential effects on wellbeing are mentioned by some authors as potential areas to explore (Keegan, 2021; MacIntyre et al., 2019; van Houwelingen-Snippe et al., 2021).

Neither specific best practices have been found for the implementation of technology in urban environments for citizens' mental health and wellbeing through NBS, nor how to enhance its performance and impact through digital placemaking.

Most scholars approach this theme in a broad sense, without specific case studies that look into precise health indicators on digital placemaking, only two studies included health indicators applied to sense of place (Agyekum and Newbold, 2019; el Khafif et al., 2021). The evident lack of studies examining specific health indicators in digital placemaking is proven by the need for the standardisation in NBS evaluation that includes health and wellbeing metrics (MacIntyre et al., 2019) and the wellbeing impact of digital and physical place interactions including geosocial data, health and social planning interventions (Shankardass et al., 2019) as areas for future research.

3.4. Green and Blue space implications in digital placemaking

The final theme is related to green and blue spaces (12%; n = 14), which include nature in cities (Ng, 2016), therapeutic green space (Kale, 2019), NBS (Gulstrud et al., 2018; MacIntyre et al., 2019), green planning and infrastructure (Cilliers et al., 2015; Truong et al., 2022) and green agriculture (Lyle et al., 2015).

The first result and most clear within this theme is that digital placemaking has not been explored through blue spaces, with only one study addressing blue spaces from an analogue placemaking approach (Toomey et al., 2021).

Findings focused on green spaces emphasised the eco-benefits of nature for wellbeing and health in cities (Gulstrud et al., 2018; Kale, 2019; Ng, 2016), which could be achieved through green implementations such as green corridors, urban green infrastructure (Truong et al.,

2022) or green walls (MacIntyre et al., 2019). Regarding this, Cilliers et al. (2015) introduced the term 'green placemaking' as the application of green planning approaches to placemaking, creating sustainable and competitive public spaces. The authors encouraged the benefits of combining these two practices as it allows the integration of placemaking's social functions with green planning's environmental functions.

The NBS approach is only mentioned in three studies within the dataset. It is approached connected to climate resilience in the city, where technology is used as a strategy for socio-ecological principles (Gulstrud et al., 2018); as a tool for NBS in urban design (Boros and Mahmoud, 2021); and highlighting the positive frame that NBS are described in while exploring different interventions in cities, presenting the potential benefit of introducing digital innovations such as digital placemaking (Author et al., 2019). Boros and Mahmoud (2021) allude to the different placemaking tools provided in literature for community engagement that can be used with NBS, while non-human elements and ecological systems in placemaking have been ignored traditionally. This supports our research and model developed to understand digital placemaking practices in urban nature spaces where nature's role is a key element.

Nature is mostly described as the context where a project happens or partially happens, but there are no specific mentions of specifications or technological representations of nature. Only Edwards et al. (2020) and van Houwelingen-Snippe et al. (2021) referred to the use of technology as a potential benefit for future research, whereas Grace et al. (2020) 'smart-natural' city interface briefly mentions placemaking as one of the spaces in this interface without understanding on how to implement it or the effect of this specific characteristic in the community. Moss et al. (2021) present how nature has been absent in most smart cities' strategies, therefore being essential to understand how it is addressed in the urban digitalisation, what part nature plays in this context and what goal is targeted. These authors describe urban nature as being mediated by technological devices, even if it has not been acknowledged in literature and policies. The particular impact of digital placemaking in communities, specifically its wellbeing and mental health effect on NBS, is an area that has been overlooked in the literature. However, existing and future NBS studies and projects should assure to cover the social impact of these practices and the opportunities that technology and digital placemaking bring to NBS performance.

3.5. Combined areas

The results of our analysis showcase that only three studies mentioned digital placemaking, health/wellbeing and green space (Keegan, 2021; MacIntyre et al., 2019; Toland et al., 2020) without specific investigation of the combination of these three areas of interest but suggesting to further explore them to understand digital placemaking implications for communities and the environment.

Four results combine mental health/wellbeing and green space with 'digital' placemaking –presenting placemaking but mentioning the implementation of technology in some ways (Edwards et al., 2020; Grace et al., 2020; Gulstrud et al., 2018; Najafi et al., 2021). Gulstrud et al. (2018) expand green placemaking as a type that integrates socio-cultural and scientific knowledge to promote urban biodiversity, combining technological strategies with climate adaptation solutions in the case study analysed. This concept is found as the only placemaking term that combines technology and urban biodiversity mentioned to affect the wellbeing of citizens briefly. Finally, one record explores healthy placemaking – without specific digital implications – with green space and mental health/wellbeing (Ng, 2016).

Besides the gaps described, we can demonstrate there is a lack of understanding of the impact of digital placemaking on the mental health and wellbeing of citizens through green and blue space and NBS. There is no mention of blue space in the data set analysed, focusing on green space. Even though some articles present these three areas, they are

explored broadly and partially, offering an incomplete concept of digital placemaking, without analysing specifically its potential use in NBS involving green and blue spaces as well as its particular mental health and wellbeing social impact and bonds within communities.

4. Discussion

The aim of the study was to understand the relationships among digital placemaking, urban nature and mental health while introducing digital placemaking as a new technique to augment NBS in urban nature environments impacting the health and wellbeing of the citizens. The review of 117 studies adds to the debate from Basaraba (2021), Courage et al. (2021), and van Houwelingen-Snippe et al. (2021) by focusing on the mental health and wellbeing social impact of digital placemaking when connecting with nature through NBS. The data synthesis conducted for this review indicated a lack of agreement on the concept and characteristics of digital placemaking (Basaraba, 2021; Chen et al., 2022; Courage, 2021; Karge, 2018; Keegan, 2021; Sanacipoor and Emami, 2020), especially when considering mental health and wellbeing effects (Najafi et al., 2021; Shankardass et al., 2019; Wright, 2021), combined with green and blue space (Edwards et al., 2020; MacIntyre et al., 2019). The findings reveal a lack of studies involving digital placemaking and blue spaces as well as a lack of application for NBS. Therefore, we advance upon and contribute to this debate by presenting this review and model.

Our study results identified four key characteristics in digital placemaking practices – hybrid reality, sense of place, community engagement and inclusion. From them, only hybrid realities were presented as unique, whereas the other key themes were mainly studied in placemaking but highlighted their potential benefit from technology. We can confirm digital placemaking's unique characteristic is the ability to create physical-digital experiences that can improve sense of place, engagement and inclusion of communities.

Problems or challenges derived from digital placemaking are usually presented briefly in the dataset, alluding mainly to privacy concerns (Hjorth and Richardson, 2017; Kostopoulou and Fatah gen Schieck, 2021; Li and Alencar, 2022; Pang et al., 2020; Peacock et al., 2021; Wilken and Humphreys, 2021), exposing and amplifying community inequalities (Bronsvoot and Uitermark, 2021; Halegoua and Polson, 2021; Witteborn, 2021), gentrification (Foth, 2017b; Karge, 2018; Sanacipoor and Emami, 2020) and a lack of community purpose and environment disconnection (Chen et al., 2022). Despite these limitations, digital placemaking is presented with positivity but further understanding of the risks from these practices would benefit a deeper explanation of this concept.

By supporting mental health and wellbeing through NBS and digital placemaking practices, a potentially positive impact on the social sphere of the community could be achieved. There is evidence supporting the positive effect of digital placemaking on mental health and wellbeing, but we have found a lack of application of specific health indicators to digital placemaking, as well as the specific study of the wellbeing impact of digital spaces (MacIntyre et al., 2019; Shankardass et al., 2019). Future studies involving NBS should include specific metrics and technologies to measure environmental performance and social impact – specifically mental health and social cohesion indicators – of these practices in order to provide strong evidence of their benefits.

The findings of this review highlight absence of blue space mentions involving digital placemaking, opening this area for further research. We have found a misconception of nature as only green space, neglecting the potential of blue spaces for the mental health and wellbeing of communities. Recent investigations demonstrating the neglected role of nature in smart cities (Grace et al., 2020; Moss et al., 2021) support our study results by presenting nature environments are a context, without understanding it as an active element for investigation involving performance and impact. The implementation of NBS in cities through digital placemaking would benefit from further investigations

on environmental performance and community effects and impact. Accordingly, future studies need to consider additional methods of data collection and analysis on this matter, such as walking or swimming interviews, auto-ethnographies or netnographic studies.

The digital placemaking approach to NBS has not been thoroughly explored, as shown in our review results. Therefore, we propose a novel approach to NBS through our review and model. Our proposed approach to digital placemaking follows (Foth, 2017a) understanding of placemaking as beyond the commercial aspect but as a strategy that fosters social change and urban renewal through democratisation. The augmentation of spaces through digital placemaking is proven to be an enhancer of public space experiences (Latorre, 2011; Wang, 2019), and could benefit NBS practices in urban nature environments (Boro and Mahmoud, 2021; MacIntyre et al., 2019), generating sense of place and place attachment (Breek et al., 2018; Halegoua and Polson, 2021), as well as creating inclusive and accessible places to the community (Szczak and Kecsks, 2020). This technological application for urban nature can expand its effects and political agenda of urban digitalisation (Moss et al., 2021), creating long-term relations and adapting these practices to the world of digital we are living in.

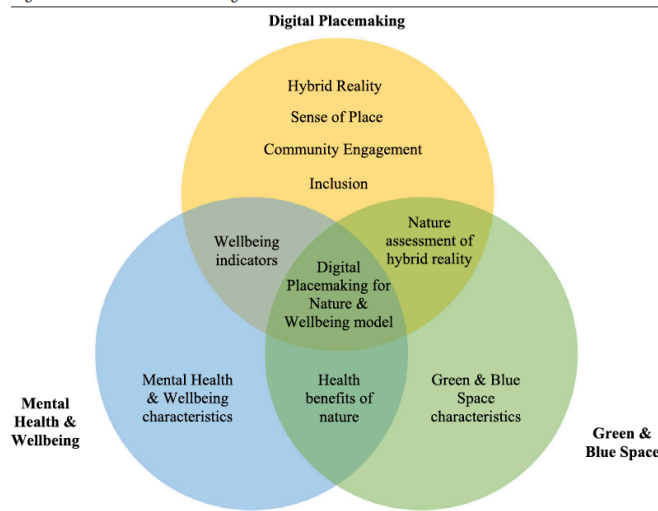
The present review has discovered a litany of studies in the past which have shown evidence of the potential application of digital placemaking practices in urban spaces. Despite the concept confusion and lack of consensus found in the digital placemaking literature, we have collated a number of characteristics of these practices that aim to contribute to clarifying the concept of placemaking and its potential application to NBS for wellbeing. For a thorough understanding and informed view on the adoption of these practices, we propose the following study and model, which aims to inform about potential applications and risks of digital placemaking practices when connecting citizens with nature and impacting their wellbeing. The Digital Placemaking for Nature & Wellbeing model brings together the findings from the digital placemaking literature, applied to urban nature and NBS while connecting with wellness.

The proposed Digital Placemaking for Nature & Wellbeing Model (see Table 7) is an overview of the current landscape in the respective areas. It will advise researchers and practitioners on how to fully implement digital placemaking for NBS performance and wellbeing impact, focusing on its mental health and wellbeing influence through connecting with nature. The model aims to serve as a help and guideline to avoid overlooking essential aspects of digital placemaking when applied to urban nature environments for health and wellbeing. This model will be further developed and examined in the future stages of this research.

The model is formed by three interrelated spheres. The digital placemaking sphere includes the four main characteristics from our review, creating a type of hybrid environment which promotes sense of place and community engagement in the public space, while assuring it is inclusive and accessible to all. These characteristics need to be assessed and planned when designing the project to assure it covers all the essential elements of a digital placemaking practice. Following Tomitsch et al. (2015), a holistic and responsive approach to technology implementations in placemaking practices in the city can reflect rising levels of social wellbeing and connectedness. The ecological framework of placemaking they propose is advanced by the informed results in our review to understand the key elements of digital placemaking to be assessed during the development of a project. Moreover, these characteristics are also informed by Edwards et al. (2020) guidelines for technology and people, where the design should be rooted in the context where it is developed, integrating social dimensions and encouraging intimate experiences.

The green and blue space sphere focus on the natural aspect – digital and analogue – of the hybrid reality. This section ensures the project includes and promotes nature connections in the urban environment, specifically since urban nature is being mediated by technological devices (Moss et al., 2021). It is crucial to measure the density, aspect and

Table 7
Digital Nature & Health Placemaking Model.



characteristics of the ‘nature’ element in digital placemaking, which will affect the type of strength of its connection with psychological wellbeing and the overall experience in the public space. Nature needs to be addressed in depth, beyond just a non-human element and a context where the digital placemaking project is developed (Chen et al., 2022). Therefore, an assessment of the “nature” element in the hybrid environment created is essential for the correct development and goal achievement of the Digital Placemaking for Nature & Wellbeing model. MacIntyre et al. (2019) encourage the importance of community engagement with green spaces when implementing NBS. To enhance this engagement, it is essential to understand how the hybrid environment is going to interact with the natural space and how it is going to be portrayed (Moss et al., 2021). NBS should be strategically designed to ensure climate mitigation and citizen engagement activities (e.g. Gulsrud et al. 2018). The way nature is portrayed through technological applications is key to the potential effects on wellbeing (van Houwelingen-Snippe et al., 2020).

The third sphere reflects the mental health and wellbeing impact of this digital placemaking experience. Mental health and wellbeing of the community will be assessed before their interaction with the experience. Specific health indicators and metrics that appraise the experience from a community or an individual level will also be implemented during and/or after the experience, depending on the scope of the project. This health and wellbeing evaluation is crucial to understand the impact of the hybrid environment (MacIntyre et al., 2019; Shankardass et al., 2019).

The three spheres are interconnected and affect each other in the development of the different aspects. This Digital Placemaking for Nature & Wellbeing model aims to bridge the different gaps found in our review to propose a guide to support placemakers in developing digital applications for urban nature spaces with a wellbeing impact approach. This technological application to enhance physical experiences and connect citizens with nature is informed by the results from our review, which defend and proves the value of digital placemaking for NBS. The model presents an application of digital placemaking for NBS that helps both to measure its impact and to enhance the experience and performance created for the community.

4.1. Limitations

This review presents some limitations. A common limitation to most reviews is the inclusion and exclusion criteria applied such as English as the only language accepted, search strings used as well as the databases. Since the digital placemaking concept is multidisciplinary and lacks consensus on definitions and applications, the keywords included aimed to avoid overlooking suitable studies, but it is possible that different studies could have been identified when using different search terms or databases. Additionally, grey literature was excluded from the review. Finally, the data synthesis process through reflexive thematic analysis informed by the research question and aims, which in turn would exclude outlier themes.

5. Conclusion

In systematically reviewing the above literature, hitherto unknown links are made between digital technology in placemaking, their mental health and wellbeing impact, and its use with nature and NBS. The review outcome offers a useful overview of key studies, which allow us to understand further the way technology – specifically digital placemaking – can enhance the performance and social impact of NBS, not only in green and blue spaces increasing its overall efficiency but also for nature amplifying its impact in the community. The results pointed to a lack of agreement in the reviewed academic literature on digital placemaking’s impact and use in urban environments. The study identified four key characteristics of digital placemaking as well as a general and incomplete approach when assessing the mental health and wellbeing impact and their connection with green and blue space. This paper contributes to understanding the concept of digital placemaking and its potential use to increase citizens’ health when connecting with nature while highlighting the benefits of bringing green and blue space back into the urban environment. It also contributes to presenting an innovative application of digital placemaking for NBS to impact citizens’ wellbeing. Our study offers a platform for understanding the opportunities of embedding digital placemaking practices in and for NBS’s social impact while stimulating prospective research debates on this topic to promote

the implementation of green and blue space strategies into the urban environment to enhance citizens' wellbeing through digital placemaking. Moreover, our research offers insight into the broad range of best practices for implementing digital placemaking practices in the urban environment through our Digital Placemaking for Nature & Wellbeing model. The findings highlight the need for further research that acknowledges the complex nature of digital placemaking in combination with mental health/wellbeing and green/blue space. An enhanced understanding of this area will help maximise the impact of digital placemaking on urban citizens' wellbeing and the climate resilience of the city.

Future studies could focus their attention on the implementation of digital placemaking for communities. A better understanding of health indicators and wellbeing metrics would benefit from assessing the impact of digital and physical place interactions. There is also an opportunity to investigate blue space's effect through digital placemaking. Moreover, there are emerging debates that offer a platform for further debate in new areas where digital placemaking might be able to fit, such as participatory design methods for sustainable placemaking practices (Clarke et al., 2019), positive design for NBS (Birkeland, 2022), or planning for health and wellbeing (Liaros, 2022).

As explored in this study, digital placemaking presents an innovative technique to augment the application of NBS. Neither has been applied in the mental health and wellbeing sphere nor the green and blue space environments. Hence, our systematic literature review addresses this gap, representing a key contribution to the three areas of interest in our study.

CRedit authorship contribution statement

MFF, BK, MJ, TM: conceived the idea, MFF, BK, MJ, TM designed the study. MFF: obtained the data. MFF, BK, MJ, TM: analysed the data. MFF, BK, MJ: wrote the paper.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.ufug.2022.127796](https://doi.org/10.1016/j.ufug.2022.127796).

References

- Abdel-Aziz, A.A., Abdel-Salam, H., El-Sayad, Z., 2016. The role of ICTs in creating the new social public place of the digital era. *Alex. Eng. J.* 55 (1), 487–493. <https://doi.org/10.1016/j.aej.2015.12.019>.
- Agyekum, B., Newbold, K.B., 2019. Sense of place and mental wellness amongst African immigrants in Canada. *J. Urban* 12 (2), 188–202. <https://doi.org/10.1080/17549175.2018.1552885>.
- Alvarez, L., Borsi, K., Rodríguez, L., 2017. The role of social network analysis on participation and placemaking. *Sustain. Cities Soc.* 28, 118–126. <https://doi.org/10.1016/j.scs.2016.06.017>.
- Aurigi, A., De Cindio, F., 2008. *Augmented urban spaces: Articulating the physical and electronic city*. Ashgate Publishing.

- Bangratz, M., Förster, A., 2021. Local Data and Global Ideas. *Citymaking in Times of Digital Transformation. Digital Citymakers : Co-creating the City in Times of Digital Transformation* 2, 7–28. <https://doi.org/10.18154/RWTH-2021-10411>.
- Basaraba, N., 2021. The emergence of creative and digital place-making: a scoping review across disciplines, 146144482110449 N. Media Soc. <https://doi.org/10.1177/14614448211044942>.
- Bashan, D., Colléony, A., Shwartz, A., 2021. Urban versus rural? The effects of residential status on species identification skills and connection to nature. *People Nat* 3 (2), 347–358. <https://doi.org/10.1002/pan3.10176>.
- Beam, J., Nawari, N.O., Tilson, B., 2018. Mental health & resiliency: designing participatory nature dependent environments and communities for a sustainable future. *J. Sustain. Dev.* 11 (3), 234. <https://doi.org/10.5539/jsd.v11n3p234>.
- Bedford, L., Mann, M., Foth, M., Walters, R., 2022. A post-capitalocentric critique of digital technology and environmental harm: new directions at the intersection of digital and green criminology. *Int. J. Crime., Justice Soc. Democr.* 11 (1), 167–181. <https://doi.org/10.5204/ijcjsd.2191>.
- Besek, J.F., 2021. On the interactive nature of place-making: modifying growth machine theory to capture the spatial and temporal connections that spawned the asian carp invasion. *Sociol. Q.* 62 (1), 121–142. <https://doi.org/10.1080/00380253.2020.1715307>.
- Beza, B.B., 2016. The role of deliberative planning in translating best practice into good practice: from placelessness to placemaking. *Planning Theory and Practice* 17 (2), 244–263.
- Bicquelet-Lock, A., 2021. Enabling healthy placemaking: overcoming barriers and learning from best practices. *Cities Health* 1–5. <https://doi.org/10.1080/23746834.2021.1899356>.
- Biedermann, P., vande Moere, A., 2021. A Critical Review of how Public Display Interfaces Facilitate Placemaking. *ACM International Conference Proceeding Series* 170–181. <https://doi.org/10.1145/3469410.3469427>.
- Bilandzic, M., Johnson, D., 2013. Hybrid placemaking in the library: designing digital technology to enhance users' on-site experience. *Aust. Libr. J.* 62 (4), 258–271. <https://doi.org/10.1080/00049670.2013.845073>.
- Birkeland, J., 2022. Nature positive: interrogating sustainable design frameworks for their potential to deliver eco-positive outcomes. *Urban Sci* 6 (2), 35. <https://doi.org/10.3390/urbansci6020035>.
- Birnbaum, L., Wilhelm, C., Chilla, T., Kröner, S., 2021. Place attachment and digitalisation in rural regions. *J. Rural Stud.* 87, 189–198. <https://doi.org/10.1016/j.jrurstud.2021.09.015>.
- Boeri, C., 2017. Color loci placemaking: the urban color between needs of continuity and renewal. *Color Research & Application* 42 (5), 641–649.
- Boffi, L., 2021. Designing for place-making in XR: the process of the Co-Drop stops and its atlas. *ACM Int. Conf. Proc. Ser.* 210–214. <https://doi.org/10.1145/3469410.3469434>.
- Boros, J., Mahmoud, I., 2021. Urban design and the role of placemaking in mainstreaming nature-based solutions. Learning from the biblioteca degli alberi case study in Milan. *Front. Sustain. Cities* 3. <https://doi.org/10.3389/frsc.2021.635610>.
- Bottero, M., Caprioli, C., Foth, M., Mitchell, P., Rittenbruch, M., Santangelo, M., 2022. Urban parks, value uplift and green gentrification: An application of the spatial hedonic model in the city of Brisbane. *Urban For. Urban Green* 74. <https://doi.org/10.1016/j.ufug.2022.127618>.
- Bowler, D.E., Buyung-Ali, L., Knight, T.M., Pullin, A.S., 2010. Urban greening to cool towns and cities: a systematic review of the empirical evidence. In: *Landscape and Urban Planning*, Vol. 97. Elsevier, pp. 147–155. <https://doi.org/10.1016/j.landurbplan.2010.05.006>.
- Bratman, G.N., Anderson, C.B., Berman, M.G., Cochran, B., de Vries, S., Flanders, J., Folke, C., Frumkin, H., Gross, J.J., Hartig, T., Kahn, P.H., Kuo, M., Lawler, J.J., Levin, P.S., Lindahl, T., Meyer-Lindenberg, A., Mitchell, R., Ouyang, Z., Roe, J., Daily, G.C., 2019. Nature and mental health: An ecosystem service perspective. *Sci. Adv.* Vol. 5.
- Braun, V., Clarke, V., 2012. Thematic analysis. *APA handbook of research methods in psychology*, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biological. American Psychological Association, pp. 57–71. <https://doi.org/10.1037/13620-004>.
- Braun, V., Clarke, V., 2021. One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qual. Res. Psychol.* 18 (3), 328–352. <https://doi.org/10.1080/14780887.2020.1769238>.
- Breek, P., Eshuis, J., Hermes, J., 2021. Sharing feelings about neighborhood transformation on Facebook: online affective placemaking in Amsterdam-Noord. *J. Urban* 14 (2), 145–164. <https://doi.org/10.1080/17549175.2020.1814390>.
- Breek, P., Hermes, J., Eshuis, J., Mommaas, H., 2018. The role of social media in collective processes of place making: a study of two neighborhood blogs in Amsterdam. *City Community* 17 (3), 906–924. <https://doi.org/10.1111/cico.12312>.
- Bronsvort, I., Uitermark, J.L., 2021. Seeing the street through Instagram. *Digital platforms and the amplification of gentrification. Urban Stud.* <https://doi.org/10.1177/00420980211046539>.
- Bronsvort, I., Uitermark, J.L., 2022. Seeing the street through Instagram. *Digital platforms and the amplification of gentrification. Urban Studies* 59 (14), 2857–2874. <https://doi.org/10.1177/00420980211046539>.
- Brunnberg, L., Frigo, A., 2012. Placemaking in the 21st-century city: introducing the funfair metaphor for mobile media in the future urban space. *Digital Creativity*, 23 (2), 113–125. <https://doi.org/10.1080/14626268.2012.709943>.
- Buizer, M., Elands, B., Vierikko, K., 2016. Governing cities reflexively—The bioculturaldiversity concept as an alternative to ecosystem services. *Environ. Sci. Policy* 62, 7–13. <https://doi.org/10.1016/j.envsci.2016.03.003>.

- Busse, B., 2021. Practices of discursive urban place-making in Brooklyn, New York: (H)idden digital and embodied discourse. *Text. Talk* 41 (5–6), 617–641. <https://doi.org/10.1518/text-2021-0003>.
- Cabe, 2000. *By design: Urban design in the planning system: Towards better practice*. Thomas Telford, Chicago.
- Calderon, S., Takeshita, E., 2021. A future of creative placemaking. *The Routledge Handbook of Placemaking*. Routledge, pp. 38–44.
- Caldwell, G., Fredericks, J., 2017. Finding the human factor in digital placemaking: a research journey through the digital nexus. *Media architecture compendium: digital placemaking* 206–208.
- Calvium, 2018. Calvium (2018) Digital Placemaking Guide. <https://calvium.com/resources/digital-placemaking/>. (Accessed 5 April 2022).
- César de Lima Araújo, H., Silva Martins, F., Tucunduva Philippi Cortese, T., Locosselli, G. M., 2021. Artificial intelligence in urban forestry—a systematic review. *Urban For. Urban Green* 66. <https://doi.org/10.1016/j.ufug.2021.127410>.
- Chaudhry, A.R., Rajput, B., Mishra, R., 2019. Influence of IoT & AI in place making and creating Smart Cities. 10th Int. Conf. Comput., Commun. Netw. Technol. ICCCNT 1–6.
- Chen, K., Guaraldi, M., Kerr, J., Turkay, S., 2022. Digital intervention in the city: a conceptual framework for digital placemaking. *Urban Design International* 1 (13). <https://doi.org/10.1057/s41289-022-00203-y>.
- Chew, L., Loke, L., Hespanhol, L., 2020. A Preliminary Design Vocabulary for Interactive Urban Play: Analysing and Composing Design Configurations for Playful Digital Placemaking. *Pervasive Health: Pervasive Computing Technologies for Healthcare* 11–24. <https://doi.org/10.1145/3441000.3441064>.
- Cilliers, E.J., Timmermans, W., van den Goorbergh, F., Slijhuis, J., 2015. Green place-making in practice: from temporary spaces to permanent places. *J. Urban Des* 20 (3), 349–366. <https://doi.org/10.1080/13574809.2015.1031213>.
- Clark, M., Lupton, D., 2021. Pandemic fitness assemblages: the sociomaterialities and affective dimensions of exercising at home during the COVID-19 crisis. *Convergence* 27 (5), 1222–1237. <https://doi.org/10.1177/13548565211042460>.
- Clarke, R., Heitlinger, S., Light, A., Forlano, L., Foth, M., DiSalvo, C., 2019. More-than-human participation: design for sustainable smart city futures. *Interactions* 26 (3), 60–63. (<https://www.decolonisingdesign.org>).
- Clarke, P. (2021). Future Places Toolkit: Engaging communities through augmented reality and performance. *Research for All*, 5(2). <https://doi.org/10.14324/RFA05.2.03>.
- Clowater, V., 2021. Pokémon Go as palimpsest: creating layers of meaning through augmented reality. *Load. J. Can. Game Stud. Assoc* 14 (24), 104–121.
- Courage, C., 2021. INTRODUCTION. What really matters—moving placemaking into a new epoch. *The Routledge Handbook of Placemaking*. Routledge, pp. 1–5.
- Courage, C., Borup, T., Jackson, M.R., Legge, K., McKeown, A., Platt, L., Schupbach, J., 2021. *The Routledge Handbook of placemaking*. Routledge.
- Cox, D.T.C., Hudson, H.L., Shanahan, D.F., Fuller, R.A., Gaston, K.J., 2017. The rarity of direct experiences of nature in an urban population. *Landscape Urban Plan* 160, 79–84. <https://doi.org/10.1016/j.landurbplan.2016.12.006>.
- Cresswell, T., 2014. *Place: An Introduction*. John Wiley & Sons, Oxford, UK.
- de Souza E Silva, A., 2006. From cyber to hybrid: Mobile technologies as interfaces of hybrid spaces. *Space Cult* 9 (3), 261–278. <https://doi.org/10.1177/1206331206289022>.
- Deloitte, 2021. Digital Consumer Trends: The UK cut. Deloitte United Kingdom. (<https://www2.deloitte.com/uk/en/pages/technology-media-and-telecommunications/articles/mobile-consumer-survey.html#smartphone-adoption-stable-and-strengthening>).
- Devine, K., 2017. Sense of place: The phenomenology of virtual heritage place. *Proc. - 2017 21st Int. Conf. Inf. Vis., IV 2017* 332–335. <https://doi.org/10.1109/IV.2017.22>.
- Eckenwiler, L., 2021. Ethical placemaking for ecological subjects. *The Routledge Handbook of Placemaking*. Routledge, pp. 346–353.
- Edwards, L., Darby, A., Dean, C., 2020. From digital nature hybrids to digital naturalists: reviving nature connections through arts, technology and outdoor activities. In: Earnshaw, R., Liggett, S., Excell, P., Thalmann, D. (Eds.), *Technol., Des. Arts-Oppor. Chall* 295–314. (<http://www.springer.com/series/10481>).
- Eggermont, H., Balian, E., Azevedo, J.M.N., Beumer, V., Brodin, T., Claudet, J., Fady, B., Grube, M., Keune, H., Lamarque, P., Reuter, K., Smith, M., van Ham, C., Weisser, W. W., Le Roux, X., 2015. Nature-based solutions: new influence for environmental management and research in Europe. *GAIA - Ecol. Perspect. Sci. Soc* 24, 243–248. <https://doi.org/10.14512/gaia.24.4.9>.
- el Khafif, M., Wibberly, K.H., Cleckley, E., Nguyen, T.H., Divers, M.H., 2021. We are Martinsville (WAM): leveraging mobile gaming for community engagement and improving health. *Int. J. E-Plan. Res* 10 (4). <https://doi.org/10.4018/IJEPR.20211001.0a4>.
- European Commission, 2016. Nature-based solutions. European Commission, (https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en).
- Fisher, J.A., Shangquan, L., & Crisp, J.S. (2018). Developing a Platform for Community-curated Mixed Reality Play Spaces. CHI PLAY 2018 - Proceedings of the 2018 Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts, 423–429. <https://doi.org/10.1145/3270316.3271513>.
- Foth, M., 2017. Participation, Co-Creation, and public space. *The Journal of Public Space* 2 (4), 21–36.
- Foth, M., 2017a. Some thoughts on digital placemaking. In: Hespanhol, L., Hank, Haessler, M., Tomitsch, Martin, Tschertou, Germot (Eds.), *Media architecture compendium: digital placemaking*. Avedition, pp. 203–205.
- Foth, M., 2017b. Lessons from urban guerrilla placemaking for smart city commons. *ACM Int. Conf. Proc. Ser* 32–35. <https://doi.org/10.1145/3083671.3083707>.
- Foth, M., Caldwell, G.A., 2018. More-than-human media architecture. *ACM Int. Conf. Proc. Ser* 66–75. <https://doi.org/10.1145/3204389.3204495>.
- Foth, M., Bilandzic, A., Gusrada, M., 2021. The impact of peer-to-peer accommodation on place authenticity: a placemaking perspective. *Shaping Smart for Better Cities: Rethinking and Shaping Relationships between Urban Space and Digital Technologies*. Elsevier, pp. 283–306. <https://doi.org/10.1016/B978-0-12-818636-7.00015-9>.
- Foth, M., Caldwell, G., Fredericks, J., & Volz, K. (2018). Augmenting cities beyond bedazzlement: Empowering local communities through immersive urban technologies. *Workshop Proceedings of Augmenting Cities and Architecture with Immersive Technologies, Media Architecture Biennale (MAB-18)*, 1–4.
- Fredericks, J., Hespanhol, L., Tomitsch, M., 2016. Not just pretty lights: Using digital technologies to inform city making. *proceedings of the 3rd Conference on Media Architecture Biennale*.
- Fredericks, J., Tomitsch, M., Hespanhol, L., McArthur, I., 2015. Digital pop-up: Investigating bespoke community engagement in public spaces. *OzCHI 2015: Being Human - Conference Proceedings* 634–642. <https://doi.org/10.1145/2838739.2838759>.
- Fredericks, J., Hespanhol, L., Parker, C., Zhou, D., Tomitsch, M., 2018. Blending pop-up urbanism and participatory technologies: challenges and opportunities for inclusive city making. *City, Cult. Soc* 12, 44–53. <https://doi.org/10.1016/j.ccs.2017.06.005>.
- Freeman, G., Liu, S.Y., Bardzell, J., Lu, X., Bardzell, S., Cao, D., 2019. Smart and fermented cities: an approach to placemaking in urban informatics. *May 2 Conf. Hum. Factors Comput. Syst. Proc.* <https://doi.org/10.1145/3290605.3300274>.
- Friedmann, J., 2010. Place and Place-Making in Cities: A Global Perspective. *Planning Theory & Practice* 11 (2), 149–165.
- Frith, J., 2015. *Smartphones as locative media*. Polity Press, Cambridge, UK.
- Frith, J., Richter, J., 2021. Building participatory counter-narratives: pedagogical interventions through digital placemaking. *Convergence* 27 (3), 696–710. <https://doi.org/10.1177/1354856521991956>.
- Giachino, C., Pattanaro, G., Bertoldi, B., Bollani, L., Bonadonna, A., 2021. Nature-based solutions and their potential to attract the young generations. *Land Use Policy* 101. <https://doi.org/10.1016/j.landusepol.2020.105176>.
- Globa, A., Wang, R., & Beza, B.B. (2019). SENSORY URBANISM AND PLACEMAKING Exploring Virtual Reality and the Creation of Place. *Intelligent & Informed, Proceedings of the 24th International Conference of the Association For Computer-Aided Architectural Design Research in Asia (CAADRIA)*, 737–746. <http://papers.cuminad.org/cgi-bin/works/BrowseAZname-authors/Show/caadria2019.211>.
- Glówczyński, M., 2022. Toward user-generated content as a mechanism of digital placemaking—place experience dimensions in spatial media. *ISPRS Int. J. Geo Inf* 11 (4). <https://doi.org/10.3390/ijgi11040261>.
- Gobbo, B., Benedetti, A., 2021. Expressive digital place making as means of aggregation: a case study from the COVID-19 pandemic. *July 11 ACM Int. Conf. Proc. Ser.* <https://doi.org/10.1145/3464385.3464731>.
- Gonsalves, K., Foth, M., Caldwell, G., Jenck, W., 2021. Radical placemaking: immersive, experiential and activist approaches for marginalised communities. *Connect. Explor. Herit. Archit. Cities Art. Media* 20 (1), 237–252. (<https://eprints.qut.edu.au/203188/>).
- Grace, M., Scott, A.J., Sadler, J.P., Proverbs, D.G., Grayson, N., 2020. Exploring the smart-natural city interface; re-imagining and re-integrating urban planning and governance. *Emerald Open Res* 2, 7. <https://doi.org/10.35241/emeraldopenres.13226.1>.
- Gulrsud, N.M., Hertzog, K., Shears, I., 2018. Innovative urban forestry governance in Melbourne?: Investigating “green placemaking” as a nature-based solution. *Environ. Res* 161, 158–167. <https://doi.org/10.1016/j.envres.2017.11.005>.
- Halegoua, G., 2020. *The Digital City: Media and the Social Production of Place*. NYU Press, New York.
- Halegoua, G., Polson, E., 2021. Exploring ‘digital placemaking’. *Convergence* 27 (3), 573–578. <https://doi.org/10.1177/13548565211014828>.
- Hardley, J., Richardson, I., 2021. Digital placemaking and networked corporeality: Embodied mobile media practices in domestic space during Covid-19. *Convergence* 27 (3), 625–636. <https://doi.org/10.1177/1354856520979963>.
- Harner, J., Knapp, K., Davis-Witherow, L., 2017. ‘The story of us’: place-making through public interaction with digital geohumanities in Colorado springs. *Int. J. Humanit. Arts Comput* 11 (1), 109–125. <https://doi.org/10.3366/ijhae.2017.0181>.
- Hartig, T., Mitchell, R., de Vries, S., Frumkin, H., 2014. Nature and health. *Annu. Rev. Public Health* 35, 207–228. <https://doi.org/10.1146/annurev-publhealth-032013-182443>.
- Heckert, M., Bristowe, A., 2021. Parks and the pandemic: a scoping review of research on green infrastructure use and health outcomes during covid-19. *Int. J. Environ. Res. Public Health* 18 (24). <https://doi.org/10.3390/ijerph182413096>.
- Her, J.J., 2021. Engaging locals in rural areas: value correspondence in placemaking through mobile augmented reality. *Digit. Creat* 32 (3), 215–233. <https://doi.org/10.1080/14626268.2021.1954955>.
- Hespanhol, L., 2018. City context, digital content and the design of intuitive urban interfaces. *Intuitive Interaction: Research and Application* 173–194.
- Hjorth, L., Richardson, I., 2017. Pokémon GO: Mobile media play, place-making, and the digital wayfarer. In: *Mobile Media and Communication*, Vol. 5. SAGE Publications Ltd., pp. 3–14. <https://doi.org/10.1177/2050157916680015>.
- Hong, Q.N., Fabregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M., Griffiths, F., Nicolau, B., O’Cathain, A., Rousseau, M., Vedel, I., Phuye, P., 2018. The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Education for information* 34 (4), 285–291.

- Houghton, K., Foth, M., Miller, E., 2015. Urban acupuncture: hybrid social and technological practices for hyperlocal placemaking. *J. Urban Technol* 22 (3), 3–19. <https://doi.org/10.1080/10630732.2015.1040290>.
- Huang, Y., 2019. Book review. *Urban For. Urban Green* 43, 126388. <https://doi.org/10.1016/j.ufug.2019.126388>.
- Hunter, M.G., Soro, A., Brown, R.A., Harman, J., Yigitcanlar, T., 2022. Augmenting community engagement in city 4.0: considerations for digital agency in urban public space. *Sustain. (Switz.)* 14 (16). <https://doi.org/10.3390/su14169803>.
- Jalali, S., Wohlin, C., 2012. Systematic literature studies: database searches vs. backward snowballing. *Int. Symp. Empir. Softw. Eng. Meas* 29–38. <https://doi.org/10.1145/2372251.2372257>.
- Jimenez, M.P., Deville, N.v., Elliott, E.G., Schiff, J.E., Wilt, G.E., Hart, J.E., James, P., 2021. Associations between nature exposure and health: A review of the evidence. In: *International Journal of Environmental Research and Public Health*, Vol. 18. MDPI. <https://doi.org/10.3390/ijerph18094790>.
- Johnstone, S., Choi, J.H.J., Leong, J., 2016. Designing for diversity: Connecting people, places, and technologies in creative community hubs. *Proc. 28th Aust. Comput. Hum. Interact. Conf., OzCHI 2016* 135–139. <https://doi.org/10.1145/3010915.3010971>.
- Kabisch, N., Frantzeskaki, N., Pauleit, S., Naumann, S., Davis, M., Artmann, M., Haase, D., Knapp, S., Korn, H., Stadler, J., Zaubner, K., Bonn, A., 2016. Nature-based solutions to climate change mitigation and adaptation in urban areas: perspectives on indicators, knowledge gaps, barriers, and opportunities for action. *Ecol. Soc* 21 (39). <https://doi.org/10.5751/ES-06373-210239>.
- Kahn, P.H., 1997. Developmental psychology and the biophilia hypothesis: children's affiliation with nature. *Dev. Rev* 17.
- Kale, A., 2019. Building attachments to places of settlement: a holistic approach to refugee wellbeing in Nelson, Aotearoa New Zealand. *J. Environ. Psychol* 65. <https://doi.org/10.1016/j.jenvp.2019.101315>.
- Kamols, N., Foth, M., Guaralda, M., 2021. Beyond engagement theatre: challenging institutional constraints of participatory planning practice. *Aust. Plan* 57 (1), 23–35. <https://doi.org/10.1080/07293682.2021.1920993>.
- Karge, T., 2018. Placemaking and urban gardening: himmelbeet case study in Berlin. *J. Place Manag. Dev* 11 (2), 208–222. <https://doi.org/10.1108/JPM-10-2017-0109>.
- Keegan, B.J., 2021. Keeping pace with the digital transformation of place. A Research Agenda for Place Branding. Edward Elgar Publishing., Chicago., pp. 163–179.
- Keegan, B.J., Schifanella, R., 2022. Social Media Data in Digital Placemaking. The SAGE Handbook of Social Media Marketing. Sage.
- Kent, F., Madden, K., 2003. Creating Great Urban Parks: Project of Public Spaces. *Places*, 15(3). Chicago. Places 15 (3), 71–73.
- Kolotouchkina, O., Barroso, C.L., Manfredi, J.L., 2021. Inclusive digital placemaking: best practices and future challenges from four global cities. *International Place Branding Association*.
- Kostopoulou, E., Fatah gen Schieck, A., 2021. Designing for hyperlocal: The use of locative media to augment place narratives. *Shaping Smart for Better Cities*. Elsevier, pp. 87–106. <https://doi.org/10.1016/b978-0-12-818636-7.00016-0>.
- Kuchelmeister, V., Luz, F., Neves, J., 2020. Experience design for virtual reality. from illusion to agency. *Int. J. Stereo Immersive Media* 41 (1). <https://doi.org/10.24140/ijism.v4.n1.08>.
- Labayen, M.F., Gutierrez, I., 2021. Digital placemaking as survival tactics: sub-Saharan migrants' videos at the Moroccan-Spanish border. *Convergence* 27 (3), 664–678. <https://doi.org/10.1177/1354856520982974>.
- Latorre, D., 2011. Digital placemaking-authentic civic engagement. Project for Public Spaces. (<https://www.pps.org/article/digital-placemaking-authentic-civic-engagement>).
- Lefebvre, H., 1996. In: Kofman, E., Lebas, E. (Eds.), *The right to the city, writings on cities*. Blackwell.
- Lepofsky, J., Fraser, J.C., 2003. Building Community Citizens: Claiming the Right to Place-making in the City. *Urban Studies* 40 (1), 127–142.
- Lew, A.A., 2017. Tourism planning and place making: place-making or placemaking? *Tour. Geogr* 19 (3), 448–466. <https://doi.org/10.1080/14616688.2017.1282007>.
- Li, J., Nassauer, J.I., 2021. Technology in support of nature-based solutions requires understanding everyday experiences. *Ecol. Soc* 26 (4). <https://doi.org/10.5751/ES-12838-260435>.
- Li, Y., Alencar, A., 2022. A tale of two cities: digital place-making and elderly Houniao migration in China. *J. Ethn. Migr. Stud* 1–18. <https://doi.org/10.1080/1369183x.2022.2115630>.
- Liaros, S., 2022. A network of circular economy villages: design guidelines for 21st century Garden Cities. *Built Environ. Proj. Asset Manag* 12 (3), 349–364. <https://doi.org/10.1108/BEPAM-01-2021-0004>.
- Licoppe, C., 2013. Merging mobile communication studies and urban research: Mobile locative media, “onscreen encounters” and the reshaping of the interaction order in public places. *Mobile Media & Communication* 1 (1), 122–128.
- Lyle, P., Foth, M., & Choi, J.H. (2015). Design Patterns for Urban Gardening. In M. Foth, M. Brynckov, & T. Ojala (Eds.), *Citizen's Right to the Digital City*. Urban Interfaces, Activism, and Placemaking.
- MacIntyre, T.E., Gidlow, C., Nieuwenhuijsen, M., Collier, M., Gritzka, S., Warrington, G., 2019. Nature-based solutions and interventions in cities: A look ahead. *Physical Activity in Natural Settings: Green and Blue Exercise*. Routledge., pp. 335–348.
- Markusen, A., Gadwa, A., 2010. Creative placemaking: How to do it well. National Endowment of the Arts. White paper report. Washington, DC.
- Markusen, A., Gadwa, A., 2014. Creative placemaking: how to do it well. *Community Dev. Invest. Rev* 2, 35–42. (http://engagedscholarship.csuohio.edu/urban_facpub/1162/).
- Marshall, G., 2021. *Placemaking in the Ecology of the Human Habitat*. The Routledge Handbook of Placemaking. Routledge, pp. 205–215.
- Matteo-Babiano, I., Lee, G., 2020. People in place: Placemaking fundamentals. Placemaking fundamentals for the built environment. Palgrave Macmillan, Singapore, pp. 15–38.
- Mattijssen, T.J.M., van der Jagt, A.P.N., Buijs, A.E., Elands, B.H.M., Erlwein, S., Laforteza, R., 2017. The long-term prospects of citizens managing urban green space: From place making to place-keeping? *Urban For. Urban Green* 26, 78–84. <https://doi.org/10.1016/j.ufug.2017.05.015>.
- McArthur, L., Xu, F., 2021. MetaPLACE: co-designing sino-australian urban media for participatory placemaking. *ACM Int. Conf. Proc. Ser* 42–53. <https://doi.org/10.1145/3469410.3469415>.
- Monno, V., Khakee, A., 2012. Tokenism or political activism? Some reflections on participatory planning. *Int. Plan. Stud* 17 (1), 85–101. <https://doi.org/10.1080/13563475.2011.638181>.
- Morrison, J., 2021. *Digital Placemaking Guide*. CALVIUM.
- Moss, T., Voigt, F., Becker, S., 2021. Digital urban nature: probing a void in the smart city discourse. *City* 25 (3–4), 255–276. <https://doi.org/10.1080/13604813.2021.1935513>.
- Najafi, P., Mohammadi, M., le Blanc, P.M., van Wesemael, P., 2021. Experimenting a healthy ageing community in immersive virtual reality environment: the case of world's longest-lived populations: June 1 2021 17th Int. Conf. Intell. Environ., IE 2021 - Proc. <https://doi.org/10.1109/IE51775.2021.9486595>.
- Nesbø, C., Assmuth, T., Irvine, K.N., Rusch, G.M., Waylen, K.A., Delbaere, B., Haase, D., Jones-Walters, L., Keune, H., Kovacs, E., Krauze, K., Kilvik, M., Rey, F., van Dijk, J., Vistad, O.L., Wilkinson, M.E., Wittmer, H., 2017. The science, policy and practice of nature-based solutions: an interdisciplinary perspective. In: *Science of the Total Environment*, Vol. 579. Elsevier B.V., pp. 1215–1227. <https://doi.org/10.1016/j.scitotenv.2016.11.106>.
- Ng, M.K., 2016. The right to healthy place-making and well-being. *Plan. Theory Pract* 17 (1), 3–6. <https://doi.org/10.1080/14649357.2016.1139227>.
- Norum, R., Polson, E., 2021. Placemaking ‘experiences’ during Covid-19. *Convergence* 27 (3), 609–624. <https://doi.org/10.1177/13548565211004470>.
- Ozluzen, O., Korkut, U., Ozluzen, C., 2021. ‘Refugees are not welcome’: digital racism, online place-making and the evolving categorization of Syrians in Turkey. *New Media Soc* 23 (11), 3349–3369. <https://doi.org/10.1177/1461444820956341>.
- Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E., Chou, R., Glanville, J., Grimshaw, J.M., Hrobjartsson, A., Lalu, M.M., Li, T., Loder, E.W., Mayo-Wilson, E., McDonald, S., Moher, D., 2021. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ* 372. <https://doi.org/10.1136/bmj.n71>.
- Pang, C., Neustaedter, C., Moffatt, K., Hennessy, K., Pan, R., 2020. The role of a location-based city exploration game in digital placemaking. *Behaviour and Information Technology* 39 (6), 624–647. <https://doi.org/10.1080/0144929X.2019.1697899>.
- Pang, C., Pan, R., Wong, S., Neustaedter, C., Wu, Y., 2020. The Design of a Location-Based Transit Game for Digital Placemaking. October 17–21, 2020, *Virtual Event, USA'47*, 47–51. Conference Companion Publication of the 2020 on Computer Supported Cooperative Work and Social Computing 45–51.
- Paquin, A.G., 2019. Public data art's potential for digital placemaking. *Tour. Herit. J* 1, 32–48. <https://doi.org/10.1344/tbj.2019.1.3>.
- Paraschivou, I., Layer-Wagner, T., 2021. Placemaking for urban sustainability: designing a gamified app for long-term, pro-environmental participation. *CHI Play 2021 - Ext. Abstr.* 2021 Annu. Symp. Comput. Hum. Interact. Play 186–191. <https://doi.org/10.1145/3450337.3483482>.
- Pavlovskaya, M., 2016. Digital place-making: insights from critical cartography and GIS. *Springer Geography*. Springer, pp. 153–167. https://doi.org/10.1007/978-3-319-40953-5_9.
- Peacock, D., MacKenzie, J., 2016. Find your Adelaide: Digital placemaking with adelaidecity explorer. Making Publics, Making Places. University of Adelaide Press., pp. 95–110.
- Peacock, S., Anderson, S., Crivellaro, C., 2018. Streets for People: Engaging Children in Placemaking Through a Socio-Technical Process. Proceedings of the 2018 CHI conference on human factors in computing systems 1–14.
- Peacock, S., Puusaar, A., Crivellaro, C., 2021. Sensing our streets. Involving children in making people-centred smart cities. *The Routledge Handbook of Placemaking*. Routledge, pp. 130–140.
- Pierce, J., Martin, D.G., Murphy, J.T., 2011. Relational place-making: The networked politics of place. *Transactions of the Institute of British Geographers* 36 (1), 54–70.
- Polson, E., 2015. A gateway to the global city: Mobile place-making practices by expats. *N. Media Soc* 17 (4), 629–645. <https://doi.org/10.1177/1461444813510135>.
- PPS, 2015. Placemaking and Place-Led Development: A New Paradigm for Cities of the Future. <http://www.pps.org/blog/placemaking-and-place-led-development-a-new-paradigm-for-cities-of-the-future/>. (Accessed 20 November 2022).
- PPS. (2004, February 29). *The Placemaking Movement*. Project for Public Spaces. Retrieved October 6, 2022, from (<https://www.pps.org/article/2003movement>).
- Prescott, C., 2019. Internet access – households and individuals, Great Britain: 2019. Office for National Statistics. (<https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetanddigitalmediausage/bulletins/internetaccesshouseholdsandindividuals/2019>).
- Qabshoq, M., 2018. Virtual Place-Making: The Re-discovery of Architectural Places through Augmented Play A playful emergence between the real and unreal. *Collab. Particip. Des* 1, 451–458. (<http://papers.cumincad.org/cgi-bin/works/Show?ceaa&2018.264>).
- Qi, J., Shen, W., Dai, K., 2021. From Digital Shock to Miniaturised Mobility: International Students' Digital Journey in China. *Journal of Studies in International Education*. <https://doi.org/10.1177/10283153211065135>.

- W.H.O. Regional Office for Europe (2021). Green and New Evidence and Perspectives for Action Blue Spaces and Mental Health. (<http://apps.who.int/bookorders>).
- Relph, E., 2007. Spirit of place and sense of place in virtual realities. *Techn. Res. Philos. Technol* 10 (3), 17–25, 10(3). (http://www.cag-acg.ca/en/edward_relph.htmlorhttp://www.geog.utoronto.ca/info/faculty/Relph.htm).
- Richards, G., Duif, L., 2018. Creative placemaking and branding strategies. *Small Cities with Big Dreams*. Routledge, New York.
- Rutha, N.M.H., Abbas, S.S., 2021. The Role Of Technology In Enhancing Place Attachment In Public Place. *IOP Conf. Ser.: Mater. Sci. Eng* 1094 (1), 012034. <https://doi.org/10.1088/1757-899x/1094/1/012034>.
- Rzeszewski, M., Naji, J., 2022. Literary placemaking and narrative immersion in extended reality virtual geographic environments. *Int. J. Digit. Earth* 15 (1), 853–867. <https://doi.org/10.1080/17538947.2022.2061619>.
- Sanaeipoor, S., Emami, K.H., 2020. Smart City: Exploring the Role of Augmented Reality in Placemaking. *Proceeding of 4th International Conference on Smart Cities, Internet of Things and Applications* 91–98. <https://doi.org/10.1109/SCIOT50840.2020.9250204>.
- Sanaeipoor, S., & Emami, K.H. (2020). Smart [AR] Mini-Application: Engaging Citizens in Digital Placemaking Approach. *Proceeding of 4th International Conference on Smart Cities, Internet of Things and Applications, SCIoT 2020*, 84–90. <https://doi.org/10.1109/SCIOT50840.2020.9250208>.
- Seddon, N., Chausson, A., Berry, P., Girardin, C.A.J., Smith, A., Turner, B., 2020. Understanding the value and limits of nature-based solutions to climate change and other global challenges. *In: Philosophical Transactions of the Royal Society B: Biological Sciences*, Vol. 375. Royal Society Publishing. <https://doi.org/10.1098/rstb.2019.0120>.
- Sepe, M., 2015. Improving sustainable enhancement of cultural heritage: Smart placemaking for experiential paths in Pompeii. *Int. J. Sustain. Dev. Plan* 10 (5), 713–733. <https://doi.org/10.2495/SDP-V10-N5-713-733>.
- Shankardass, K., Robertson, C., Shaughnessy, K., Sykora, M., Feick, R., 2019. A unified ecological framework for studying effects of digital places on well-being. *Soc. Sci. Med* 227, 119–127. <https://doi.org/10.1016/j.socscimed.2018.09.022>.
- Sharma, A., Jaggi, R.K., 2022. Reconceptualising Digital Placemaking: A Netnographic Study from the State of Uttarakhand, India. *Journal of Creative Communications*. <https://doi.org/10.1177/09732586221088137>.
- Soodarsono, W., Astuti, E.Y., Paramitasari, A.U., Asriana, N., Putri, D., & Zahra, A. (2021). Placemaking in the Digital Era: A Case Study of M Bloc Space-Jakarta.
- Stokes, B., Baumann, K., Bar, F., 2018. Placemaking across platforms: Playing to circulate stories in the smart city. *Lect. Notes Inst. Comput. Sci., Soc. Inform. Telecommun. Eng., LNCS* 215, 146–150. https://doi.org/10.1007/978-3-319-73062-2_13.
- Stokes, B., Bar, F., Baumann, K., Caldwell, B., Schrock, A., 2021. Urban furniture in digital placemaking: Adapting a storytelling payphone across Los Angeles. *Convergence* 27 (3), 711–726. <https://doi.org/10.1177/1354856521999181>.
- Strydom, W., Puren, K., Drewes, E., 2018. Exploring theoretical trends in placemaking: towards new perspectives in spatial planning. *Journal of Place Management and Development* 11 (2), 165–180. <https://doi.org/10.1108/JFMD-11-2017-0113>.
- Sugangga, M., Paramitasari, A., Martokusumo, W., & Sarwo Wibowo, A. (2021). Revitalization of Kota Lama Semarang and Early Signs of Digital Place Making Through Instagram.
- Sun, E., 2015. The Importance of Play in DigitalPlacemaking. *International AAAI Conference on Web and Social Media*.
- Sun, E., McLachlan, R., Naaman, M., 2017. MoveMeant: Anonymously Building Community Through Shared Location Histories. Sun, E., McLachlan, R., & Naaman, M. (2017, May). MoveMeant: Anonymously Building Community Through Shared Location Histories. *In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* 4284–4289.
- Sweeney, J., Mee, K., McGuirk, P., Ruming, K., 2018. Assembling placemaking: making and remaking place in a regenerating city. *culturalgeographies* 25 (06 2018). *cultural geographies* 25 (4), 571–587.
- Szasszik, G., Kecskés, T., 2020. Universal Open Space Design to Inform Digital Technologies for Disability-Inclusive Place-Making on the Example of Hungary. *Smart Cities* 3f (4), 1293–1333. <https://doi.org/10.3390/smartcities3040063>.
- Toland, A., Cate, M., Worrall, J., 2020. DigitalXPlace. *In: Hes, D., Hernandez-Satin, C. (Eds.), Placemaking Fundamentals for the Built Environment*. Palgrave, Macmillan, pp. 253–274.
- Tomaso, L.P., Yin, J., Laurent, J.G.C., Chen, J.T., Catalano, P.J., Spengler, J.D., 2021. The relationship between nature deprivation and individual wellbeing across urban gradients under covid-19. *Int. J. Environ. Res. Public Health* 18 (4), 1–20. <https://doi.org/10.3390/ijerph18041511>.
- Tomitsch, M., 2016. What Urban Media Art can Do: Why When Where and How. *What urban media art can do*. Stuttgart.
- Tomitsch, M., McArthur, I., Haeusler, M.H., Foth, M., 2015. The role of digital screens in urban life: New Opportunities for placemaking. *Citizen's Right to the Digital City: Urban Interfaces, Activism, and Placemaking*. Springer Singapore, pp. 37–54. https://doi.org/10.1007/978-981-287-919-6_3.
- Tools, E.E., 2017. Theorizing critical placemaking as a tool for reclaiming public space. *American Journal of Community Psychology* 59, 184–199.
- Toomey, A.H., Strehlau, L., Manzollilo, B., Thomas, C., 2020. The Place-Making Potential of Citizen Science: Creating Social-Ecological Connections in an Urbanized World. *Landscape and Urban Planning* 200. <https://doi.org/10.1016/j.landurbplan.2020.103824>.
- Toomey, A.H., Campbell, L.K., Johnson, M., Strehlau-Howay, L., Manzollilo, B., Thomas, C., Graham, T., Palta, M., 2021. Place-making, place-disruption, and place protection of urban blue spaces: perceptions of waterfront planning of a polluted urban waterbody. *Local Environ* 26 (8), 1008–1025. <https://doi.org/10.1080/13549839.2021.1952966>.
- Truong, S., Gray, T., Ward, K., 2022. Enhancing urban nature and place-making in social housing through community gardening. *Urban For. Urban Green* 72. <https://doi.org/10.1016/j.ufug.2022.127586>.
- Tsekeri, E., Lilli, A., Katsiakalis, M., Gobakis, K., Mania, A., & Kolokotsa, D. (2022). On the integration of nature-based solutions with digital innovation for health and wellbeing in cities. 1–6. <https://doi.org/10.23919/aplitech55088.2022.9854269>.
- Tuan, Y.F., 1977. *Space and Place The Perspective of Experience*. University of Minnesota Press.
- United Nations, 2018. 68% of the world population projected to live in urban areas by 2050, says UN. United Nations Department of Economic and Social Affairs. (<https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>).
- United Nations. (2008). UN forum examines positive impact of urbanization. Retrieved January 20, 2022, from (<https://news.un.org/en/story/2008/04/255242-un-forum-examines-positive-impact-urbanization-development>).
- Vallicelli, M., 2018. Smart cities and digital workplace culture in the global European context: Amsterdam, London and Paris. *City, Cult. Soc* 12, 25–34. <https://doi.org/10.1016/j.ccs.2017.10.001>.
- van Houwelingen-Snippe, J., van Rompay, T.J.L., Allouch, S. ben, 2020. Feeling connected after experiencing digital nature: a survey study. *Int. J. Environ. Res. Public Health* 17 (18), 1–16. <https://doi.org/10.3390/ijerph17186879>.
- van Houwelingen-Snippe, J., ben Allouch, S., van Rompay, T.J.L., 2021. Virtual Reality representations of nature to improve well-being amongst older adults: a rapid review. *J. Technol. Behav. Sci* 6 (3), 464–485. <https://doi.org/10.1007/s41347-021-00195-6>.
- Waite, C., 2020. Making place with mobile media: young people's blurred place-making in regional Australia. *Mob. Media Commun* 8 (1), 124–141. <https://doi.org/10.1177/2050157919843963>.
- Waite, C., 2021. Making place beyond the city through the lens of digital media: Culturally diverse young people negotiating social change in a rural city. *Digital Geography and Society* 2. <https://doi.org/10.1016/j.diggeo.2021.100021>.
- Wang, W., 2019. A study of digitally enhanced people-space interaction: a place-centric perspective. *Space Cult.* <https://doi.org/10.1177/1206331219881352>.
- Wang, W., 2022. A study of digitally enhanced people-space interaction: a place-centric perspective. *Space Cult* 25 (1), 65–76. <https://doi.org/10.1177/1206331219881352>.
- Wilken, R., Humphreys, L., 2021. Placemaking through mobile social media platform Snapchat. *Convergence* 27 (3), 579–593. <https://doi.org/10.1177/1354856521989518>.
- Williams, D.R., 2014. Making sense of "place": reflections on pluralism and positionality in place research. *Landscape Urban Plan* 131, 74–82. <https://doi.org/10.1016/j.landurbplan.2014.08.002>.
- Witteborn, S., 2021. Digital placemaking and the datafication of forced migrants. *Convergence* 27 (3), 637–648. <https://doi.org/10.1177/13548565211003876>.
- Wright, I., 2021. *Integral Placemaking. A poetics of sophrosynes? The Routledge Handbook of Placemaking*. Routledge, pp. 322–332.
- Wyckoff, M.A., 2014. Definition of placemaking: four different types. *Plan. Zoning N* 32 (3). (www.mplacemaking.org).
- Zacher, H., Rudolph, C.W., 2021. Individual differences and changes in subjective wellbeing during the early stages of the COVID-19 pandemic. *Am. Psychol* 76 (1), 50.
- Zhang, H., Gong, Q., 2021. Migrant placemaking and authorship: digital storytelling by Chinese interprovincial students. *Continuum* 35 (4), 509–527. <https://doi.org/10.1080/10304312.2021.1932748>.

Appendix C: MMAT from Fernandez-Osso Fuentes et al. (2023b).

MMAT available in the below link:

<https://ars.els-cdn.com/content/image/1-s2.0-S1618866722003399-mmc1.docx>

Appendix D: MMAT from Chapter 2 Part B.

STUDY		MMAT					
		Category of study design	Methodological quality criteria	Responses			Score
				Yes	No	Can't tell	
Moodley and Marks	2023	Screening questions	S1. Are there clear research questions?			x	4
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			2
Niksic et al	2023	Screening questions	S1. Are there clear research questions?	x			
			S2. Do the collected data allow to address the research questions?			x	
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?			x	
			1.2. Are the qualitative data collection methods adequate to address the research question?			x	
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?			x	
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?			x	2
Costa et al	2024	Screening questions	S1. Are there clear research questions?	x			
			S2. Do the collected data allow to address the research questions?	x			
		Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?			x	

			5.2. Are the different components of the study effectively integrated to answer the research question?			x	
			5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?			x	
			5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?			x	
			5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?			x	
Imara et al.,	2024	Screening questions	S1. Are there clear research questions?			x	2
			S2. Do the collected data allow to address the research questions?	x			
		Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?	x			
			5.2. Are the different components of the study effectively integrated to answer the research question?			x	
			5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?			x	
			5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?			x	
			5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?			x	
Thompson et al.,	2023	Screening questions	S1. Are there clear research questions?	x			1
			S2. Do the collected data allow to address the research questions?			x	
		Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?			x	
			5.2. Are the different components of the study effectively integrated to answer the research question?			x	
			5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?			x	
			5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?			x	
			5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?			x	
Dai & Liu	2023	Screening questions	S1. Are there clear research questions?	x			4
			S2. Do the collected data allow to address the research questions?			x	
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?			x	

			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?			x	
Naji & Rzeszewski	2022	Screening questions	S1. Are there clear research questions?	x			2
			S2. Do the collected data allow to address the research questions?			x	
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?			x	
			1.3. Are the findings adequately derived from the data?			x	
			1.4. Is the interpretation of results sufficiently substantiated by data?			x	
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?			x	
Kotus et al.	2022	Screening questions	S1. Are there clear research questions?	x			5
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			
Kolotouchkina	2022	Screening questions	S1. Are there clear research questions?	x			3
			S2. Do the collected data allow to address the research questions?			x	
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?			x	
			1.4. Is the interpretation of results sufficiently substantiated by data?			x	
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?			x	
Low et al.	2022	Screening questions	S1. Are there clear research questions?	x			5
			S2. Do the collected data allow to address the research questions?	x			

		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			
Khamis & el Hara	2023	Screening questions	S1. Are there clear research questions?	x			2
			S2. Do the collected data allow to address the research questions?	x			
		Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?	x			
			5.2. Are the different components of the study effectively integrated to answer the research question?			x	
			5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?			x	
			5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?			x	
			5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?			x	
Sacramento et al.	2022	Screening questions	S1. Are there clear research questions?			x	4
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?			x	
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			
Slingerland et al.	2022	Screening questions	S1. Are there clear research questions?	x			4
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?			x	
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			

			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?			x	
Gonsalves et al	2024	Screening questions	S1. Are there clear research questions?	x			5
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			4
Ebaid	2023	Screening questions	S1. Are there clear research questions?			x	
			S2. Do the collected data allow to address the research questions?	x			
		Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?	x			
			5.2. Are the different components of the study effectively integrated to answer the research question?	x			
			5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?			x	
			5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?			x	
			5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	x			2
Almqvist et al.	2023	Screening questions	S1. Are there clear research questions?	x			
			S2. Do the collected data allow to address the research questions?			x	
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?			x	
			1.2. Are the qualitative data collection methods adequate to address the research question?			x	
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?			x	
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?			x	4
Gonsalves et al	2023	Screening questions	S1. Are there clear research questions?	x			

			S2. Do the collected data allow to address the research questions?			x	
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?			x	
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?			x	
Noronha & Canuto da silva	2023	Screening questions	S1. Are there clear research questions?	x			1
			S2. Do the collected data allow to address the research questions?			x	
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?			x	
			1.2. Are the qualitative data collection methods adequate to address the research question?			x	
			1.3. Are the findings adequately derived from the data?			x	
			1.4. Is the interpretation of results sufficiently substantiated by data?			x	
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?			x	
Hespanol	2022	Screening questions	S1. Are there clear research questions?	x			4
			S2. Do the collected data allow to address the research questions?			x	
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?			x	
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			
Yang	2023	Screening questions	S1. Are there clear research questions?			x	2
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?			x	
			1.3. Are the findings adequately derived from the data?			x	

			1.4. Is the interpretation of results sufficiently substantiated by data?			x	
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?			x	
Antonic et al	2023	Screening questions	S1. Are there clear research questions?	x			5
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			
Loroño-leturiado & Illingworth	2023	Screening questions	S1. Are there clear research questions?	x			5
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			
Klein	2022	Screening questions	S1. Are there clear research questions?	x			3
			S2. Do the collected data allow to address the research questions?			x	
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?			x	
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?			x	
			1.4. Is the interpretation of results sufficiently substantiated by data?			x	
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			
Razi & Ziminski	2022	Screening questions	S1. Are there clear research questions?	x			5
			S2. Do the collected data allow to address the research questions?	x			

		Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?	x			
			5.2. Are the different components of the study effectively integrated to answer the research question?	x			
			5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	x			
			5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	x			
			5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	x			
Najafi et al	2022	Screening questions	S1. Are there clear research questions?	x			5
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			
Törnberg	2022	Screening questions	S1. Are there clear research questions?	x			3
			S2. Do the collected data allow to address the research questions?	x			
		Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?			x	
			5.2. Are the different components of the study effectively integrated to answer the research question?			x	
			5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?			x	
			5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?			x	
			5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	x			
Kurniawaty et al.	2022	Screening questions	S1. Are there clear research questions?	x			3
			S2. Do the collected data allow to address the research questions?	x			
		Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?	x			

			5.2. Are the different components of the study effectively integrated to answer the research question?			x	
			5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?			x	
			5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?			x	
			5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?			x	
Ouda	2022	Screening questions	S1. Are there clear research questions?	x			4
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?			x	
			1.3. Are the findings adequately derived from the data?			x	
			1.4. Is the interpretation of results sufficiently substantiated by data?			x	
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			5
Amirzadeh & Sharifi	2024	Screening questions	S1. Are there clear research questions?	x			
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			4
Boros et al.	2024	Screening questions	S1. Are there clear research questions?	x			
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?			x	
			1.4. Is the interpretation of results sufficiently substantiated by data?			x	

			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?			x	
Maciej	2024	Screening questions	S1. Are there clear research questions?			x	4
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			
te Tintelo et al.	2024	Screening questions	S1. Are there clear research questions?			x	4
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?			x	
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?			x	
Atteneder & Lohmeier	2024	Screening questions	S1. Are there clear research questions?	x			5
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			
Hurley	2024	Screening questions	S1. Are there clear research questions?	x			3
			S2. Do the collected data allow to address the research questions?			x	
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			

			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?			x	
			1.4. Is the interpretation of results sufficiently substantiated by data?			x	
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?			x	
Najafi & Mohammadi	2024	Screening questions	S1. Are there clear research questions?	x			5
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	x			
			1.2. Are the qualitative data collection methods adequate to address the research question?	x			
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			
Chen et al.	2024	Screening questions	S1. Are there clear research questions?			x	4
			S2. Do the collected data allow to address the research questions?	x			
		Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?			x	
			1.2. Are the qualitative data collection methods adequate to address the research question?			x	
			1.3. Are the findings adequately derived from the data?	x			
			1.4. Is the interpretation of results sufficiently substantiated by data?	x			
			1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	x			

Appendix E: Table of definitions from Chapter 2 Part B.

Definitions				
Author	Own definition?	Cited Author	Type of placemaking	Definition
Almqvist et al. (2023)	No	Purcell (2002)	Radical placemaking	It is a kind of placemaking that is radical. What makes this placemaking radical is the struggling away from forces that deplete citizens' abilities and motivations to shape their place (Purcell, 2002).
Amirzadeh and Sharifi (2024)	Yes	References: (Foth, 2017a; Fredericks et al., 2015; Haleboua (2020); Haleboua & Polson, 2021; Tsekeri et al., 2022)	Digital placemaking	The process of shaping urban experiences and fostering a connection to a place by employing augmented technology, digital applications, and media to create a citizen-centric environment that enhances community engagement in the place making process and improves the relationship between people and place.
Antonić et al. (2023)	Yes		Placemaking	Placemaking is generally considered as a multi-layer and multi-aspect approach in urban studies focused on public open spaces, such as streets, parks, town squares or quays.
Atteneder and Lohmeier (2024)	No	Basaraba (2021)	Placemaking	The term 'placemaking' dates back to the 1960s (Basaraba, 2021) and refers to the planning, restructuring and design of urban living places; a process that is strongly community-driven to create 'high-quality' liveable places to which inhabitants feel emotionally connected
Chen et al. (2024)	No	Morrison (2022)	Digital placemaking	Digital placemaking, according to Morrison (2022), is the process of enhancing physical locations with location-specific digital services, products, or experiences to make them more alluring for tourists.
Ebaid (2023)	Yes		Placemaking	Placemaking is a comprehensive process utilized to meet the requirements of those communities [cities].
Gonsalves et al. (2023)	No	Gonsalves et al. (2021)	Radical placemaking	Radical Placemaking is a tactic where those who experience marginalization utilize digital tools to engage in place-based activism (Gonsalves et al., 2021).
Gonsalves et al. (2024)	Yes		Radical placemaking	We consider Radical Placemaking to be a community-driven approach to shaping and "socially co-owning" public spaces that challenges traditional placemaking and top-down urban planning and development. It empowers local residents and marginalised communities to actively participate in the design and transformation of their neighbourhoods by prioritising inclusivity, social justice, and community concerns.

Hespanhol (2022)	Yes	Placemakingx, 2019, Schneekloth and Shibley,	Augmented placemaking	Recalling definitions of placemaking as constituting common causes capable of drawing people together to collectively re-imagine and reinvent public spaces as the heart of their community (placemakingx,
		2000, Hespanhol et al., 2017, Morrison, 2021		2019, Schneekloth & Shibley, 2000), one can argue that the COVID-19 pandemic has unleashed a particularly new form of placemaking, underpinned by digital technologies, yet going beyond what has often been called digital placemaking (Hespanhol et al., 2017, Morrison, 2021). I refer to this new form as ‘augmented placemaking’.
Hurley (2023)	No	Basaraba (2021)	Digital placemaking	Since 2015, it has appeared as “digital placemaking” in media studies (Basaraba, 2021). There has been an emerging focus on more creative applications of digital placemaking that involve the combination of resources (tangible and intangible), affective meanings (emotions), and creativity to capture public attention through performative content creation, including the production of geolocational tagging, image, and video production on social media.
Imara et al. (2024)	Yes		Digital placemaking	This is further called ‘digital-placemaking’, an augmentation of physical places with location-specific digital services, products, or experiences to create better and more meaningful destinations for all while attracting communities of all types to deepen their connections to the public realm and with each other.

Klein (2022)	No	Akbar and Edelenbos (2021); Madden (2018).	Placemaking	The term placemaking was popularised in the 1960s to describe urban design projects and was increasingly understood as consultative, collaborative processes involving the varied groups of people who share a space (Akbar & Edelenbos 2021; Madden 2018).
Kotus et al., 2022)	No	Evans, (2015); Halegoua (2020); Pavlovskaya (2016); Polson (2015).	Digital placemaking	But this change can also be considered in the context of digital placemaking opportunities. We can use digital media to construct social or locational capital, by connecting oneself to places that become embodied in spatial habitus (Evans, 2015; Halegoua, 2020). Places can also be produced through their online representations and neogeography initiatives either individually or by whole spatially bonded communities (Pavlovskaya, 2016; Polson, 2015).
Kurniawaty et al. (2022)	Yes		Placemaking	Placemaking is one of the architecture design principles to emphasizes the formation of the space, which prioritizes human interactions, human and building interactions, and interactions between building with their environmental context.
Loroño-Leturiondo and Illingworth (2023)	No	Strydom et al. (2018)	Placemaking	Placemaking can be defined as creating suitable living spaces through the involvement of all interested parties, including community members (Strydom et al.,2018).
Maciej (2024)	Yes		Digital placemaking	Thus, digital placemaking can be understood as a process in which the experiences of places are transformed, mediated, and created through multifaceted communication processes between people, places, and digital technology.

Moodley and Marks (2023)	Yes		Critical placemaking	Critical placemaking—placemaking that focuses on more vulnerable population groupings, and which impacts public views and enhances the discourse surrounding marginal groupings.
Najafi and Mohammadi (2024)	No		Digital placemaking	Digital placemaking, on the other hand, can use technology and digital media to enhance the physical and social environment of a semi-public space. Examples include the use of interactive displays (e.g., Harley & Richardson (2021); Tomitsch (2022), 26, augmented reality (e.g., Gwilt et al. (2022); Tengku Anuar et al. (2022)), and gamification (e.g., Innocent (2018); Pang et al. (2020)) to create new forms of engagement and participation.
Najafi et al. (2022)	No	Clark et al. (2008)	Placemaking	Placemaking is a concept coined by Jane Jacobs and William H. Whyte in the 1960s that promises to make cities a better place to live. It refers to creating a place that promotes health, happiness, and well-being by drawing on the community's assets, values, and resources (Clark et al. 2008).
Naji and Rzeszewski (2022)	Yes		Digital placemaking	Digital placemaking is a concept and practice in which the affordances of digital media are used to evoke a sense of place that offers an emotional attachment to a place that allows social actors to craft and express their identities
Noronha et al. (2023)	No	Frith & Richter (2021)	Digital placemaking	This is important for creating a sense of community in this artificially developed urban environment, something that has also been called digital placemaking (Frith & Richter, 2021)
Ouda (2022)	No	Griffiths & Barbour (2016); Kember & Zylinska (2012); O'Neil (2016); Toland et al. (2020)	Digital placemaking	Digital placemaking is an evolving field of study and practice that addresses the use and impacts of digital technologies on placemaking practices (Toland et al.; 2020) (...) Digital placemaking can be viewed as a part of extensive and swiftly emerging studies on the physical, digital, social, environmental experiences stemming from the abundance of smartphones and social media platforms (Griffiths & Barbour, 2016; Kember& Zylinska, 2012; O'Neil, 2016).
Razi and Ziminski (2022)	Yes		Placemaking	Placemaking, the beautification of underutilized urban space, is a relatively recent intervention that has emerged as a diverse and flexible tool for engaging communities across a variety of topics
Slingerland et al. (2022)	No	Foth (2017b)	Digital placemaking	Place-making in the digital domain, already signalled by others as digital placemaking (Foth, 2017b)

te Lintelo et al. (2024)	No	Cresswell (2014); Lew (2017), Montgomery (2016); Wyckoff (2024)	Placemaking	While place has been a core theoretical idea within geography since the 1970s, various disciplinary traditions have generated a range of ‘confusing and contradictory’ definitions of placemaking (Wyckoff, 2014, p. 1,2). Top-down approaches to placemaking influential within architecture, design and urban planning go back to the 1970s. These tend to be preoccupied with shaping cities’ form and image, to advance economic/infrastructure development, and privilege expert knowledge and definitions of quality (Lew, 2017; Montgomery, 2016). An alternative bottom-up perspective on placemaking asks how spaces are ‘made and remade on a daily basis’ (Cresswell, 2014, p. 70) and invested with a sense of place by ordinary users rather than experts.
Törnberg (2022)	No	Zukin et al. (2017)	Platform placemaking	“Platform placemaking”: a process in which platforms mobilize their users as “discursive investors” (Zukin et al., 2017, p. 459), to shape spatial imaginaries in the interests of the platform.



Conceptualizing digital placemaking in nature for wellbeing

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ABSTRACT

Increased urban population has created a disconnection between humans and natural environments that needs to be recognised as a key challenge. This article proposes that disconnection from nature in urban settings can be mitigated by digital placemaking. A conceptual framework which accounts for place attachment and place branding, Social Identity Theory and nature connectedness is presented. The benefit of this approach is that it can help us understand more clearly the different dynamics involved in hybrid place experience as a driver for both social change and consumer wellbeing. This modified hybrid tripartite model creates meaningful places for consumers, fostering their attachment to the space and with others, while simultaneously enhancing their wellbeing. In addition, the model contributes to our understanding of place branding effects on consumers beyond commercial outcomes; explaining the positive effects on wellbeing of nature-based digital placemaking; and providing clarity on the role of technology in nature-based place brand experiences. In synthesising the different dimensions of the framework, potential implications for place managers, marketers and leaders are outlined.

1. Introduction

Despite the demonstrated positive impact of engagement with nature on people's wellbeing, the disconnection from nature that humans have been experiencing has increased in urban environments. A combination of decreased opportunities to access and engage nature and constant engagement with technology have been attributed as causes (Barboza et al., 2021; Kesebir and Kesebir, 2017; McLean et al., 2021). Therefore, scholars have proposed a rethink in the ways people engage and build a relationship with nature, where new technology is embraced (Richardson et al., 2018; Riechers et al., 2021). In this article we will present a conceptual model to support the use of digital placemaking for nature and wellbeing, exploring different theories to reframe the human-nature relationship in urban environments.

The exploration of experiences in nature through technology is supported both by digital nature exposure (e.g., Lideskare et al., 2022; Murphy et al., 2022), and the way in which technology is used as a mediator in daily interactions with our environment and with others. These examples of technology use could be redirected in urban

environments to help communities connect, engage with, and use nature for health and wellbeing (Murphy et al., 2022; Riechers et al., 2021).

As a process that uses digital media to foster individual and communal place attachment (Halegoua and Polson, 2021), digital placemaking is a viable option in urban environments to foster nature connectedness to support wellbeing. However, literature on the concept is fragmented, lacking a deep understanding of the dynamics involved in the process (Fernandez-Osso Fuentes et al., 2023a).

Drawing from literature in the areas of digital placemaking, psychology of nature and wellness, virtual games and place branding, we propose a model meant to broaden the conceptual domain of digital placemaking to reframe the human-nature relationship in cities through an innovative approach. We propose hybrid nature place experiences, understood as the digital extension of the physical place (Hespanhol, 2022), to act as a driver for social change (Foth, 2017) and consumer wellbeing (Wright, 2021). This model provides organisations with a clear path to implement technology for nature and wellbeing, improving climate resilience in cities (Gulsrud et al., 2018) and promoting pro-environmental behaviours (Paraschivoiu and Layer-Wagner, 2021).

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Our study aims to conceptualize the technology-mediated consumer wellbeing and social change benefits of digital placemaking in nature-based place experiences. The conceptual model of Digital Placemaking for Nature and Wellbeing, which proposes a future research agenda, addresses phenomena relevant to contemporary organisations interested in new technological approaches to the current climate crisis concerning communities.

Through this conceptual model we provide a critical dialogue using theories, i) to understand the place branding approach's effects on consumers beyond their commercial outcomes; ii) to address the gap in wellbeing effects of digital placemaking experiences in nature environments; iii) to advance the understanding of digital placemaking to support planners and scholars; iv) to contribute to the debate on the role of technology as a mediator in place experiences.

2. Theoretical foundations

2.1. Digital placemaking

The potential of digital placemaking to create of a sense of attachment within a community is key (Courage, 2021; Halegoua and Polson, 2021). Placemaking practices were first implemented in urbanism as a strategy to foster innovation and knowledge-intensive activities (Abdel-Aziz et al., 2016; Pancholi et al., 2019). Its digital counterpart has emerged to become an increasingly relevant topic for academics and practitioners working collaboratively with local governments and community groups (Hespanhol, 2018). However, digital placemaking suffers from a definitional dilemma (Fernandez-Osso Fuentes et al., 2023a; Głowczyński, 2022), and consensus on an operational definition is lacking. The conceptualisation is exacerbated by the complex variety of technologies that can be used (Chen et al., 2022), from social media (Soedarsono et al., 2021) to augmented reality and gamification (Clowater, 2021).

The difference of digital placemaking from other technological dimensions in place resides on the creation of hybrid place experiences that combine online and offline elements while producing a 'sense of place' and belonging through participatory processes (Polson, 2015). Participatory processes and community engagement activities are crucial for digital placemaking.

Gamification processes are commonly used to understand the technological dimension and effects of digital placemaking in communities (e.g., Hjorth and Richardson, 2017; Pang et al., 2020). Digitally gamified experiences have been demonstrated to foster behaviour change and pro-environmental attitudes (Paraschivoiu and Layer-Wagner, 2021). Experience of navigating virtual environments, which are a representation of the physical environments through gamification, could benefit consumers' wellbeing (Clowater, 2021; Hjorth and Richardson, 2017).

Although there are some potential risks such as limited engagement of marginalised or diverse groups (Peacock et al., 2021), benefits include economic growth or cultural wealth (Morrison, 2021), enhanced community place attachment and sense of place (Halegoua and Polson, 2021), inclusion and social cohesion (Najafi et al., 2021; Szaszák and Kecsés, 2020) and enriched experiences of memorable physical places (Her, 2021). Yet, associated implications for urban nature and consumer wellbeing have been overlooked (Fernandez-Osso Fuentes et al., 2023a). Specifically, nature has been broadly described as a context where the experience is developed. Moreover, wellbeing, which is understood as a broad concept that combines several wellness indicators such as positive affective states or social engagement (Shankardass et al., 2019), is mentioned as a result from the dynamics involved in digital placemaking without further clarification.

Recent explanatory frameworks have emerged (e.g., Chen et al., 2022; Głowczyński, 2022; Hespanhol, 2022; Ozkul, 2021) to explore the complex dynamics involved in digital placemaking. However, to date, research has overlooked both the effects of urban natural environments and the potential wellbeing effects. Razi and Ziminski (2022) mention

social wellbeing as a consequence of place attachment and community identity, without further explanation.

Digital placemaking, in relation to place branding and marketing, has been identified as one of the elements in the place branding trifecta (Keegan, 2021). This can support the development of more meaningful experiences of places (Ellery et al., 2021). The place marketing and branding approach to the concept has been mainly applied to tourism (e.g. Sugangga et al., 2021) from an analogue placemaking perspective (Balsas, 2021; Lew, 2017; Ni and Say, 2022; Richards, 2017), associated with an economic intention. Our proposed model shifts the participant focus from tourists to local residents. This recognised the potential for greater co-creation process of a place image that is part of the identity of the community, fostering belonging to support social wellbeing.

Our conceptual model has been informed by seminal digital placemaking studies (e.g., Halegoua, 2020; Polson, 2015) and a systematic review which identified four key characteristics: sense of place, community engagement, inclusion and hybrid reality (Fernandez-Osso Fuentes et al., 2023a). Many studies were found to apply place attachment or sense of place to understand the feeling of belonging digitally created with a place. Another clear aspect of digital placemaking is the creation of a community engagement activity that sets up a space for co-creation and social relationships, which affects their identity. Furthermore, wellbeing benefits and improved nature relationships through digital means are only briefly described and mainly studied in analogue applications (Kale, 2019; Ng, 2016). Consequently, it is important to more clearly understand how these dynamics are interconnected and how they could be applied in urban nature spaces from a place branding approach to help reframe the human-nature relationship in the current climate crisis.

2.2. Place attachment theory

Place attachment or sense of place is one of the most cited processes involved in a digital placemaking experience (see Breek et al., 2018; Freeman et al., 2019; Halegoua and Polson, 2021; Polson, 2015). Place attachment theory describes how intimate relationships provide people with a safe haven, enabling them to explore their environments and develop an attachment to places, which may provide them with feelings of belonging, relief and psychological and wellbeing benefits (Nisa et al., 2020; Scannell and Gifford, 2017).

Scannell and Gifford's (2010a) place attachment tripartite model aims to explain this multidimensional concept and its effects. The tripartite model proposes three dimensions: person, place and psychological process. The person dimension involves both individual (subjective experiences) and collective (symbolic meaning of place in a community) place attachment; the psychological process of sense of place involves affect (emotional connection), cognition (memories, beliefs, meaning and knowledge) and behaviour (action through proximity-maintaining behaviour and reconstruction of place); and the place dimension is divided between social (facilitation of social relationship and group identity) and physical (features) place attachment.

Lewicka's review (2011) highlighted that the person element has received the most attention in literature. The review identified a lack of research on the process through which people collectively create meaningful relations with places. Our model focuses on communal dynamics that affect the group belonging processes that positively affect consumers.

Moreover, Scannell and Gifford (2017) extend the psychological benefits of place attachment into thirteen categories, including memory support, belonging and connection to nature. The social aspect of place attachment not only is presented as a key element in the person and place dimension of the tripartite, but it also is found as a key psychological benefit. Furthermore, interpersonal relationships in a place provide with belonging and use place attachment as a mediator between social identity and wellbeing (Maricchiolo et al., 2021). Additionally, nature connection is also considered a benefit of this process. Multiple

studies explore the combination of place attachment and nature, describing place attachment as a key factor in human-nature interactions (Jayakody et al., 2024) and alluding to positive associations and effects (e.g., Colley and Craig, 2019; Yoshida et al., 2022). Specifically, place attachment to natural settings is a greater predictor of pro-environmental behaviours compared to civic place attachment (Scannell and Gifford, 2010b). Yet, there is a key gap in literature in urban nature spaces and their combination with digital technologies to enhance place attachment experiences.

The increased use of technology in our daily place interactions has made essential the conception of online place attachment. Defined by Schwartz (2015) as a way to create online-offline personal connections to a place through location-based technology, online place attachment bonds users with physical spaces through digital interactions, also as a setting stone to understanding online consumers' actions and their effect on their local community and identity. However, the exploration of online place attachment is very limited. Few researchers have investigated online engagement and place attachment, with Huang et al. (2022) being the exception in their study with university students. Therefore, the potential implications of online place attachment beyond understanding online consumers' actions are a promising area of research.

Despite using digital devices to explore and engage with surroundings, place attachment's digital dimension is still unclear and underexplored. Specifically looking at fostering a communal place identity and stimulating positive effects of technology in place, consumers online place attachment could be promoted through place branding experiences in urban nature spaces. This could help identify consumers with the place associating it with positive brand outcomes (Pedeliento and Kavaratzis, 2019) such as enhancing their wellbeing.

2.3. Place branding

Highly connected with place attachment, place branding is derived from place marketing, as one of the traditional product marketing mix (McCarthy, 1960). Place marketing refers to a location as both the product and the place, which benefits involve strategic guidance for place development, attracting investment and creating positive place experiences (Kavaratzis et al., 2017). Place branding is the application of branding principles to places (Reitsamer and Brunner-Sperdin, 2021) and aims to create, influence and reinforce the image of the place and its associations (Wamaby and Medway, 2015; Zenker and Braun, 2010), beyond 'selling' places (Graziano and Albanese, 2020).

Place branding theory was at first focused on the country level (Aronczyk, 2013; Hanna and Rowley, 2008) and tourism destination brands (Ma et al., 2019) with different categorisations, mostly based on destination image and country/city branding (see Chan and Marafa, 2013; de San Eugenio Vela et al., 2013; Kavaratzis, 2005; Kavaratzis and Ashworth, 2005). Works on nation branding also include environmental perspectives (Aronczyk, 2013; Aronczyk and Espinoza, 2021), which are important to understand the nature lens of our model. Specifically, the reflections on the role of public relations and environmental communication as a cultural producer in international environmental governance (Aronczyk and Espinoza, 2021) are crucial in today's paradigm of climate crisis and international plans to mitigate it.

Nevertheless, our approach to place branding focuses on the community level. Authors such as Aitken and Campelo (2011) recognised the role of brand-community practices and their ownership, where the brand meaning is constantly co-created and represented. The role of the local community shifts towards an active participant or co-creator in the place brand. This is essential to preserve authentic places that are meaningful to their inhabitants, as it enhances the identity and the local culture of a place with memorable experiences (Aitken and Campelo, 2011; Kavaratzis, 2005). Braun et al. (2013) describe different functions of local consumers in place branding, such as residents as place brand ambassadors. To implement place branding, the power of the brand is

relocated to the residents (Zenker and Erfgen, 2014). To explore success measurements in this context, Zenker and Martin (2011) propose an inclusive approach to understanding target groups' diversity and place complexity.

Similarly to online place attachment and the need to understand place branding in the current digital context, online place branding is first introduced by Florek (2011). Online place branding is defined to have two main directions: promotion and communication channels, and the creation of online communication. Only recently, have studies on online place branding emerged to try to understand how the digital realm affects place branding, such as Briciu et al. (2020) or Graziano and Albanese (2020), who call for place branding to be supported by online and offline actions due to the growth of new technologies. Moreover, limited nature involvement in place branding studies can be found, and usually from a tourism perspective. Graziano and Albanese's case study (2020) on online place branding of a natural space requests to involve locals in place-image building processes for place branding effectiveness. Therefore, we aim to understand how online place branding is applied beyond the communication of a brand, its effect on local consumers for wellbeing and social change through attachment and engagement with nature.

Concerning place attachment, multiple studies have explored their interrelations, specifically the co-creation of place branding and the result of place attachment (Leal et al., 2022), its use with place brand credibility and technology while categorizing the brand as part of the self (Reitsamer and Brunner-Sperdin, 2021), or its disregard in commercial settings (Debenedetti et al., 2014). Pedeliento and Kavaratzis (2019) conceptualize place brand and place branding as the interplay between culture, identity and image, where place attachment is a result of being culturally bonded to a collective and a place while a social identity is also developed.

Thus, place branding and place attachment are interconnected as they both affect consumers on how they feel attached and identify with a place. This connection is understood from a group level as consumers interact with the place and among themselves. This interaction generates group identification and trust, which could impact their relationship with nature and support their wellbeing.

2.4. Social identity theory

The third key theory involved in a digital placemaking experience is Social Identity Theory. The creation of community engagement spaces that offer a forum for co-creation and social interactions is found to affect their identity. Social Identity Theory is one of the most influential approaches to group processes and intergroup relations worldwide (Hornsey, 2008). It refers to a personal sense of belonging to a social group, where individuals identify themselves according to the group they are members (Makri et al., 2021; Tajfel and Turner, 1986). Therefore, it is commonly applied in relation to Self-Categorisation Theory (Turner et al., 1987). Social Identity Theory suggests that group membership is internalised by individuals, becoming part of one's self-concept (Heath et al., 2017; Tajfel, 1978). It enhances self-esteem (Haslam et al., 2009) and residents health and wellbeing (Bowe et al., 2020). Furthermore, in the present climate crisis, the impact of group identification also affects the willingness to contribute to urban regeneration and the development of environmental attitudes (Fielding and Hornsey, 2016; Heath et al., 2017; Maricchiolo et al., 2021).

As described earlier, 'belonging' referring to connecting with others and the influence it has on an individual is one of the psychological benefits of place attachment (Scannell and Gifford, 2017), and it is a key aspect in the place attachment tripartite (Scannell and Gifford, 2010a). Hence, the clear interconnection between these two theories helps shape individuals' relations with a place and with others affecting their own identity creation. However, these theories have not been combined and presented in a similar setting before.

The connection with others and with a place that develops a sense of

belonging is crucial to understanding the Social Identity Theory approach to health (Haslam et al., 2018), which is mediated through a positive relationship with place identity and social relations – both dimensions of place attachment (Maricchiolo et al., 2021). Our model would follow this approach by exploring social identity and wellbeing through place attachment for place brand consumers mediated with technology.

Social Identity Theory has been applied to numerous fields, including several aspects of branding. From understanding group dynamics in brand communities and their self-definition (Kuo and Hou, 2017), to brand relationships in digital global social media networks (Akram et al., 2022), Facebook communities (Zhang et al., 2010), gamers' team dynamics (Liao et al., 2020), and social networking sites (Shih et al., 2021). The branding approach to this theory is focused on brand awareness and consumer behaviour, with studies exploring digital environments. However, the potential impact of participatory dynamics or environmental characteristics has been overlooked.

Studies on Social Identity Theory, place attachment and place branding, demonstrate the benefit from each other, impacting consumers' place image, belonging and group membership. In our proposed model, we redirect these dynamics to enhanced nature-based place experiences using technology. This can potentially support consumers reframe their relationship with nature.

2.5. Nature connectedness

The key aspect we are addressing in the model is to help reframe the human-nature relationship through digital mediation.

Nature has been approached in the above sections, commonly referring to 'connecting to nature' as goals or outcomes. Nature connectedness refers to an individual's subjective sense of connection with nature, which can also be measured as a state (Capaldi et al., 2015). This psychological construct emerged from the biophilia hypothesis (Wilson, 1984), which predicts that people's psychological health is related to their relationship with nature (Howell et al., 2011). Evidence has supported the emotional, psychological and wellbeing benefits of nature connectedness (Nisbet et al., 2011; Pensini et al., 2016; Pritchard et al., 2020).

The sense of community and feeling of belonging with nature is linked to feeling connected to it and being less likely to harm it (Mayer and Frantz, 2004). While the construct suffers from a definitional dilemma with challenges in measurement (MacIntyre et al., 2019), researchers typically agree that it refers to how people think about, feel about, and see themselves as part of nature (Richardson et al., 2020). However, the impact of nature connectedness could be how it may support spill-over behaviours, in terms of pro-environmental behaviour and environmental concern (Richardson et al., 2020). Evidence also suggests that it is trainable and fostered by applying interventions such as the 'pathways to nature connectedness' (Lumber et al., 2017).

Linked to pro-environmental behaviours (Gosling and Williams, 2010), place attachment is found as a positive mediator effect between nature connectedness and wellbeing (Basu et al., 2020). Scannell and Gifford (2017) describe 'connection to nature' as one of the psychological benefits of place attachment, demonstrating the connection among these theories.

As mentioned earlier, group identification affects urban regeneration willingness and pro-environmental attitudes (Fielding and Hornsey, 2016; Heath et al., 2017; Maricchiolo et al., 2021). The need to feel part of a broader natural world and a natural community is crucial to understanding nature connectedness (Mayer et al., 2009). But only Mackay et al. (2021) mention 'nature connection' as a form of collective identification understood from a social identity perspective. Clear connections between social identity and place relationships are described earlier but specific implications of nature have been overlooked.

The potential of simulated and indirect experiences of nature (images or videos) have been explored, demonstrating positive

psychological benefits while experiences in nature have substantially greater benefits (Mayer et al., 2009). Recently, Sheffield et al. (2022) proposed nature connectedness as a useful construct to renew the human-nature relationship, positively affecting our sense of wellbeing. In their review, there is clear evidence of the effect of contact and engagement with nature to increase nature connectedness, "but neither the type of contact (indirect v direct), quality of engagement (passive vs. active) or timing of the intervention were significant predictors of effect size for nature connectedness" (pg. 15). The digital approach to nature experiences has mostly focused on virtual nature, exploring the links among nature connectedness, wellbeing and place attachment in digital experiences (Brambilla et al., 2022; Litleskare et al., 2022). Immersive virtual nature is studied on its similarity with real nature effects through virtual reality (Brambilla et al., 2022), or if seasonality affects immersive virtual nature outcomes (Litleskare and Calogiuri, 2022). However, we propose a broader technological approach in a location, opening opportunities for potential consumers and digital mediums that are part of the interactive physical experience of nature.

Studies have pointed at the interconnections between nature connectedness and place attachment, wellbeing benefits from social identity, or place branding and place attachment impacts. However, research conducted to identify and understand the interconnections and potential wellbeing impact of digital placemaking in nature spaces has not been addressed, which is why we present a conceptual model to understand how to reframe the human-nature relationship through hybrid place experiences.

3. Digital placemaking for nature and wellbeing. Conceptual model development

The previous section presents initial relations between the dynamics involved in digital placemaking for nature and wellbeing as isolated processes. This provides the foundation to understand how they are involved in digital placemaking at an urban nature space supporting wellbeing, as a driver for social change and climate resilience. If we combine these processes in urban nature spaces shifting the way we engage with technology, for it to act as a medium to expand place experiences, branded place experiences could affect consumers' intentions, behaviours and wellbeing using digital placemaking. As a participatory place branding strategy (Zenker and Erfgen, 2014), it can reframe urban nature spaces to foster place attachment (Scannell and Gifford, 2010a), where consumers' nature connectedness and group identification is enhanced (Basu et al., 2020; Bowe et al., 2020), impacting their wellbeing (Haslam et al., 2018; Maricchiolo et al., 2021) (see Fig. 1). This model informs place managers and marketers to ensure their practices benefit local consumers – current place consumers or potential consumers.

Our model is a bottom-up process informed by the described theories and constructs, applying the four key characteristics of digital placemaking identified in our review and following a proposed modification of the place attachment tripartite by Scannell and Gifford (2010a). This directs the conceptualisation of four main propositions for Digital Placemaking for Nature and Wellbeing.

Our modification of the place attachment tripartite adapts it to the hybrid reality experience constructed from digital placemaking in urban nature, to understand how it affects community identity and sense of belonging to physical spaces through technological mediation. Our modification is formed by the community, hybrid place and psychological process dimensions. The community dimension includes the individual and community elements, which overlap and are explored following Social Identity Theory (Haslam et al., 2018; Tajfel and Turner, 1986) to understand its dynamics in building the sense of self and its effects on wellbeing, and participatory place branding (Zenker and Erfgen, 2014). The individual element identifies personal connections that create sense of place, whereas the community element refers to shared meanings and symbols with a place among members. The hybrid

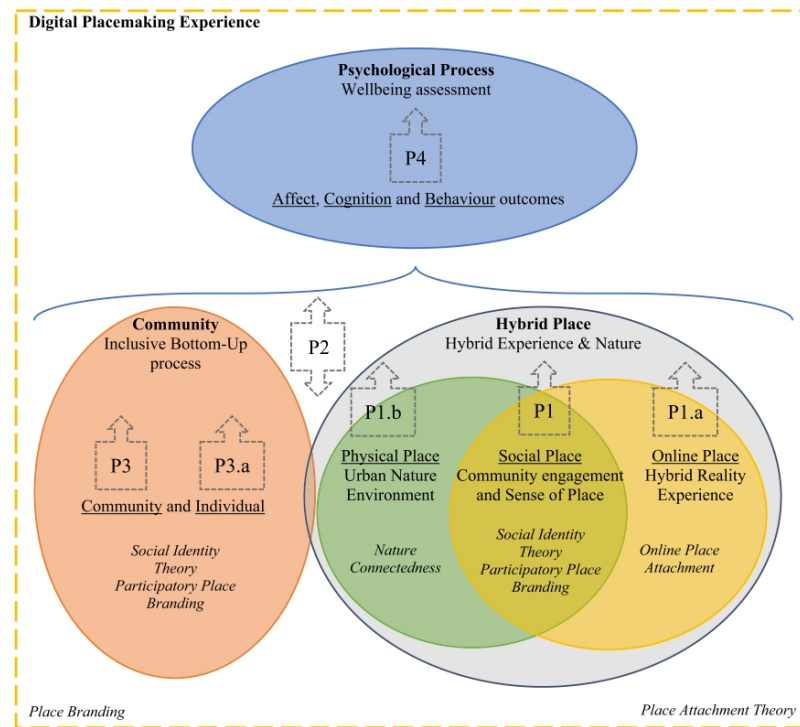


Fig. 1. Digital Placemaking for Nature and Wellbeing Conceptual Model. Developed from the extant literature, such as Scannell and Gifford (2010a), Schwartz (2015), Aitken and Campelo (2011), Bowe et al. (2020), Basu et al. (2020), Zenker and Erfgen (2014), Haslam et al. (2018) and Polson (2015).

place dimension is formed by the social, physical and online place attachment. The social place attachment refers to how the place allows social relationships and group identity, strongly linked to community engagement activities and social identity generation (Haslam et al., 2018; Tajfel and Turner, 1986; Zenker and Erfgen, 2014). The physical place attachment indicates the physical features of the natural place, from a nature connectedness perspective (Basu et al., 2020; Capaldi et al., 2015; Murphy et al., 2022). Finally, the online place attachment (Schwartz, 2015) is approached from hybrid reality experiences, combining physical and online connections to a place through location-based technology (Hespanhol, 2022; Polson, 2015). Lastly, the psychological process dimension is formed by affect (emotional connection), cognition (memories, beliefs, meanings and knowledge) and behaviour (actions), developed through digital placemaking activities and assessed from a wellbeing perspective.

We propose to approach digital placemaking from a participatory place branding perspective (Zenker and Erfgen, 2014), specifically in the community dimension and social place element. This ensures local consumers' opinions, visions and ideas are leading throughout the digital placemaking experience. The development of the digital placemaking experience will be informed by Zenker and Erfgen's (2014) three-stage process and we advise using different tools and measurements suggested by Zenker and Martin (2011), depending on the characteristics of the initiative.

In this context, digital placemaking hybrid place experiences

(Hespanhol, 2022; Polson, 2015) can promote sense of belongingness and authenticity, creating meaningful experiences for consumer communities that impact their vision of a place, and the vision of them within that place. The proven connection between social identity and wellbeing (Haslam et al., 2009) mediated through place attachment (Cole et al., 2021; Maricchiolo et al., 2021), the key role of place attachment in human-nature interactions (Jayakody et al., 2024) including nature connectedness (Basu et al., 2020; Gosling and Williams, 2010), and the value of digitally mediated experiences fostering pro-environmental behaviours (Paraschivoiu and Layer-Wagner, 2021) leads to a number of propositions:

P1. Digital placemaking creates sense of place between the community and the space where it is developed, facilitating group belongingness and identity among members and with the place.

P1.a. Digital placemaking experiences foster community hybrid place attachment, promoting authenticity and differentiating them from others.

P1.b. When applied in urban nature environments, digital placemaking fosters place attachment with the urban nature place but also nature connectedness through community engagement in that place.

We propose an innovative approach to digital placemaking from a participatory place branding perspective, where local consumers are brand ambassadors and co-creators of the place (Aitken and Campelo,

2011; Kalandides et al., 2012; Kavaratzis and Hatch, 2013). In this bottom-up model, local consumers are co-creators in each stage. Placemaking is considered a community of practice (Courage, 2021), where participation is essential to develop identity and mutual recognition, and hybrid place experiences help foster belonging (Polson, 2015). Therefore, Social Identity Theory predicts placemaking practices' effect on the community identity.

P2. Digital placemaking facilitates place brand and consumer interactions through hybrid participation (online and offline) that fosters group identity and belonging.

Digital placemaking approached from participatory place branding fulfils two objectives. First, it promotes internal voices in the community as brand ambassadors (Braun et al., 2013), increasing brand commitment (Hatch and Schultz, 2009) and co-creation of the place brand (Aitken and Campelo, 2011; Kalandides et al., 2012; Kavaratzis and Hatch, 2013). Second, it ensures locals are included in every step of the process for its success (Graziano and Albanese, 2020), specifically underrepresented groups, as an inclusive practice (Foth, 2017).

P3. Community consumers engaged in digital placemaking from a participatory place branding perspective become place brand ambassadors.

P3.a. Excluded or marginalised members have the opportunity to connect with others and with the place through digital placemaking as an inclusive and barrier-free practice.

Place attachment, Social Identity Theory and nature connectedness have been studied and linked to benefit human wellbeing (Basu et al., 2020; Lewicka, 2011; Maricchiolo et al., 2021; Scannell and Gifford, 2017). Nowadays, digital nature interactions are being considered a promoter of nature connections and wellbeing in communities (Liteskare et al., 2022), but they could benefit from implementing a place branding approach through which consumers are attracted to the place experience. Additionally, specific wellbeing benefits could be targeted through the digital placemaking experience and gamification, also promoting pro-environmental behaviours (Paraschivoiu and Layer-Wagner, 2021), and positive environmental experiences (Aronczyk and Espinoza, 2021).

P4. Consumers participating in digital placemaking nature-based place brand experiences can benefit from several wellbeing outcomes, feeling emotionally attached to the place, to the community and to nature.

These propositions address each characteristic of digital placemaking to understand how it can be used to enhance consumer wellbeing through nature-based place brand experiences, promoting social change. They explain how digital placemaking can foster community urban nature connections to benefit consumers' wellbeing and theorize that digital placemaking applied as a place branding strategy can create, change or promote specific consumer community experiences, interactions and identity values.

4. Discussion

This conceptual model aims to produce knowledge and forecast digital placemaking benefits for consumers' wellbeing and social change, using technology as a mediator in nature-based place brand experiences. The place branding approach we propose creates, changes, and/or promotes specific community experiences and belonging (Bowe et al., 2020), place attachment interactions (Scannell and Gifford, 2010a), and identity values for their wellbeing (Maricchiolo et al., 2021), which can affect environmental attitudes (Fielding and Hornsey, 2016; Heath et al., 2017; Maricchiolo et al., 2021).

The present paper aims to conceptualize the technology-mediated consumer wellbeing and social change benefits of digital placemaking

in nature-based place experiences. We explore the broad concept of digital placemaking and present the lack of studies deepening its application to nature environments supporting wellbeing. Then, we adopt a participatory place branding approach (Zenker and Erfgen, 2014) which follows a proposed extension of the place attachment tripartite (Scannell and Gifford, 2010a) used to define the conceptual model of Digital Placemaking for Nature and Wellbeing. We systematically combined developments in the place attachment and place branding literature with developments in Social Identity Theory (Haslam et al., 2018; Tajfel and Turner, 1986) and nature connectedness construct (Basu et al., 2020; Howell et al., 2011; Mayer and Frantz, 2004; Murphy et al., 2022) exploring their wellbeing effects, to create guidelines for digital placemaking.

Our conceptual framework presents a modification of the place attachment tripartite (Scannell and Gifford, 2010a) to hybrid realities applied to urban nature spaces from a participatory place branding perspective. According to the original tripartite (Scannell and Gifford, 2010a), place attachment is created through individual, place and psychological process dimensions. However, this model does not consider the use of technology in our daily interactions. We extend the original tripartite in three ways. First, we re-focus the individual dimension by prioritising the community element which has been overlooked in the past (Lewicka, 2011), applying a Social Identity Theory perspective and its impact on people's wellbeing (Haslam et al., 2018; Tajfel and Turner, 1986). Second, we extend the place dimension by incorporating online place attachment (Schwartz, 2015) towards hybrid place attachment. Finally, we complement the tripartite by addressing the natural space element in the hybrid place dimension to understand how to specifically build hybrid place attachment for nature connectedness (Basu et al., 2020; Capaldi et al., 2015). Furthermore, we introduce participatory place branding (Zenker and Erfgen, 2014) as an approach to the overall model to benefit from these processes and strategies and ensure the community is an active part of the dynamics described, creating attractive and meaningful experiences to provoke social change.

Our propositions are in line with Scannell and Gifford (2010a) and Zenker and Erfgen (2014), and supported by the findings of Maricchiolo et al. (2021) and Basu et al. (2020) that place attachment acts as a mediator for wellbeing and nature connectedness. The propositions are also consistent with the work of Halegoua and Polson (2021) who defined digital placemaking as a process that creates place attachment between a community and a space, Polson's (2015) understanding of hybrid place experiences for belonging, and Foth's (2017) understanding as a tool for social change. We answer the call by Graziano and Albanese (2020) to include locals in place branding strategies for its success and the need to advance online place branding with the growing technological evolution. The innovation of this model resides in the combination of areas of study that are interlinked but were studied in silos in the past.

We propose a digital transformation to be included in future strategies by place professionals such as placemakers or place managers following the effect of technology and digital formats in consumers' behaviours. Therefore, providing them with a guide and explanation of the dynamics involved in hybrid place experiences can inform projects that explore how to implement nature-based solutions in the current technological paradigm, how to help citizens connect with their natural spaces, or explore digital opportunities in cities to positively affect consumers. Digital placemaking is presented as a new and adapted perspective to the current consumer behaviour context. Furthermore, Mao et al. (2020) study indicates a number of benefits from technological innovations for society such as improving cultural diversity and social change. Along these lines, our model approaches digital placemaking as a tool for social change (Foth, 2017) that can potentially benefit urban communities by fostering pro-environmental behaviours through gamification (Paraschivoiu and Layer-Wagner, 2021; Richardson et al., 2020).

Following Pancholi et al. (2019) findings of placemaking outcomes

beyond the physical aspect to holistic economic, cultural, spatial, social and organizational, our model describes a number of dynamics that benefit urban communities' wellbeing, place attachment, group belongingness and nature connectedness. The innovation of including Social Identity Theory in our model is influenced by Akram et al. (2022) study on the effect of consumer engagement and social identity in brand relationships in digital social media networks, the wellbeing approach to the theory by (Haslam et al., 2018), and its connection with place attachment and wellbeing (Maricchiolo et al., 2021).

We argue that the human-nature disconnection (Beery et al., 2023; Kesebir and Kesebir, 2017), specifically in urban environments, could be improved by promoting place branding and place attachment processes through digital placemaking. Moreover, our model extends Jayakody et al.'s (2024) work on place attachment as being essential in human-nature relationships for wellbeing by exploring the impact of hybrid place experiences. These authors show how place interactions and proximity are key for the development of a strong place identity with the natural space and how place attachment contributes to creating meaningful bonding with nature and with others. We extend these results and explore the impact of hybrid place experiences through digital placemaking, where individuals not only interact with a place online and offline but also with other community members which helps to enhance benefits. This brings nature and place experiences to more participants who are not able to physically be in the place or interact with the place as others – also alluding to the inclusion aspect of digital placemaking.

To ensure a collective positive identity and appealing experience is created, we respond to the call for applying place marketing and branding to placemaking (Ellery et al., 2021) while considering digital placemaking a part of the place branding trifecta (Keegan, 2021). We propose the hybrid place attachment tripartite that combines participatory place branding, nature connectedness and Social Identity Theory elements. Our model also responds to Aronczyk and Espinoza's (2021) work on strategic nature and environmentalism from a marketing and branding perspective to present organisations and practitioners of place with a way to reframe the human-nature relationship in cities, fostering social connections, wellbeing and belongingness feelings that also promote pro-environmental behaviours and social change. This positive and community-centred approach to hybrid place experiences ensures this branded and cultural production promotes a valuable approach to our environments.

4.1. Contributions

This study presents four contributions to help reframe the human-nature relationships by predicting and incorporating technology through digital placemaking in natural environments as a place branding strategy that enhances consumers' wellbeing and social change. First, our model goes beyond the generalized commercial outcome of place branding strategies (Graziano and Albanese, 2020) to understand how hybrid place experiences in nature spaces foster place attachment and group identity (Basu et al., 2020; Kuo and Hou, 2017; Maricchiolo et al., 2021), nature connectedness (Capaldi et al., 2015), supporting consumer wellbeing (Huang et al., 2022; Pritchard et al., 2020) and promote social change (Foth, 2017). By unpacking the elements involved in our innovative model we predict digital placemaking strategies as a tool to enhance nature-based place experiences, social change and consumers' wellbeing. Our place branding approach enhances specific values that are transferred to the community (Aitken and Campelo, 2011; Kavaratzis and Hatch, 2013).

Secondly, existing studies and frameworks mention the wellbeing effects of digital placemaking practices but without further understanding of internal mechanisms (e.g., Razi and Ziminski, 2022). We contribute to addressing this gap by engaging in theories and constructs to predict how branded place experiences that improve consumers' wellbeing – through place attachment (Huang et al., 2022), community belongingness (Bowe et al., 2020), social identity (Maricchiolo et al.,

2021) and nature connectedness (Basu et al., 2020). We present a model that specifically looks at wellbeing effects, which should be tested in an empirical scenario.

Our third contribution is to advance the knowledge of digital placemaking and support practitioners with a fundamental understanding and guide of digital placemaking experiences from interdisciplinary perspectives. In unpacking these dynamics, the paper has practical relevance for place managers, environmental psychologists, and place marketers. We have highlighted the relationships between specific digital placemaking applications and consumers' outcomes through our modification of the place attachment tripartite (Scannell and Gifford, 2010a) to include hybrid environments (Hespanhol, 2022; Polson, 2015) and online place attachment (Schwartz, 2015), nature connectedness linked to wellbeing (Basu et al., 2020; Maricchiolo et al., 2021), and participatory place branding (Zenker and Erfgen, 2014). This model informs the current rise of projects and policies that advocate for improving and augmenting nature in cities, specifically nature-based solutions and the increased interest in the use of technology for healthy environments (WHO Regional Office for Europe, 2021).

Finally, our model contributes to the debate about the role of technology in place experiences for consumers. The overarching premise of this paper is that digital placemaking benefits consumers' wellbeing and social change through technology mediation in nature-based place brand experiences. We do not present digital placemaking as a nature replacement, but as an enhancer that aims to reframe the human-nature relationship (Riechers et al., 2021). Since technology is part of our daily routines, we should use it to our benefit and foster relationships that would promote pro-environmental behaviours. The benefits of connecting with nature are supported by evidence from the extant literature (e.g., Bratman et al., 2019; Jimenez et al., 2021), yet consumers are still struggling to create healthy habits that involve nature experiences (Riechers et al., 2021). It is certain that digital placemaking presents several drawbacks for citizens (e.g., Bottero et al., 2022; Foth and Caldwell, 2018), and they will need to be addressed.

5. Limitations and future research

This analysis presents a conceptual framework developed from the extant literature across place branding, place attachment, Social Identity Theory, nature connectedness and digital placemaking. The propositions which form the basis of the conceptual model serve as suggestions for future research. The presented Digital Placemaking for Nature and Wellbeing model is currently being tested through a modified Delphi study (Fernandez-Osso Fuentes et al., 2023b) to obtain consensus and explore the characteristics of digital placemaking as a medium to promote place attachment and place branding processes in urban nature environments, fostering community nature connectedness while impacting consumers' wellbeing and social change.

Plausible limitations include the framework being based on the idea of a hybrid reality experience as the optimum way to approach the connection between the physical and online space in the current global context. We acknowledge technological mediation such as digital placemaking presents a series of challenges that need to be considered. For example, digitally excluded individuals and communities may not benefit from a digital placemaking approach. Further study on the potential drawbacks of digital placemaking for nature and wellbeing and how to minimize their impact is needed. Despite being justified and described as a guideline, our model has to be tested in a real practical case to confirm the assumptions and prepositions defined. Finally, we presented the model in an optimal environment scenario, but we understand its application depends on the characteristics of the community, the place, and the resources.

Further understanding of the best assessment tools depending on the project goal and research aim is also required. Digital placemaking is an interdisciplinary process that can be applied from different perspectives such as organizational management, urbanism, or creative arts.

We have identified new interactions and processes, extending the existing place attachment tripartite by Scannell and Gifford (2010a) into hybrid realities and urban nature environments, applied to digital placemaking practices as part of participatory place branding processes. From a practical perspective, we offer insights into enhancing consumers' wellbeing and social change through digitally mediated urban nature experiences combining place branding and place attachment. Our model guides place managers when implementing digital placemaking experiences to foster community relationships and place attachment through hybrid place experiences to support consumers' wellbeing but also city resilience, pro-environmental behaviours, and economic and cultural growth. Digital Placemaking for Nature and Wellbeing bring numerous benefits to consumers, organisations, and nature.

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CRedit authorship contribution statement

Maria J. Fernandez-Osso Fuentes: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Brendan J. Keegan:** Writing – review & editing, Validation, Supervision, Funding acquisition, Conceptualization. **Marc V. Jones:** Writing – review & editing, Validation, Supervision, Conceptualization. **Tadhg E. MacIntyre:** Writing – review & editing, Validation, Supervision, Project administration, Funding acquisition, Conceptualization.

Declaration of competing interest

None of the authors have a conflict of interest to disclose.

Data availability

No data was used for the research described in the article.

References

- Abdel-Aziz, A.A., Abdel-Salam, H., El-Sayad, Z., 2016. The role of ICTs in creating the new social public place of the digital era. *Alex. Eng. J.* 55 (1), 487–493. <https://doi.org/10.1016/j.aej.2015.12.019>.
- Aitken, R., Campelo, A., 2011. The four rs of place branding. *J. Mark. Manag.* 27 (9–10), 913–933. <https://doi.org/10.1080/0267257X.2011.560718>.
- Akram, M.S., Malhotra, N., Goraya, M.A.S., Shareef, M.A., Malik, A., Lal, B., 2022. User engagement on global social networks: examining the roles of perceived brand globalness, identification and global identity. *Technol. Forecasting Soc. Change* 181. <https://doi.org/10.1016/j.techfore.2022.121771>.
- Aronczyk, M., 2013. *Branding the Nation: The Global Business of National Identity*. Oxford University Press, USA.
- Aronczyk, M., Espinoza, M.I., 2021. *A Strategic Nature: Public Relations and the Politics of American Environmentalism*. Oxford University Press.
- Balsas, C., 2021. From place-marketing to place-making, examining Boston's case of global transformation. *Local Develop. Soc.* 1–21. <https://doi.org/10.1080/26883597.2021.1930575>.
- Barboza, E.P., Cirach, M., Khomenko, S., lungman, T., Mueller, N., Barrera-Gómez, J., Rojas-Rueda, D., Kondo, M., Nieuwenhuijsen, M., 2021. Green space and mortality in European cities: a health impact assessment study. *Lancet Planet. Health* 5 (10), e718–e730. [https://doi.org/10.1016/S2542-5196\(21\)00229-1](https://doi.org/10.1016/S2542-5196(21)00229-1).
- Basu, M., Hashimoto, S., Dasgupta, R., 2020. The mediating role of place attachment between nature connectedness and human well-being: perspectives from Japan. *Sustain. Sci.* 15 (3), 849–862. <https://doi.org/10.1007/s11625-019-00765-x>.
- Beery, T., Stahl Olafsson, A., Gentin, S., Maurer, M., Stålhammar, S., Albert, C., Bieling, C., Bujs, A., Fagerholm, N., Garcia-Martin, M., Plieninger, T., M.
- Raymond, C., 2023. Disconnection from nature: expanding our understanding of human–nature relations. *People Nat.* <https://doi.org/10.1002/pan3.10451>.
- Bottero, M., Caprioli, C., Foth, M., Mitchell, P., Rittenbruch, M., Santangelo, M., 2022. Urban parks, value uplift and green gentrification: an application of the spatial hedonic model in the city of Brisbane. *Urban Forest. Urban Green.* 74. <https://doi.org/10.1016/j.ufug.2022.127618>.
- Bowe, M., Gray, D., Stevenson, C., McNamara, N., Wakefield, J.R.H., Keller, B., Wilson, L., Cleveland, M., Mair, E., Halder, M., Costa, S., 2020. A social cure in the community: a mixed-method exploration of the role of social identity in the experiences and well-being of community volunteers. *Eur. J. Soc. Psychol.* 50 (7), 1523–1539. <https://doi.org/10.1002/ejsp.2706>.
- Brambilla, E., Petersen, E., Stendal, K., Sundling, V., MacIntyre, T.E., Calogiuri, G., 2022. Effects of immersive virtual nature on nature connectedness: a systematic review protocol. *Digit. Health* 8. <https://doi.org/10.1177/20552076221120324>.
- Bratman, G.N., Anderson, C.B., Berman, M.G., Cochran, B., de Vries, S., Flanders, J., Folke, C., Frumkin, H., Gross, J.J., Hartig, T., Kahn, P.H., Kuo, M., Lawler, J.J., Levin, P.S., Lindahl, T., Meyer-Lindenberg, A., Mitchell, R., Ouyang, Z., Roe, J., Daily, G.C., 2019. Nature and mental health: an ecosystem service perspective. *Sci. Adv.* 5.
- Braun, E., Kavaratzis, M., Zenker, S., 2013. My city - my brand: the different roles of residents in place branding. *J. Place Manag. Dev.* 6 (1), 18–28. <https://doi.org/10.1108/1753833111306087>.
- Breek, P., Hermes, J., Eshuis, J., Mommaas, H., 2018. The role of social media in collective processes of place making: a study of two neighborhood blogs in Amsterdam. *City Community* 17 (3), 906–924. <https://doi.org/10.1111/cico.12312>.
- Briciu, V.A., Rezanu, C.I., Briciu, A., 2020. Online place branding: is geography “destiny” in a “space of flows” world? *Sustainability (Switzerland)* 12 (10). <https://doi.org/10.3390/SU12104073>.
- Capaldi, C.A., Passmore, H.A., Nisbet, E.K., Zelenski, J.M., Dopko, R.L., 2015. Flourishing in nature: a review of the benefits of connecting with nature and its application as a wellbeing intervention. *Int. J. Wellbeing* 5 (4), 1–16. <https://doi.org/10.5502/ijw.v5i4.1>.
- Chan, C.S., Marafa, L.M., 2013. A review of place branding methodologies in the new millennium. *Place Brand. Public Dipl.* 9 (4), 236–253. <https://doi.org/10.1057/pb.2013.17>.
- Chen, K., Guaralda, M., Kerr, J., Turky, S., 2022. Digital intervention in the city: a conceptual framework for digital placemaking. *Urban Des. Int.* <https://doi.org/10.1057/s41289-022-00203-y>.
- Clowater, V., 2021. Pokémon Go as palimpsest: creating layers of meaning through augmented reality. *J. Can. Game Stud. Assoc.* 14 (24), 104–121.
- Cole, L.B., Coleman, S., Scannell, L., 2021. Place attachment in green buildings: making the connections. *J. Environ. Psychol.* 74. <https://doi.org/10.1016/j.jenvp.2021.101558>. Academic Press.
- Colley, K., Craig, T., 2019. Natural places: perceptions of wildness and attachment to local greenspace. *J. Environ. Psychol.* 61, 71–78. <https://doi.org/10.1016/j.jenvp.2018.12.007>.
- Courage, C., 2021. INTRODUCTION. What really matters - moving placemaking into a new epoch. In: *The Routledge Handbook of Placemaking*. Routledge, pp. 1–8.
- de San Eugenio Vela, J., Fernández-Cavia, J., Nogué, J., Jiménez-Morales, M., 2013. Characteristics and functions for place brands based on a Delphi method. *Revista Latina de Comunicación Social* 68, 656–675. <https://doi.org/10.4185/RLCS-2013-995en>.
- Debenedetti, A., Oppewal, H., Arsel, Z., 2014. Place attachment in commercial settings: a gift economy perspective. *J. Consum. Res.* 40 (5), 904–923. <https://doi.org/10.1086/673469>.
- Ellery, P.J., Ellery, J., Borkowsky, M., 2021. Toward a theoretical understanding of placemaking. *Int. J. Community Well-Being* 4 (1), 55–76. <https://doi.org/10.1007/s42413-020-00078-3>.
- Fernandez-Osso Fuentes, M.J., Keegan, B.J., Jones, M.V., MacIntyre, T.E., 2023a. Digital placemaking, health & wellbeing and nature-based solutions: A systematic literature review and practice model. *Urban Forest Urban Greening* 79, 127796.
- Fernandez-Osso Fuentes, M.J., Keegan, B.J., Jones, M.V., MacIntyre, T.E., 2023b. Achieving Consensus on Digital Placemaking for Nature & Wellbeing through a Modified-Delphi Study. An Abstract. *Academy of Marketing Science*.
- Fielding, K.S., Hornsey, M.J., 2016. A social identity analysis of climate change and environmental attitudes and behaviors: insights and opportunities. *Front. Psychol.* 7 (FEB) <https://doi.org/10.3389/fpsyg.2016.00121>. Frontiers Research Foundation.
- Florek, M., 2011. Online city branding. In: Dinnie, K. (Ed.), *City Branding: Theory and Cases*. Plaggrave Macmillan, pp. 82–90.
- Foth, M., 2017. Some thoughts on digital placemaking. In: Hespanhol, L., Haeusler, M., Hank, Tomitsch, Martin, Tschertau, Gernot (Eds.), *Media Architecture Compendium: Digital Placemaking, Avedition*, pp. 203–205.
- Foth, M., Caldwell, G.A., 2018. More-than-human media architecture. In: *ACM International Conference Proceeding Series*, pp. 66–75. <https://doi.org/10.1145/3284389.3284495>.
- Freeman, G., Liu, S.Y., Bardzell, J., Lu, X., Bardzell, S., Cao, D., 2019. May 2. Smart and fermented cities: an approach to placemaking in urban informatics. *Conf. Human Factors Comput. Syst. Proc.* <https://doi.org/10.1145/3290605.3300274>.
- Giłowczyński, M., 2022. Toward user-generated content as a mechanism of digital placemaking—place experience dimensions in spatial media. *ISPRS Int. J. Geo Inf.* 11 (4) <https://doi.org/10.3390/ijgi11040261>.
- Gosling, E., Williams, K.J.H., 2010. Connectedness to nature, place attachment and conservation behaviour: testing connectedness theory among farmers. *J. Environ. Psychol.* 30 (3), 298–304. <https://doi.org/10.1016/j.jenvp.2010.01.005>.

- Graziano, T., Albanese, V.E., 2020. Online place branding for natural heritage: institutional strategies and users' perceptions of Mount Etna (Italy). *Heritage* 3 (4), 1539–1558. <https://doi.org/10.3390/heritage3040085>.
- Gulrud, N.M., Hertzog, K., Shears, L., 2018. Innovative urban forestry governance in Melbourne? investigating 'green placemaking' as a nature-based solution. *Environ. Res.* 161, 158–167. <https://doi.org/10.1016/j.envres.2017.11.005>.
- Halegoua, G., 2020. *The Digital City: Media and the Social Production of Place*. NYU Press, New York.
- Halegoua, G., Polson, E., 2021. Exploring 'digital placemaking'. *Convergence* 27 (3), 573–578. <https://doi.org/10.1177/13548565211014828>.
- Hanna, S., Rowley, J., 2008. An analysis of terminology use in place branding. *Place Brand. Public Dipl.* 4 (1), 61–75. <https://doi.org/10.1057/palgrave.pb.6000084>.
- Haslam, S.A., Jetten, J., Postmes, T., Haslam, C., 2009. Social identity, health and well-being: an emerging agenda for applied psychology. *Appl. Psychol.* 58 (1), 1–23. <https://doi.org/10.1111/j.1464-0597.2008.00379.x>.
- Haslam, C., Jetten, J., Cruwys, T., Dingle, G., Haslam, A., 2018. *The New Psychology of Health: Unlocking the Social Cure*. Routledge.
- Hatch, M.J., Schultz, M., 2009. Of bricks and brands: from corporate to enterprise branding. *Organ. Dyn.* 38 (2), 117–130. <https://doi.org/10.1016/j.orgdyn.2009.02.008>.
- Heath, S.C., Rabinovich, A., Barreto, M., 2017. Putting identity into the community: exploring the social dynamics of urban regeneration. *Eur. J. Soc. Psychol.* 47 (7), 855–866. <https://doi.org/10.1002/ejsp.2296>.
- Her, J.J., 2021. Engaging locals in rural areas: value correspondence in placemaking through mobile augmented reality. *Digital Creativity* 32 (3), 215–233. <https://doi.org/10.1080/14626268.2021.1954955>.
- Hespanhol, L., 2018. Making Meaningful Spaces: Strategies for Designing Enduring Digital Placemaking Initiatives. SAAN. <https://www.researchgate.net/publication/334780244>.
- Hespanhol, L., 2022. Augmented placemaking: urban technologies, interaction design and public spaces in a post-pandemic world. *Interacting with Computers*. <https://doi.org/10.1093/iwc/iwac037>.
- Hjorth, L., Richardson, L., 2017. Pokémon GO: mobile media play, place-making, and the digital wayfarer. *Mobile Media and Communication* 5 (1), 3–14. SAGE Publications Ltd. <https://doi.org/10.1177/2050157916680015>.
- Hornsey, M.J., 2008. Social identity theory and self-categorization theory: a historical review. *Soc. Personal. Psychol. Compass* 2 (1), 204–222. <https://doi.org/10.1111/j.1751-9004.2007.00066.x>.
- Howell, A.J., Dopko, R.L., Passmore, H.A., Buro, K., 2011. Nature connectedness: associations with well-being and mindfulness. *Personal. Individ. Differ.* 51 (2), 166–171. <https://doi.org/10.1016/j.paid.2011.03.037>.
- Huang, Y., Finsterwalder, J., Chen, N. (Chris), Crawford, F.R.L., 2022. Online student engagement and place attachment to campus in the new service marketplace: an exploratory study. *J. Serv. Mark.* <https://doi.org/10.1108/JSM-04-2021-0148>.
- Jayakody, D.Y., Adams, V.M., Pecl, G., Lester, E., 2024. What makes a place special? Understanding drivers and the nature of place attachment. *Appl. Geogr.* 163 <https://doi.org/10.1016/j.apgeog.2023.103177>.
- Jimenez, M.P., Deville, N.V., Elliott, E.G., Schiff, J.E., Wilt, G.E., Hart, J.E., James, P., 2021. Associations between place exposure and health: a review of the evidence. *International Journal of Environmental Research and Public Health* 18 (9). <https://doi.org/10.3390/ijerph18094790>. MDPI.
- Kalandides, A., Kavaratzis, M., Boisen, M., 2012. From "necessary evil" to necessity: stakeholders' involvement in place branding. *J. Place Manag. Dev.* 5 (1), 7–19. <https://doi.org/10.1108/17538331211209013>.
- Kale, A., 2019. Building attachments to places of settlement: a holistic approach to refugee wellbeing in Nelson, Aotearoa New Zealand. *J. Environ. Psychol.* 65 <https://doi.org/10.1016/j.jenvp.2019.101315>.
- Kavaratzis, M., 2005. Place branding: a review of trends and conceptual models. *Mark. Rev.* 5, 329–342. www.themarketingreview.com.
- Kavaratzis, M., Ashworth, G.J., 2005. City branding: an effective assertion of identity or a transitory marketing trick? *Tijdschr. Econ. Soc. Geogr.* 96 (5), 506–514. <https://doi.org/10.1111/j.1467-9663.2005.00482.x>.
- Kavaratzis, M., Hatch, M.J., 2013. The dynamics of place brands: an identity-based approach to place branding theory. *Mark. Theory* 13 (1), 69–86. <https://doi.org/10.1177/1470593112467268>.
- Kavaratzis, M., Giovannardi, M., Lichrou, M., 2017. Inclusive place branding. Critical perspectives on theory and practice. In: *Place Branding and Public Diplomacy*. Routledge. <https://doi.org/10.1057/s41254-018-0108-8>. Issue 2.
- Keegan, B.J., 2021. Keeping Pace with the Digital Transformation of Place. In: Medway, D., Warnaby, G., Byrom, J. (Eds.), *A Research Agenda for Place Branding*, pp. 163–179.
- Keserib, S., Keserib, P., 2017. A growing disconnection from nature is evident in cultural products. *Perspect. Psychol. Sci.* 12 (2), 258–269. <https://doi.org/10.1177/1745691616662473>.
- Kuo, Y.-F., Hou, J.-R., 2017. Oppositional brand loyalty in online brand communities: Perspectives on Social Identity Theory and consumer-brand relationship. *Article in Journal of Electronic Commerce Research*. <https://www.researchgate.net/publication/319098607>.
- Leal, M.M., Casais, B., Prouença, J.F., 2022. Tourism co-creation in place branding: the role of local community. *Tour. Rev.* 77 (5), 1322–1332. <https://doi.org/10.1108/TR-12-2021-0542>.
- Lew, A.A., 2017. Tourism planning and place making: place-making or placemaking? *Tour. Geogr.* 19 (3), 448–466. <https://doi.org/10.1080/14616688.2017.1282007>.
- Lewicka, M., 2011. Place attachment: how far have we come in the last 40 years? *J. Environ. Psychol.* 31 (3), 207–230. <https://doi.org/10.1016/j.jenvp.2010.10.001>.
- Liao, G.Y., Pham, T.T.L., Cheng, T.C.E., Teng, C.I., 2020. How online gamers' participation fosters their team commitment: perspective of social identity theory. *Int. J. Inform. Manag.* 52 <https://doi.org/10.1016/j.jinfomgt.2020.102095>.
- Litleskare, S., Calogiuri, G., 2022. Seasonal variations in the effectiveness of immersive virtual nature. *Health. Environ. Res. Design J.* <https://doi.org/10.1177/19375687221127420>.
- Litleskare, S., Fröhlich, F., Flaten, O.E., Haile, A., Kjes Johnsen, S.A., Calogiuri, G., 2022. Taking real steps in virtual nature: a randomized blinded trial. In: *Virtual Reality*, pp. 1–17. <https://doi.org/10.1007/s10055-022-00670-2>.
- Lumber, R., Richardson, M., Sheffield, D., 2017. Beyond knowing nature: contact, emotion, compassion, meaning, and beauty are pathways to nature connection. *PloS One* 12 (5). <https://doi.org/10.1371/journal.pone.0177186>.
- Ma, W., Schraven, D., de Bruijne, M., de Jong, M., Lu, H., 2019. Tracing the origins of place branding research: a bibliometric study of concepts in use (1980–2018). *Sustainability (Switzerland)* 11 (11). <https://doi.org/10.3390/su11112999>.
- MacIntyre, T.E., Gidlow, C., Nieuwenhuijsen, M., Collier, M., Gritska, S., Warrington, G., 2019. Nature-based solutions and interventions in cities: A look ahead. In: Donnelly, A., MacIntyre, T. (Eds.), *Physical Activity in Natural Settings: Green and Blue Exercise*. Routledge, pp. 335–348.
- Mackay, C.M.L., Schmitt, M.T., Lutz, A.E., Mendel, J., 2021. Recent developments in the social identity approach to the psychology of climate change. *Curr. Opin. Psychol.* 42, 95–101. <https://doi.org/10.1016/j.copsy.2021.04.009>.
- Makri, K., Papadakis, K., Schlegelmilch, B.B., 2021. Global social networking sites and global identity: a three-country study. *J. Bus. Res.* 130, 482–492. <https://doi.org/10.1016/j.jbusres.2019.11.065>.
- Mao, C., Koide, R., Brem, A., Akenji, L., 2020. Technology foresight for social good: social implications of technological innovation by 2050 from a global expert survey. In: *Technological Forecasting and Social Change*, vol. 153. Elsevier Inc. <https://doi.org/10.1016/j.techfore.2020.119914>.
- Maricchiolo, F., Mosca, O., Paolini, D., Fornara, F., 2021. The mediating role of place attachment dimensions in the relationship between local social identity and well-being. *Front. Psychol.* | *Www.Frontiersin.Org* 1, 645648. <https://doi.org/10.3389/fpsyg.2021.645648>.
- Mayer, F.S., Frantz, C.M.P., 2004. The connectedness to nature scale: a measure of individuals' feeling in community with nature. *J. Environ. Psychol.* 24 (4), 503–515. <https://doi.org/10.1016/j.jenvp.2004.10.001>.
- Mayer, F.S., Frantz, C.M.P., Bruehlman-Senechal, E., Dolliver, K., 2009. Why is nature beneficial? the role of connectedness to nature. *Environ. Behav.* 41 (5), 607–643. <https://doi.org/10.1177/0013916508319745>.
- McCarthy, E.J., 1960. *Basic Marketing: A Managerial Approach*. R.D. Irwin. <https://ab.out.jstor.org/terms>.
- McLean, G., Al-Nabhani, K., Marriott, H., 2021. 'Regrettable-escapism' the negative effects of mobile app use: a retail perspective. *Psychol. Mark.* 39 (1), 150–167. <https://doi.org/10.1002/mar.21584>.
- Morrison, J., 2021. *Digital Placemaking Guide*. CALVIUM. <https://calvium.com/resources/digital-placemaking/>.
- Murphy, C., MacCarthy, D., Petersen, E., 2022. Emerging concepts exploring the role of nature for health and well-being. In: *Springer eBooks*, pp. 1–9. https://doi.org/10.1007/978-3-030-51812-7_250-1.
- Najafi, P., Mohammadi, M., Le Blanc, P.M., Van Wesemael, P., 2021. Experimenting a healthy ageing community in immersive virtual reality environment: the case of World's longest-lived populations. In: *2021 17th International Conference on Intelligent Environments, IE 2021 - Proceedings*. <https://doi.org/10.1109/IE51775.2021.9486595>. June 1.
- Ng, M.K., 2016. The right to healthy place-making and well-being. *Plan. Theory Pract.* 17 (1), 3–6. <https://doi.org/10.1080/14649357.2016.1139227>.
- Ni, C.-C., Say, D., 2022. Placemaking and tourism to build resilience: a quest for sustaining Peripheral Island Communities in Taiwan. *Sustainability* 15 (1), 699. <https://doi.org/10.3390/su15010699>.
- Nisa, C.F., Bélanger, J.J., Schumpe, B.M., 2020. On solid ground: secure attachment promotes place attachment. *J. Environ. Psychol.* 70 <https://doi.org/10.1016/j.jenvp.2020.101463>.
- Nisbet, E.K., Zelenski, J.M., Murphy, S.A., 2011. Happiness is in our nature: exploring nature relatedness as a contributor to subjective well-being. *J. Happiness Studies* 12 (2), 303–322. <https://doi.org/10.1007/s10902-010-9197-7>.
- Ozkul, D., 2021. The algorithmic fix: location intelligence, placemaking, and predictable futures. *Convergence* 27 (3), 594–608. <https://doi.org/10.1177/13548565211005644>.
- Pancholi, S., Yigitcanlar, T., Guaraldi, M., 2019. Place making for innovation and knowledge-intensive activities: the Australian experience. *Technol. Forecast. Soc. Chang.* 146, 616–625. <https://doi.org/10.1016/j.techfore.2017.09.014>.
- Pang, C., Neustaedter, C., Moffatt, K., Hennessey, K., Pan, R., 2020. The role of a location-based city exploration game in digital placemaking. *Behav. Inform. Technol.* 39 (6), 624–647. <https://doi.org/10.1080/0144929X.2019.1697899>.
- Paraschivou, I., Layer-Wagner, T., 2021. Placemaking for urban sustainability: designing a gamified app for long-term, pro-environmental participation. In: *CHI PLAY 2021 - Extended Abstracts of the 2021 Annual Symposium on Computer-Human Interaction in Play*, pp. 186–191. <https://doi.org/10.1145/3450337.3483482>.
- Peacock, S., Puusaar, A., Crivellaro, C., 2021. Sensing our streets. Involving children in making people-centred smart cities. In: *The Routledge Handbook of Placemaking*. Routledge, pp. 130–140.
- Pedellento, G., Kavaratzis, M., 2019. Bridging the gap between culture, identity and image: a structuralist conceptualization of place brands and place branding. *J. Prod. Brand Manag.* 28 (3), 348–363. <https://doi.org/10.1108/JPB-01-2018-1735>.

- Pensini, P., Horn, E., Calmbiano, N.J., 2016. An exploration of the relationships between adults' childhood and current nature exposure and their mental well-being. *Children Youth Environ.* 26 (1), 125. <https://doi.org/10.7721/chilyoutenvi.26.1.0125>.
- Polson, E., 2015. A gateway to the global city: Mobile place-making practices by expats. *New Media Soc.* 17 (4), 629–645. <https://doi.org/10.1177/1461444813510135>.
- Pritchard, A., Richardson, M., Sheffield, D., McEwen, K., Richardson, M., 2020. The relationship between nature connectedness and eudaimonic well-being: a meta-analysis. *J. Happiness Stud.* 21, 1145–1167. <https://doi.org/10.1007/s10902-019-00118-6>.
- Razi, L., Ziminski, D., 2022. Physical and digital placemaking in a public art initiative in Camden, NJ. *Cosmopolitan Civil Soc. Interdiscip. J.* 14 (2), 21–39. <https://doi.org/10.5130/ccs.v14.i2.8201>.
- Reitsamer, B.F., Brunner-Sperdin, A., 2021. It's all about the brand: place brand credibility, place attachment, and consumer loyalty. *J. Brand Manag.* 28 (3), 291–301. <https://doi.org/10.1057/s41262-020-00229-z>.
- Richards, G., 2017. From place branding to placemaking: the role of events. *Int. J. Event Festiv. Manag.* 8 (1), 8–23. <https://doi.org/10.1108/IJEFM-09-2016-0063>.
- Richardson, M., Hussain, Z., Griffiths, M.D., 2018. Problematic smartphone use, nature connectedness, and anxiety. *J. Behav. Addict.* 7 (1), 109–116. <https://doi.org/10.1556/2006.7.2018.10>.
- Richardson, M., Dobson, J., Abson, D.J., Lumber, R., Hunt, A., Young, R., Moorhouse, B., 2020. Applying the pathways to nature connectedness at a societal scale: a leverage points perspective. *Ecosyst. People* 16 (1), 387–401. <https://doi.org/10.1080/26395916.2020.1844296>.
- Riechers, M., Balazsi, Á., García-Llorente, M., Loos, J., 2021. Human-Nature Connectedness as Leverage Point. <https://doi.org/10.1080/26395916.2021.1912830>.
- Scannell, L., Gifford, R., 2010a. Defining place attachment: a tripartite organizing framework. *J. Environ. Psychol.* 30 (1), 1–10. <https://doi.org/10.1016/j.jenvp.2009.09.006>.
- Scannell, L., Gifford, R., 2010b. The relations between natural and civic place attachment and pro-environmental behavior. *J. Environ. Psychol.* 30 (3), 289–297. <https://doi.org/10.1016/j.jenvp.2010.01.010>.
- Scannell, L., Gifford, R., 2017. The experienced psychological benefits of place attachment. *J. Environ. Psychol.* 51, 256–269. <https://doi.org/10.1016/j.jenvp.2017.04.001>.
- Schwartz, R., de Souza e Silva, A., 2015. Online place attachment. Exploring technological ties to physical places. In: Sheller, M. (Ed.), *Mobility and Locative Media. Mobile Communication in Hybrid Spaces*. Routledge, pp. 85–100.
- Shankardass, K., Robertson, C., Shaughnessy, K., Sykora, M., Feick, R., 2019. A unified ecological framework for studying effects of digital places on well-being. *Soc. Sci. Med.* 227, 119–127. <https://doi.org/10.1016/j.socscimed.2018.09.022>.
- Sheffield, D., Butler, C.W., Richardson, M., 2022. Improving nature connectedness in adults: a meta-analysis, review and agenda. *Sustainability (Switzerland)* 14 (19). <https://doi.org/10.3390/su141912494>.
- Shih, C.M., Trejla, S., Zaleckis, K., Bratuskis, U., Chen, C.H., Chen, Y.H., Chiang, C.T.W., Jankauskaitė-Jureviciene, L., Kamincityte, J., Korolova, A., Lee, H.C., Lektuere, A., Mlinkauskiene, A., 2021. Digital placemaking for urban regeneration: identification of historic heritage values in Taiwan and the Baltic states. *Urban Plan.* 6 (4), 257–272. <https://doi.org/10.17645/up.v6i4.4406>.
- Soedarsono, W., Astuti, E.Y., Paramitasari, A.U., Asriana, N., Putri, D., Zahra, A., 2021. Placemaking in the Digital Era: A Case Study of M Bloc Space-Jakarta.
- Sugangga, M., Paramitasari, A., Martokusumo, W., Sarwo Wibowo, A., 2021. Revitalization of Kota Lama Semarang and Early Signs of Digital Place Making Through Instagram.
- Szaszak, G., Kecskés, T., 2020. Universal open space design to inform digital technologies for a disability-inclusive place-making on the example of Hungary. *Smart Cities* 3 (4), 1293–1333. <https://doi.org/10.3390/smartcities3040063>.
- Tajfel, H., 1978. The social identity theory of intergroup behaviour. In: Israel, J., Tajfel, H. (Eds.), *The Context of Social Psychology: A Critical Assessment*. Academic Press, pp. 69–119.
- Tajfel, H., Turner, J.C., 1986. The social identity and intergroup behaviour. In: Worchel, S., Austin, W.G. (Eds.), *The Psychology of Intergroup Relations*. Nelson-Hall, pp. 7–24.
- Turner, J.C., Hogg, M.A., Oakes, P.J., Reicher, S.D., Wetherell, M.S., 1987. *Rediscovering the Social Group: A Self-Categorization Theory*. Basil Blackwell.
- Warnaby, G., Medway, D., 2015. Rethinking the place product from the perspective of the service-dominant logic of marketing. In: *Rethinking Place Branding: Comprehensive Brand Development for Cities and Regions*. Springer International Publishing, pp. 33–50. https://doi.org/10.1007/978-3-319-12424-7_3.
- WHO Regional Office for Europe, 2021. Green and New Evidence and Perspectives for Action Blue Spaces and Mental Health. <https://apps.who.int/bookorders>.
- Wilson, E.O., 1984. *Biophilia*. Harvard University Press.
- Wright, L., 2021. Integral placemaking. A poesis of sophrosynes?. In: *The Routledge Handbook of Placemaking*. Routledge, pp. 322–332.
- Yoshida, Y., Matsuda, H., Fukushi, K., Takeuchi, K., Watanabe, R., 2022. The missing intangibles: nature's contributions to human wellbeing through place attachment and social capital. *Sustain. Sci.* 17 (3), 809–822. <https://doi.org/10.1007/s11625-021-01067-x>.
- Zenker, S., Braun, E., 2010. June. The place brand centre-a conceptual approach for the brand management of places. In: 39th European Marketing Academy Conference.
- Zenker, S., Erigen, C., 2014. Let them do the work: a participatory place branding approach. *J. Place Manag. Dev.* 7 (3), 225–234. <https://doi.org/10.1108/JPM-06-2013-0016>.
- Zenker, S., Martin, N., 2011. Measuring success in place marketing and branding. *Place Brand. Public Dipl.* 7 (1), 32–41. <https://doi.org/10.1057/pb.2011.5>.
- Zhang, S., Jiang, H., Carroll, J.M., 2010. Social identity in Facebook community life. *Int. J. Virtual Commun. Soc. Network.* 2 (4), 64–76. <https://doi.org/10.4018/jvcn.2010100105>.

Maria J. Fernandez de Osso Fuentes is a current PhD scholar in the School of Business at Maynooth University. She is researching the concept of digital placemaking from a marketing perspective, involving nature and wellbeing. Her interest in digital technology, communication, sustainability and wellbeing led her to continue researching these areas after working in marketing agencies for several years. Her PhD research is funded by the GoGreenRoutes Project.

Brendan James Keegan is an Assistant Professor in Marketing at Maynooth University, specialising in digital media marketing analytics, artificial intelligence application and digital placemaking. Interested in digital and social media analytics and agency-client relationships, his research is published in various journals including *European Journal of Marketing*, *European Management Review*, *Industrial Marketing Management* and *Information Systems Frontiers*. Brendan is a Principal Investigator within digital place-making work for the GoGreenRoutes Project which involves collaboration with up to 80 academics and Doctoral students across 40 different institutions.


Marc V. Jones is a Professor of Psychology at Manchester Metropolitan University. His work is focused on understanding the impact of stress on health, wellbeing and performance across a range of domains including sport, businesses, emergency medicine, military settings and engagement with nature. Marc was part of the PHENOTYPE research project (www.phenotype.eu), a €3.5 million European FP7 project (2012–2016) which explored links between the natural environment and health involving nine partner institutions and he is currently part of the GoGreenRoutes Project.


Tadhg E. MacIntyre is an environmental psychologist investigating fundamental theoretical questions about motor cognition, well-being and human-nature interactions. He has published widely on topics including mental imagery and embodied cognition, mental health and well-being and most recently on nature based interventions including green exercise. He is a member of the advisory board of H2020 NBS project RE-Nature, the INTERREG Project CCAT on coastal citizenship and is a visiting lecturer at the Technical University of Munich. He is the coordinator of GOGREEN ROUTES a 10.5 m. euro project of 40 partners on urban health which targets six European cities.


Appendix G: Round 2 Questionnaire.

[Restart Survey](#) [Place Bookmark](#) [Tools](#) [Share Preview](#)

0% Survey Completion 100%

**Maynooth University**
National University of Ireland Maynooth

**GO GREEN ROUTES**



**ALL Institute**
Assisting Living & Learning

Thank you for your time completing this form and reading the pertinent information.

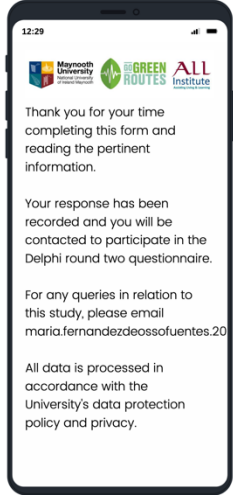
Your response has been recorded and you will be contacted to participate in the Delphi round two questionnaire.

For any queries in relation to this study, please email maria.fernandezdeossofuentes.2022@mumail.ie




All data is processed in accordance with the University's data protection policy and privacy.

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12:29



Thank you for your time completing this form and reading the pertinent information.



Your response has been recorded and you will be contacted to participate in the Delphi round two questionnaire.

For any queries in relation to this study, please email maria.fernandezdeossofuentes.2022@mumail.ie

All data is processed in accordance with the University's data protection policy and privacy.

Restart Survey
Place Bookmark
Tools
Share Preview

0%
Survey Completion
100%

Please respond by 19/01/2024

Thank you for participating in the modified Delphi Study on Digital Placemaking for Nature and Wellbeing.

Your participation and conversation were extremely thorough and important. We now have analysed each interview and have built the first Delphi questionnaire with the different topics discussed.

The below details will explain to you what this questionnaire entails. If you are completing it on a phone or tablet, it may be easier to complete if you flip the device to landscape.

The Delphi round one questionnaire should take around 15 minutes to complete.

It contains a list of statements that we need you to rate, according to how much you agree or disagree with them. We will present you with the results from these ratings in the next questionnaire.

The first round contains four sections.

1. The first section collects data on demographic details.
2. The second section includes a Likert scale to identify important characteristics, factors and challenges for digital placemaking. You are asked to rate these items from 'strongly agree' to 'strongly disagree'.
3. The third section collects data on place attachment and place branding related to digital placemaking.
4. The final section collection collects data on digital placemaking for nature, for wellbeing and nature and wellbeing combined.

Information and consent.

All information provided will be confidential and your anonymity will be protected through the study. You maintain the right to withdraw from the study at any stage up to the point of data analysis. At this point, your data will be collated with that of other participants and can no longer be retracted.

I would like to thank you for your time and interest in the study.

We also ask you to complete all questions, as this is important in enabling us to identify areas of consent.

The closing date for responses is 19/01/2024.

Please contact the research team at maria.fernandezdeossosfuentes.2022@mumail.ie if you need further information.

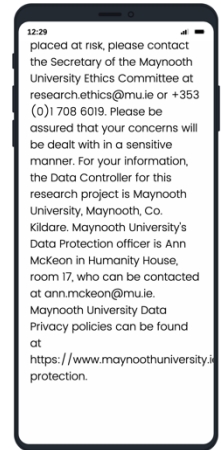
If you have any questions about your rights as a participant in this research, or if you feel that you have been placed at risk, please contact the Secretary of the Maynooth University Ethics Committee at research.ethics@mu.ie or +353 (0)1 708 6019. Please be assured that your concerns will be dealt with in a sensitive manner. For your information, the Data Controller for this research project is Maynooth University, Maynooth, Co. Kildare. Maynooth University's Data Protection officer is Ann McKeon in Humanity House, room 17, who can be contacted at ann.mckeon@mu.ie. Maynooth University Data Privacy policies can be found at <https://www.maynoothuniversity.ie/data-protection>.

Please tick the box to confirm that you have read and understand the information provided above

☐ I have read and understood the information provided

→

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Restart Survey

Place Bookmark

Tools

Share Preview

0%100%

Survey Completion

Maynooth University

National University of Ireland Maynooth

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SECTION 0 – DEMOGRAPHICS

Do you consent to participate in this study

☒ Yes

☐ No

Please enter the last four digits of your phone number so that we can link your responses between rounds

TEST

Gender

☐ Male

☐ Female

☐ Non-binary / third gender

☒ Prefer not to say

Age

☒ 18–30 years

☐ 31–40 years

☐ 41–50 years

☐ 51–60 years

☐ 61–70 years

☐ >71 years

Expert or Expanded Expert?

☒ Expert

☐ Expanded Expert

Profession

☒ Academic

☐ Practitioner

Country of residence

TEST

←

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12:29

Expert or Expanded Expert?

☒ Expert

☐ Expanded Expert

Profession

☒ Academic

☐ Practitioner

Country of residence

TEST

583

Survey Completion
0%100%



SECTION 2 – PLACE ATTACHMENT AND PLACE BRANDING

This section asks you to rank statements relating to:

1. Place Attachment
2. Place Branding

1/2 Statements for Place Attachment

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. A physical connection to the place in digital placemaking is essential for the creation of place attachment	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Digital placemaking can be a shortcut to promote place attachment feelings	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Digital placemaking helps maintaining and reinforce place attachment feelings	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. A place's identity is built through shared experiences and the digital can help with it	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Communities have multiple identities	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Digital placemaking allows people to carry their identity even though they are no longer physically there	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Digital placemaking opens up place attachment to a community dimension	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Digital placemaking could convey people's memories and stories of belonging to place to create and maintain place attachment	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Digital placemaking takes away from creating place attachment	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Communal feeling of attachment to place benefits wellbeing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional – Any further comments/specifications?

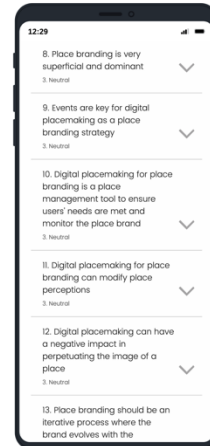
2/2 Statements for Place Branding

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. Digital placemaking creates a shared sense of place image and brand	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Place branding can use digital placemaking as a tool for the identification of common sense of place	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Digital placemaking as a place branding strategy must be participatory	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Participatory place branding and digital placemaking have to focus on people's representation of place, its materiality and the digital as a performative act	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Digital placemaking as a participatory place branding strategy needs clear guidelines	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Place branding can use digital placemaking to communicate stories of a place	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Social media creates a space for people to share and build a place brand image	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Place branding is very superficial and dominant	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Events are key for digital placemaking as a place branding strategy	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Digital placemaking for place branding is a place management tool to ensure users' needs are met and monitor the place brand	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Digital placemaking for place branding can modify place perceptions	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Digital placemaking can have a negative impact in perpetuating the image of a place	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Place branding should be an iterative process where the brand evolves with the community over time, which conflicts with common strict branding guidelines	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Branding spaces as hybrid locations for everyday place connections will benefit nature connectedness	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional – Any further comments/specifications?



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Tools

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Share Results

Survey completion100%

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SECTION 3 – NATURE AND WELLBEING

This section asks you to rank statements relating to:

- Digital placemaking and nature
- Digital placemaking and wellbeing
- Digital placemaking for nature and wellbeing

1/3 Statements for digital placemaking and nature

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. Technology is a distraction from nature experiences	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Technology can help people positively reconnect with nature	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Sense engagement through technology enhances emotional connection with nature	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Technology can promote behaviour change towards nature conservation	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Digital placemaking can be used as a way to first explore and discover nature places (e.g. place information, audio guides)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Digital placemaking lowers the entry barriers in nature places	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Digital placemaking can help people understand and take notice of nature (e.g. an app to learn about trees, listen to bird sounds, and recognise species)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Digital placemaking can be used to tell stories about nature	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Technology can help raise awareness and educate on the importance of nature and biodiversity	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Technology can inspire people to nature (e.g. nature videos, nature sounds)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Technology helps us imagine futures for nature	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Technology for nature should also be approached beyond the human lens (e.g. for animals sharing the space with humans)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Digital placemaking is a place management tool for nature spaces	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Digital placemaking allows sharing experiences in nature places	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Digital placemaking creates sense of ownership needed for nature connectedness	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Social media has helped people reflect on their experiences with nature	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Digital placemaking for nature should measure the nature element	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Digital placemaking for nature should measure the experience in nature	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional - Any further comments/specifications?

2/3 Statements for digital placemaking and wellbeing

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. The wellbeing impact of digital placemaking practices resides in the sense of belonging created with the community	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The wellbeing impact of digital placemaking practices resides in the sense of belonging created with the place	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The wellbeing impact of digital placemaking practices resides in feelings of ownership and co-ownership	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Maximising people's experiences of place through digital placemaking affects their wellbeing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Only the physical experience can benefit people's wellbeing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Digital placemaking can be used to monitor the health/wellbeing status of a community	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional - Any further comments/specifications?

3/3 Statements for digital placemaking, nature and wellbeing

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. User ownership of the digital placemaking experience is the link between digital placemaking and nature-supporting wellbeing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Virtual nature increases feelings of wellbeing for those with no access to nature	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Virtual nature has a positive effect on wellbeing, but real nature is better	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Technology can help people understand how nature benefits their wellbeing (e.g. mood improvement, relief of stress, etc.)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. To encourage behavioural change is the connection between digital placemaking, nature and wellbeing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Digital guided wellness walks in nature benefit citizen wellbeing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Downloaded digital placemaking experiences in nature (e.g. a nature hunt in nature using QR codes) is a good health and wellbeing initiative	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Digital placemaking, nature and wellbeing are part of a circular economy approach to benefit a sustainable future	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Digital placemaking can repurpose spaces to link them with nature-supporting wellbeing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Digital placemaking creates awareness and consciousness among a sense of place, sense of environment and nature to support wellbeing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Digital placemaking should educate communities on nature and its support for wellbeing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Digital placemaking narrative characteristics can be a strategy to reintroduce nature digitally in urban environments to make case studies examples of its benefits	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Digital placemaking for nature supporting wellbeing is a complementary measure to getting out in real nature	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Digital placemaking can help communities find nature places to support their wellbeing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. The link between technology, nature and wellbeing has been mostly approached from a digital data perspective	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Digital placemaking can 'hook' people to get in nature and benefit from it	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Digital placemaking initiative that supports safe location information including nature spaces community wellbeing (e.g. changing your commute to go through a nature space)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Digital placemaking can create a sense of accountability in the community when involving nature and wellbeing	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. Nature as an assessment element is key to understanding the wellbeing impact of digital placemaking	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional - Any further comments/specifications?

586

Appendix H: Round 3 Questionnaire.




Restart Survey

Place Bookmark

Tools

Share Preview

Survey Completion 0% 100%



Please respond by 08/03/2024

Thank you for participating in the modified Delphi Study on Digital Placemaking for Nature and Wellbeing (round two).

Your participation, conversation and completion of the round one questionnaire were extremely thorough and important. We now have analysed the first Delphi questionnaire and have created the second Delphi questionnaire (round two)

The details below will explain to you what this questionnaire entails. If you are completing it on a phone or tablet, it may be easier to complete if you flip the device to landscape.

The Delphi round two questionnaire should take around 5 minutes to complete.

It contains a list of 54 agreed statements from the previous round. Agreement was found when an item obtained over 70% of percentage of response (Avella, 2016). We ask you to rate these items again, according to how much you agree or disagree with them. We have included a N/A option too. We will present you with the results from round two ratings in the next round if needed.

Thank you for your valuable comments in the previous round, these will be used in the final analysis.

The second round contains four sections.

1. The first section collects data on demographic details.
2. The second section includes a Likert scale to identify important characteristics, factors and challenges for digital placemaking.
3. The third section collects data on place attachment and place branding related to digital placemaking.
4. The final section collection collects data on digital placemaking for nature, for wellbeing and nature and wellbeing combined.

Information and consent.

All information provided will be confidential and your anonymity will be protected through the study. You maintain the right to withdraw from the study at any stage up to the point of data analysis. At this point, your data will be collated with that of other participants and can no longer be retracted.

I would like to thank you for your time and interest in the study.

We also ask you to complete all questions, as this is important in enabling us to identify areas of consent.

The closing date for responses is 08/03/2024.

Please contact the research team at maria.fernandezdeossosfuentes.2022@mumail.ie if you need further information.

If you have any questions about your rights as a participant in this research, or if you feel that you have been placed at risk, please contact the Secretary of the Maynooth University Ethics Committee at research.ethics@mu.ie or +353 (0)1 708 6019. Please be assured that your concerns will be dealt with in a sensitive manner. For your information, the Data Controller for this research project is Maynooth University, Maynooth, Co. Kildare. Maynooth University's Data Protection officer is Ann McKeon in Humanity House, room 17, who can be contacted at ann.mckeeon@mu.ie. Maynooth University Data Privacy policies can be found at <https://www.maynoothuniversity.ie/data-protection>.

Please tick the box to confirm that you have read and understand the information provided above

☐ I have read and understood the information provided

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placed at risk, please contact the Secretary of the Maynooth University Ethics Committee at research.ethics@mu.ie or +353 (0)1 708 6019. Please be assured that your concerns will be dealt with in a sensitive manner. For your information, the Data Controller for this research project is Maynooth University, Maynooth, Co. Kildare. Maynooth University's Data Protection officer is Ann McKeon in Humanity House, room 17, who can be contacted at ann.mckeeon@mu.ie. Maynooth University Data Privacy policies can be found at <https://www.maynoothuniversity.ie/data-protection>.

Restart Survey


Place Bookmark

Tools


Share Preview

0%100%


Survey Completion



Maynooth University
National University of Ireland Maynooth



GO GREEN ROUTES



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SECTION 0 – DEMOGRAPHICS

Do you consent to participate in this study

☒ Yes

☐ No

Please enter the last four digits of your phone number so that we can link your responses between rounds

TEST

Gender

☐ Male

☐ Female

☐ Non-binary / third gender

☒ Prefer not to say

Age

☐ 18-30 years

☒ 31-40 years

☐ 41-50 years

☐ 51-60 years

☐ 61-70 years

☐ >71 years

Expert or Expanded Expert? Please choose as determined in the email

☒ Expert

☐ Expanded Expert

Profession

☒ Academic

☐ Practitioner

Country of residence

TEST

←

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12:29

Expert or Expanded Expert?
Please choose as determined in the email

☒ Expert

☐ Expanded Expert

Profession

☒ Academic

☐ Practitioner

Country of residence

TEST

588

Return Survey

Place Bookmark

Tests

0

Share Results

Survey Completion100%

Maynooth University

School of Business

at Maynooth

theGREEN ROUTES

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SECTION 1 – DIGITAL PLACEMAKING

This section asks you to rank statements relating to:

1. The definition of digital placemaking
2. Its characteristics
3. Challenges
4. Technology used
5. Measurement

1/5 Statements for definition of digital placemaking

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	N/A
1. Digital placemaking is an umbrella term (mean=4.02)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Placemaking is digital necessarily (mean=2.77)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Digital placemaking should be defined as a process (mean=3.88)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Sense of place (place attachment) is a key aspect in the digital placemaking definition (mean=4.55)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Hybrid place experience (creating the physical sense with digital sense) is a key aspect of the digital placemaking definition (mean=3.85)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Community connection is a key aspect of the digital placemaking definition (mean=3.85)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The physical place characteristics/connection (as an anchor) is a key aspect of the digital placemaking definition (mean=4.55)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional - Any further comments/specifications?

2/5 Statements for characteristics of digital placemaking

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	N/A
1. Inclusion and accessibility are key characteristics of digital placemaking (mean=4)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Storytelling is a way to empower communities through digital placemaking (mean=4.55)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Classification is a strategy for digital placemaking practices (mean=3.55)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Digital placemaking must adapt to the place and community characteristics (mean=4.25)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Digital placemaking must focus on the aim and purpose of the project (mean=4.55)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Digital placemaking projects are unique for each location and community (mean=3.98)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Digital placemaking professionals are facilitators (mean=3.55)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional - Any further comments/specifications?

3/5 Statements for challenges of digital placemaking

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	N/A
1. Policy and safety safety concerns are challenges to digital placemaking (mean=4)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Digital equity is a challenge to digital placemaking (mean=4.77)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Inclusion and accessibility are challenges to digital placemaking (mean=3.93)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Digital literacy is a barrier to digital placemaking (mean=4.25)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. How to address multiple identity communities is a challenge to digital placemaking (mean=3.98)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Technology reliance is a challenge to digital placemaking (mean=3.85)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The exclusion of some audiences is a challenge to digital placemaking (mean=4.7)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Participant motivation and incentives are challenges to digital placemaking (mean=4.55)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. The cost and lack of funding are challenges to digital placemaking (mean=3.83)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Digital readiness (the engagement and selection/rejection of participants using technology) is a challenge to digital placemaking (mean=4.7)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Ethics of digital placemaking practices is a challenge to digital placemaking (mean=4.55)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional - Any further comments/specifications?

4/5 Technology in digital placemaking

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	N/A
1. Technology is a medium, not a final product (mean=4.33)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Digital placemaking is a vehicle for talking about place differently and creating emotional connections (mean=4)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional - Any further comments/specifications?

5/5 Statements for measurement of digital placemaking

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	N/A
1. Digital placemaking measurement is very difficult and depends on the project (mean=3.98)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The definition of success in digital placemaking is essential for impact measurement (mean=3.83)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Mixed methods are the best way to measure digital placemaking (mean=4.55)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional - Any further comments/specifications?

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5/5 statements for measurement of digital placemaking

1. Digital placemaking measurement is very difficult and depends on the project (mean=3.98)
Neutral

☐ 1. Strongly Disagree

☐ 1. Disagree

☒ 1. Neutral

☐ 1. Agree

☐ 1. Strongly Agree

☐ N/A

2. The definition of success in...

589

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SECTION 2 – PLACE ATTACHMENT AND PLACE BRANDING

This section asks you to rank statements relating to:

- Place Attachment
- Place Branding

1/2 Statements for Place Attachment

	1. Strongly Disagree	2. Disagree	3. Neutral	4. Agree	5. Strongly Agree	N/A
1. A physical connection to the place in digital placemaking is essential for the creation of place attachment (mean=3.76)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. A place's identity is built through shared experiences and the digital can help with it (mean=4.13)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Communities have multiple identities (mean=4.65)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Digital placemaking allows people to carry their identity even though they are no longer physically there (mean=3.96)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Digital placemaking could convey people's memories and stories of belonging to place to create and maintain place attachment (mean=4.22)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Communal feeling of attachment to place benefits wellbeing (mean=4.17)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional – Any further comments/specifications?

2/2 Statements for Place Branding

	1. Strongly Disagree	2. Disagree	3. Neutral	4. Agree	5. Strongly Agree	N/A
1. Place branding can use digital placemaking as a tool for the identification of common sense of place (mean=3.96)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Digital placemaking as a place branding strategy must be participatory (mean=3.87)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Place branding can use digital placemaking to communicate stories of a place (mean=4.13)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Place branding should be an iterative process where the brand evolves with the community over time, which conflicts with common strict branding guidelines (mean=3.87)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional – Any further comments/specifications?



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Asking, Using & Learning

SECTION 3 – NATURE AND WELLBEING

This section asks you to rank statements relating to:

- Digital placemaking and nature
- Digital placemaking and wellbeing
- Digital placemaking for nature and wellbeing

1/3 Statements for digital placemaking and nature

	1. Strongly Disagree	2. Disagree	3. Neutral	4. Agree	5. Strongly Agree	N/A
1. Technology can help people positively reconnect with nature (mean=3.87)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Technology can promote behaviour change towards nature connectedness (mean=3.83)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Digital placemaking can be used as a way to find, explore and discover nature places (e.g. place information, audio guides) (mean=4.35)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Digital placemaking can help people understand and take notice of nature (e.g. an app to learn about trees, listen to bird sounds, and recognise species) (mean=4.22)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Digital placemaking can be used to tell stories about nature (mean=4.22)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Technology can help raise awareness and educate on the importance of nature and biodiversity (mean=4.26)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Technology can expose people to nature (e.g. nature videos, nature sounds) (mean=4)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Technology helps us imagine futures for nature (mean=3.83)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Technology for nature should also be approached beyond the human lens (e.g. for animals sharing the space with humans) (mean=4.09)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Digital placemaking allows sharing experiences in nature places (mean=4)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional - Any further comments/specifications?

2/3 Statements for digital placemaking and wellbeing

	1. Strongly Disagree	2. Disagree	3. Neutral	4. Agree	5. Strongly Agree	N/A
1. The wellbeing impact of digital placemaking practices resides in the sense of belonging created with the place (mean=4.04)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional - Any further comments/specifications?

3/3 Statements for digital placemaking, nature and wellbeing

	1. Strongly Disagree	2. Disagree	3. Neutral	4. Agree	5. Strongly Agree	N/A
1. Technology can help people understand how nature benefits their wellbeing (e.g. mood improvement, relief of stress, etc.) (mean=4.04)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Digital placemaking can repurpose spaces to link them with nature supporting wellbeing (mean=3.74)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Digital placemaking should educate communities on nature and its support for wellbeing (mean=3.87)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Digital placemaking can help communities find nature places to support their wellbeing (mean=4.04)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Optional - Any further comments/specifications?

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Tools

Share Preview

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Assisting Living & Learning

Thank you for your time completing this form and reading the pertinent information.

Your response has been recorded and you will be contacted to participate in the Delphi round two questionnaire.

For any queries in relation to this study, please email maria.fernandezdeossofuentes.2022@mumail.ie

All data is processed in accordance with the University's data protection policy and privacy.

12:29

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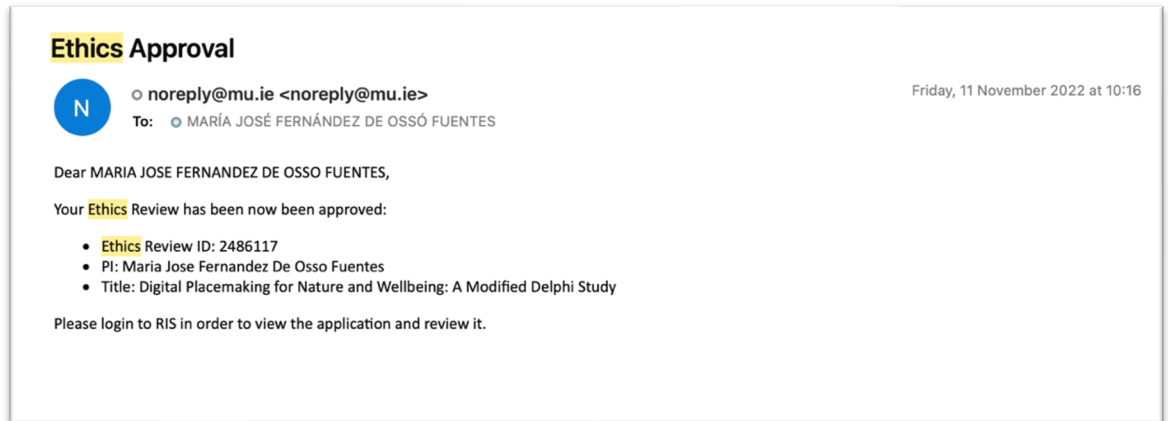
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Appendix I: Ethics Forms and Approval Confirmation.



**Social Research Ethics Sub-Committee**

**Protocol for Tier 2-3 Ethical Review of a Research Project Involving
Participation of Humans**

(This form must be submitted via the online [Ethics Module in RIS](#)).

1. Applicant.

Name:	MU Address/Department
Maria Fernandez de Osso Fuentes	Business School

2. Title. Brief title of the research project:

Digital Placemaking for Nature and Wellbeing: A Modified Delphi Study

3. Research Objectives. Please summarize briefly the objective(s) of the research, including relevant details such as purpose, research question, hypothesis, etc. **(maximum 100 words).**

This modified-Delphi study will help understanding the characteristics and impact of digital placemaking (DPM) as a place attachment and place branding strategy. DPM is a process that involved location-based technology to improve urban spaces for communities (Pang et al., 2020). We will appraise DPM regarding nature and wellbeing through this method to obtain consensus from experts (Nevo & Chan, 2007) and expanded experts (defined in section 5.a.), using questionnaires and controlled feedback. A framework would be developed from conclusions to guide DPM in supporting nature and wellbeing. We will study ***"how DPM can promote place attachment branding in cities fostering community nature connectedness while impacting their wellbeing?"***

4. Methodology.**4a.** Where will the research be carried out?

Location(s)	The research will be conducted both online (in a audio recorded Teams call, visual data will be deleted immediately upon recording) and additionally with face-to-face interviews where possible (audio recorded). The expanded experts in this study will be recruited from the cultivating cities associated with the GoGreenRoutes project (Limerick, Ireland; Versailles, France; Burgas, Bulgaria; Lahti, Finland; Umea, Sweden; Tallinn, Estonia.) It is hoped that these interviews will take place in person in the cities
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	<p>aforementioned where possible.</p> <p>The participants in the expert category will be recruited from Europe (including the UK), and Australia. These interviews will be conducted online in most instances.</p>
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4b. Briefly describe the overall methodology of the project. 350w

We will use a modified Delphi method in this study.

Materials: Experts and 'expanded experts' would be recruited from an established criterion (see section 5) and the results of a pre-survey to gather demographic information (see Appendix C) to determine if they are a suitable candidate for the study (see section 5a). A guide for the semi-structured interviews will be created based upon three pilot participants and prior research (Keegan, 2021; MacIntyre et al., 2019). We will be using a Likert scale to weight the statements in the different Delphi rounds from 'strongly disagree' to 'strongly agree' (Schneider et al., 2016; von der Gracht, 2012).

Procedures: Informed consent will be provided online (See Appendix A and B) on an Qualtrics survey platform, preceded by an information sheet with the opportunity for participants to submit questions about the process of the study. The participants will also be asked to fill in a short pre-interview survey to determine their suitability for the study. Once criteria is met, they will be asked to take part in a semi-structured interview with a researcher which will be audio recorded (via video if online and visual data will be deleted immediately upon recording or through audio if in person.) Interviews will be conducted in English and Spanish based on the preference of the interviewees in the initial survey. Study details will be explained verbally to the participants prior the interview, allowing them to ask questions or withdraw their consent.

Interviews will be transcribed and analysed using thematic analysis (Braun & Clarke, 2012, 2021). Following this, participants will be asked to take part on three 'Delphi rounds' of questionnaires to 'weight the agreement' of various items, which have been developed from the analysis of the interviews. These rounds will take the form of three separate 10–15-minute online surveys in which participants rate statement related to digital placemaking application to nature and wellbeing on a Likert scale. The rounds are used to 1. Build Consensus, 2. Resolve Differences and 3. Prioritise.

Frequency/duration: Interviews duration will vary between 45- 60 minutes long. A 4-week period between research stages will take place to allow researchers to analyse data from previous stage. See section 5.c.

Appendix A: Information Sheet

Appendix B: Consent Form

Appendix C: Pre-Interview Survey

Appendix D: Semi-structured interview guides and initial survey on participants demographic information and related experiences (Stage 1-Mapping the Topic)

Appendix E: Example of what a Delphi round will look like (1. Build Consensus, 2. Resolve Differences and 3. Prioritise)

Appendix F: Key References

5. Participants.**5a. Who will the participants be?**

The participants will comprise two samples:

1. **Experts Group:** specialists in digital placemaking from fields such as technology, urbanism, business and marketing, and environmental science. This will also include allied areas which have studied the concept of digital placemaking, such as researchers who have conceptualised on this topic and related areas (e.g. placemaking and technology implementations in architecture). The main criteria will be years working in the field holding a position in an institution or a programme, having specialist expertise and authority or influence in the concept of digital placemaking.
2. **Expanded Expert Group:** this additional group will comprise individuals for whom technology and public spaces are central to their work in different areas, such as architecture, urban planning, marketing, software development or creative arts. These expanded experts have a strong link with nature and technology, addressing aspects relating to the use of technology to amplify place experiences including nature with effects in health.

The above pre-selected groups will be expanded through snowball sampling with referrals from these participants. Inclusion criteria will additionally include that all participants must be 18 years or older at the time of consent.

Participants have a right to withdraw from the study at any time prior to when they have returned their approved transcript of their interview (procedure outlined in section 4.b). Once the participant has returned their approved transcript their findings will be used to dictate the rest of the process. However, participants can choose to not take part in the Delphi rounds following their interview. The information they provided in the interview will still be included in the final result.

5b. Outline the recruitment process, considering any criteria for inclusion/exclusion.

The research team will work to compile a list of possibly-participants who would meet the section 5a criteria. This list will be comprised of both experts and expanded experts. The recruitment will then expand through snowball sampling with suggestions from the participants.

5c. What will research participants be asked to do for the purposes of this research study?

See 4.b 'procedures'.

The time commitments that will be ask of the participants are as follows:

- 5-10 minutes for pre-interview study,
- 45-60 minutes for interview,
- 15-20 minutes for round one of modified-Delphi,
- 10-15 minutes round two of modified-Delphi,
- 10-15 minutes round three of modified-Delphi,

Total: a maximum of 120 minutes over a six-month period.

5d. Conflict of Interest.

☐ Yes ☒ No

Please consider the basis of any potential conflict of interest and describe the steps you will take to address this should it arise?

[Access the Conflict of Interest Policy here](#)

5e. Will the research involve power relationships e.g. student/employee/employer/colleague etc.?

☐ Yes ☒ No

If yes to above, please outline the basis of the potential power relationship and describe the steps you will take to address this should it arise?

Note that power relationships may exist in situations other than supervisor-student relationships and or adult/child relationships.

5f. Will the participants be remunerated, and if so, in what form?

No, they will not be remunerated.

6. Risk/Benefit Analysis

6a. Potential Risks: Please identify and describe any potential risks arising from the research techniques, procedures or outputs (such as physical stress/reactions, psychological emotional distress, or reactions) **and** for each one, explain how you will address or minimise them.

Potential risks are fatigue from the duration of the interview, but participants will be allowed to take a break if they require one. Potential stress created from discussing topics that include commercial sensitivity or projects that were not successful. Other risks from this interview and survey-based data collection methods are minimal.

6b. Potential Benefits: Provide a list of potential benefits for this Research.

To clarify areas in which digital placemaking is understood and has effects on from different perspectives including the role of nature and the wellbeing impact. The involvement of expanded experts will overcome the homogeneity of profiles in previous research in this area while contributing to approach a consensual picture of the potential involvement of digital placemaking as a nature-based solution in place attachment and place branding, specifically its use in urban natural environments and its wellbeing impact. They would potentially collaborate through this study to create a set of criteria for digital placemaking practices involving nature and impacting the wellbeing of citizens as a place attachment process in place branding. From these conclusions we

aim to develop a framework that would help shaping activities involving digital placemaking, nature and wellbeing impact.

This is important as digital placemaking can potentially be used in nature-based solutions. Nature-based solutions for human and environmental health are one of the commitments stated in the 2030 EU Biodiversity Strategy and European Green Deal.

6c. Risk/Benefit Analysis: Taking into account your answer in section 9 (a) & (b) above, please provide a short justification for proceeding with the research as outlined in this project.

Other risks from this interview and survey-based data collection methods are minimal, so the benefit of the research is overwhelming.

7. Informed Consent.

This section focuses on what and how, you tell participants about your research, and then obtain their informed consent as outlined in [section 3.4 of MU Research Ethics Policy](#).

Please note if you are collecting personally identifiable data you must seek explicit consent in a recordable manner (e.g. written or audio recorded and transcribed) [Template consent form available from the website](#)

7a. Confirm you are seeking and recording informed consent from participants



- Who will be responsible for seeking and recording consent?
Osso Fuentes

PI Maria Fernandez de

When and where is consent obtained e.g. do participants get an information sheet and sign a consent form, keeping a copy for their records or is consent secured by another means?

Consent will be obtained via an online consent form if the interview is taking place online, an email confirming that we received their consent will be sent to them.

7b. If applicable, please also justify deceiving or withholding information from participants ([see section 4.9 MU Ethics Policy](#)).

8. Follow-up. As appropriate, please explain what strategies you have in place to debrief or follow up with participants – especially in cases where information is withheld or deception is involved or where research has been carried out on sensitive topics, and/or with vulnerable persons.

Following the interview participants will be offered the opportunity to discuss the process and project with the interviewer and make any comments regarding the study. An evaluation of the methodological process will also be sent to participants in a follow-up communication through a 5-point Likert scale questionnaire.

This questionnaire will assess specific items relating to efficiency, usefulness and coherence of the ideas that will be presented in the study (e.g. To what extent was this research process conducted in an coherent manner? Rate 1-5 with anchor points: Inefficient -Highly Efficient).
One open ended question will be included on “how valuable was this research process for understanding the concept and impact of digital placemaking? Please comment.”

9. Data Management, Storage

Please complete 9a if personally identifiable data is being collected. If no personally identifiable data is being collected please move to 9b.

9a. Anonymity

Page 2 of the [Maynooth University's Research Integrity Policy](#) states 'where ever possible personally identifiable data should be rendered anonymous in order to provide the best protection for participants'.

Will personally identifiable data be protected through the use of pseudonyms and/or codes?

Yes ☒ No ☐

- If yes, please confirm that the key to pseudonyms and/or codes will be held in a separate location to the raw data? ☒
- Will personally identifiable data collected be irreversibly anonymised (All identifiers including keys to link pseudonyms or codes back to individual participants are destroyed)?

Yes ☒ No ☐

- Who will be responsible for rendering the data anonymous? PI Maria Fernandez de Osso Fuentes

If you answered No to above and are keeping personally identifiable data please explain your decision & rationale for not adhering to the policy.

Participants have the opportunity to waiver their anonymity should they believe it will benefit the nature of the study (e.g. European Commissioner).

9b. Data Access and Security:

Data must be stored in a safe, secure and accessible form, must be held for an appropriate length of time, to allow (if necessary) for future reassessment or verification of the data from primary sources, as outlined in the [Maynooth University's Research Integrity Policy](#).

Please tick the box to confirm;

- Only the researchers listed on this application will have access to the personal information and data collected from participants

☒

- Electronic Information sheets/consent forms and data collected will be encrypted and stored on a PC or secure server at Maynooth University



- Hard copy Information sheets/consent forms and data collected will be held securely in locked cabinets, locked rooms or rooms with limited access on campus



- Please justify any exceptions to the information stated above

- Do you plan to transfer Data outside of the European Economic Area? Yes ☐ No



- If yes, please confirm you are doing so in accordance with Section 6 of the Maynooth University Data Protection Policy

Yes ☐

[See Data Commissioners website for a list of approved countries and exceptions](#)

9c. Data Storage:

- Are you planning to collect data on a mobile device (SB keys, smart phones; video recorders; audio recorders and/or laptops)?

Yes ☒ No ☐

If yes, to be compliant with [Data protection Law](#), please confirm:

- Data collected on a mobile device will be protected with a strong password at a minimum, and/or encrypted if the device supports encryption
- Data will be removed from the mobile device as soon as is practicable
- Data will be removed to a desktop PC or server in a secure location at Maynooth University



9d. Secondary Use and Processing:

- Are you planning for any secondary use of the data?

Yes ☐ No ☒

If yes, please confirm you will obtain **explicit consent** for;

- Re-use and/or sharing of anonymous data at the beginning of the project
- Re-use and/or sharing of the identifiable data for any purpose other than the current research project
- Depositing in an Archive such as the [Irish Qualitative Data Archive](#) or the [Irish Social Science Data Archive](#) ?
- If yes, please give name and contact details for the proposed archive



9e. Data Disposal: Data should be destroyed in a manner appropriate to the sensitivity of that data. Please confirm:

- Paper based data will be destroyed by confidentially shredding or incineration
- Electronic files will be deleted by overwriting



- Who will be responsible for destroying personally identifiable data? PI Maria Fernandez de Osso Fuentes

10. Professional Codes of Ethics. Please append an appropriate code of ethics governing research in your area to this protocol, and/or provide a link to the website where the code may be found.

<ul style="list-style-type: none"> • General Data Protection Regulation 2016/679 (European Commission) https://gdpr.eu/ • Ethics and Data Protection (European Commission, 2018) https://ec.europa.eu/info/sites/info/files/5_h2020_ethics_and_data_protection_0.pdf 	
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Submission Check List

• Completed application form	<input checked="" type="checkbox"/>
• Letter from supervisor if applicant is a student	<input checked="" type="checkbox"/>
<u>if applicable – copies of:</u>	
• prior ethical approval	<input type="checkbox"/>
• ethical approval from other partner institutions	<input type="checkbox"/>
• Letter/email of support from named gatekeepers or external parties involved in the research	<input type="checkbox"/>
• proposed information sheet and consent form	<input checked="" type="checkbox"/>
• Samples of surveys/questionnaires, indicative focus groups/interview questions etc.	<input checked="" type="checkbox"/>
• Documentary evidence for the use of existing data records, sourced from third party organisations, that consent was originally sought for data to be used for research purposes	<input type="checkbox"/>
Please upload your full application to <u>RIS</u> as one single File.	

TEMPLATE FOR SUPERVISOR'S LETTER

The supervisor's letter should outline how the student is suitably prepared to carry out the type of research proposed. The following points should be addressed:

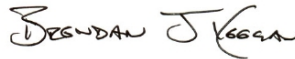
- Please elaborate on the student's preparedness to undertake the proposed research.
- Please provide details of the student's methodological competence to undertake the research project.
- Please address your confidence in the student's ability to manage risks that may arise as part of the research project.
- Please describe the support that you and the department will give to the student in the management and the execution of the research project.

Dear Ethics Committee,

I fully support and endorse Maria's application. She is an excellent candidate who has developed her skills in data collection and analysis in a very short timeframe. She is more than competent to conduct such a study as proposed above and I have confidence in her ability to this to an excellent standard.

Maria will be supported by myself and her supervisory team who possess a combination of subject-specific and methodological experience.

Regards



Brendan James Keegan

Appendix A



Information Sheet

Purpose of the Study. I am Maria Fernandez de Osso Fuentes, a doctoral student, in the School of Business, Maynooth University. I am undertaking this research study, *Digital Placemaking for Nature and Wellbeing: A Modified Delphi Study*, as part of my doctoral studies funded by the Horizon2020 project *GoGreenRoutes* (grant no. 869764). The study will investigate the concept of digital placemaking and its effects when involving nature connections to impact the wellbeing of citizens.

About GoGreenRoutes: This project targets urban health across six European cities using a combination of re-naturing cities, digital (Virtual and Digital Nature) and social innovation (e.g. participatory processes of co-creation). The goal is to promote a natural way to foster health and well-being. The project runs from Sept. 2020-August 2024. Our proposal is to take a citizen-centred approach to understanding nature, health and the urban environment. For further information see www.gogreenroutes.eu or @gogreenroutes on Twitter.

What will the study involve? Firstly, you will be asked to complete a short pre-interview survey to gather demographic information to determine your suitability for the study. The study will involve a semi-structured interview (approx. 45-60 mins. in duration) which will be recorded (via video if online or through an audio device if in person.) Within four weeks of the interview, you will be asked to review the full interview transcript and approve your quotes, which will be coded to remove any identifying information. Following the analysis of the interviews you will be asked to volunteer to participate in three rounds of 10-15 minute online questionnaires in which you rate statements related to nature connectedness using a Likert scale (e.g. 'strongly disagree' to 'strongly agree').

Who has approved this study? This study has been reviewed and received ethical approval from Maynooth University Research Ethics Committee (Social Research Ethics Sub-Committee) and the GoGreenRoutes H2020 Ethics Monitoring Process Committee along with the Gender, Inclusion and Diversity Panel of our project. You may have a copy of this approval if you request it and the approval no. from Maynooth University is 2441635.

Why have you been asked to take part? You have been asked to participate because you are considered to fall into the category of *expert* or *expanded expert* in the area of digital placemaking. *Expert* refers to our judgement that you have conducted research central to the idea of digital placemaking. *Expanded Expert* refers to our judgement that you may have unique experiences to enrich our understanding of digital placemaking or technological implementations in public spaces for nature and/or wellbeing. If you meet the further inclusion criteria (e.g., over the age of 18 years of age) please consider participating.

Do you have to take part?

No, you are under no obligation whatsoever to take part in this research. However, we hope that you will agree to take part and give us some of your time to complete a short questionnaire followed by a one-to-one interview with a researcher as outlined in the ethical protocol. It is entirely up to you to decide whether or not you would like to take part. If you decide to do so, you will be asked to sign a digital consent form and you will be forwarded a copy of the information sheet for your own records. If you decide to take part, you are still free to withdraw at any time without giving a reason and/or to withdraw your information up until such time as you return an approved copy of your interview transcription to the researcher. A decision to withdraw at any time, or a decision not to take part, will not affect your relationships with Maynooth University of the GoGreenRoutes project.

What information will be collected? Initially we gather some demographic information from you such as age, gender, place of residence, occupation and years of expertise. All information gathered after this will be based on your opinions and experience of the concept of digital placemaking.

Will your participation in the study be kept confidential? Yes, all information that is collected about you during the course of the research will be kept confidential. No names will be identified at any time, unless you give explicit consent to allow this. All hard copy information will be held in a locked cabinet at the researchers' place of work, electronic information will be encrypted and held securely on MU PC or servers and will be accessed only by researchers on the project: Maria Fernandez de Osso Fuentes, MA, BA; Dr Brendan Keegan and other researchers on the GoGreenRoutes project (see below).

No information will be distributed to any other unauthorised individual or third party. If you so wish, the data that you provide can also be made available to you at your own discretion.

'It must be recognised that, in some circumstances, confidentiality of research data and records may be overridden by courts in the event of litigation or in the course of investigation by lawful authority. In such circumstances the University will take all reasonable steps within law to ensure that confidentiality is maintained to the greatest possible extent.'

What will happen to the information which you give? All the information you provide will be coded and kept at Maynooth University in such a way that it will not be possible to identify you (unless you have chosen to waive your anonymity). On completion of the research, the data will be retained on the MU server. After 9 years, all data will be destroyed (by the PI). Manual data will be shredded confidentially, and electronic data will be reformatted or overwritten by the PI in Maynooth University.

What will happen to the results? The research will be written up and presented as a report which will be presented at National and International conferences and may be published in scientific journals. A summary report and toolkit will be written and used to influence the development and implementation of digital placemaking practices from a nature and health perspective, to meet the requirements of the H2020 GoGreenRoutes agreement. In line with all H2020 projects we are required to provide open access to our findings. A copy of the research findings will be made available to you upon request.

What are the possible disadvantages of taking part? I don't envisage any negative consequences for you in taking part in this research.

What if there is a problem? At the end of the interview, I will discuss with you how you found the experience. You may contact my supervisor Dr Brendan Keegan (Brendan.keegan@mu.ie) if you feel the research has not been carried out as described above or if you have any questions about the process.

Any further queries? If you need any further information, you can contact me:

Principal Investigator
Maria Fernandez de Osso Fuentes MA BA,
Maria.fernandezdeossofuentes.2022@mumail.ie
PhD Candidate
School of Business
Maynooth University

Additional Investigators
Dr Brendan Keegan
Brendan.keegan@mu.ie
Assistant Prof. in Marketing
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Maynooth University

Prof Marc Jones
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Prof. of Psychology
Manchester Metropolitan University

Dr Tadhg MacIntyre
tadhg.macintyre@mu.ie
Associate. Prof. of Environmental Psychology
Dept. of Psychology
Maynooth University

If you agree to take part in the study, please complete and sign the consent form overleaf or click Yes in the Online Form.

Thank you for taking the time to read this

Appendix B

Consent Form

I _____ agree to participate in Maria Fernandez de Osso Fuentes' research study titled *Digital Placemaking for Nature and Wellbeing: A Modified Delphi Study*.

Please tick each statement below:

The purpose and nature of the study has been explained to me verbally & in writing. I've been able to ask questions, which were answered satisfactorily. ☐

I am participating voluntarily. ☐

I give permission for my interview with Maria to be audio/video recorded. ☐

I understand that I can withdraw from the study, without repercussions, at any time, whether that is before it starts or while I am participating. ☐

I understand that I can withdraw permission to use the data right up to when I return a revised copy of my interview transcript. ☐

It has been explained to me how my data will be managed and that I may access it on request. ☐

I understand the limits of confidentiality as described in the information sheet. ☐

I wish to waive my anonymity. ☐

I understand that my data, in an anonymous format, may be used in further research projects and any subsequent publications if I give permission below: ☐

I agree to quotation/publication of extracts from my interview. ☐

I do not agree to quotation/publication of extracts from my interview. ☐

I agree for my data to be used for further research projects ☐

I do not agree for my data to be used for further research projects ☐

Signed.....

Date.....

Participant Name in block capitals

I the undersigned have taken the time to fully explain to the above participant the nature and purpose of this study in a manner that they could understand. I have explained the risks involved as well as the possible benefits. I have invited them to ask questions on any aspect of the study that concerned them.

Signed.....

Date.....

Researcher Name in block capitals

If during your participation in this study you feel the information and guidelines that you were given have been neglected or disregarded in any way, or if you are unhappy about the process, please contact the Secretary of the Maynooth University Ethics Committee at research.ethics@mu.ie or +353 (0)1 708 6019. Please be assured that your concerns will be dealt with in a sensitive manner.

For your information the Data Controller for this research project is Maynooth University, Maynooth, Co. Kildare. Maynooth University Data Protection officer is Ann McKeon in Humanity house, room 17, who can be contacted at ann.mckeon@mu.ie. Maynooth University Data Privacy policies can be found at <https://www.maynoothuniversity.ie/data-protection>.

Two copies to be made: 1 for participant, 1 for PI

Appendix C

Pre-Interview Survey

1. Name:
2. Age:
3. Occupation:
4. Years of Expertise:
5. Field of Expertise:
6. Country of Residence:
7. Country of Birth (if different from Residence):
8. How does digital placemaking/technology and public spaces play a role in your occupation?

Appendix D**Semi-Structured Interview**

Be sure to begin interview by building rapport with participant by asking about them and their experience with nature.

AREA OF INQUIRY	INTERVIEW QUESTION	EXPECTED OUTCOME	STUDIES
DIGITAL PLACEMAKING	<i>Describe your approach to digital placemaking in your work.</i>	Identification of activities, methods and techniques when applying digital placemaking	Courage et al. (2021)
	<i>Have you come across the term digital placemaking in your work? If so, in what capacity?</i>	Field that digital placemaking has been used/applied	
	<i>How would you define digital placemaking?</i>	Definition of the term	
	<i>What are the essential elements for a successful digital placemaking project or implementation? Can you give some best practice examples?</i>	Identification of key characteristics/elements in digital placemaking. Some type of technology/hybrid reality, sense of place, community engagement and inclusion (from SLR)	Chew et al. (2020), Morrison (2021), Basaraba (2021). Foth (2017).
	<i>Explain the main target groups that will benefit from digital placemaking in cities and what benefits will they receive.</i>	Identification of key consumer/audiences and direct effects	Courage et al. (2021)
	<i>What is your experience assessing the impact of digital placemaking practices?</i>	Gather information about indicators and performance measurement for digital placemaking	
PLACE ATTACHMENT & PLACE BRANDING	<i>What are the main drawbacks/challenges for digital placemaking that you have experienced?</i>	Potential risks and critics to digital placemaking practices.	Foth (2017)
	<i>Can sense of belonging/place attachment in urban spaces be promoted through digital placemaking? If so, how?</i>	Identification of key elements and processes.	Huang et al. (2022) and Birnbaum et al. (2021)
	<i>How can digital placemaking promote place branding in cities within the local community?</i>	Identification of key elements and processes.	Debenedetti et al. (2014); Reitsamer and Brunner-Sperdin (2021); Aitken and Campelo (2011)

SOCIAL IDENTITY THEORY	<i>Can digital placemaking create/modify an identity element in a community through hybrid experiences? If so, how?</i>	Description of process and elements	online brand communities + social identity Kuo and Hou (2017)
	<i>How can we promote nature as an identity element in a community?</i>	Identification of processes, stages, activities, and strategies.	
NATURE CONNECTEDNESS	<i>How do you think digital placemaking can be implemented in urban-nature spaces to promote human-nature connections?</i>	Description of applications of digital placemaking and nature, potential uses and engagement	
	<i>What benefits can digital placemaking bring when implemented in nature-based solutions?</i>	Potential applications and effects related to NBS. Components, applications, and strategies	MacIntyre et al. (2019)
MODEL (COMBINATION)	<i>How do you think digital placemaking, urban-nature and mental health and wellbeing could be combined? What potential effects would it have in the community?</i>	Identification of nexus among the areas and effects in communities	Edwards et al., 2020; Grace et al., 2020; Gulrud et al., 2018; Najafi et al., 2021
	<i>What is the role you envision digital placemaking could have on vulnerable citizens? What specific groups could be targeted for these practices?</i>	Potential benefits and risks, identification of specific audiences	Migrants + DPM: (Witteborn, 2021; , Labayen & Gutierrez, 2021; Agyekum & Newbold, 2019; Kale, 2019). Accessibility: (Szaszak & Kecskes, 2020). Marginalised communities (Radical placemaking by Gonsalves et al., 2021). Older adults (Van Houwelingen-Snippe et al., 2021)

	<i>Tell me about any existing application of digital placemaking, urban-nature and wellbeing that you know of.</i>	Gather insight of related projects, uses and impacts	Potential use: Keegan, 2021; MacIntyre et al., 2019; Toland et al., 2020. Placemaking + tech: Edwards et al., 2020; Grace et al., 2020; Gulsrud et al., 2018; Najafi et al., 2021
	<i>What is the future you envision for digital placemaking practices? And applied to nature and wellbeing?</i>	Identification of future areas of development in digital placemaking	
EXPERTS	<i>When did you first come across the concept of digital placemaking?</i>	Identification of fields of interest	
	<i>What digital technologies should digital placemaking be implementing from the literature?</i>	Identification of digital technologies that are and can be implemented in digital placemaking practices	
	<i>What essential aspects differentiates digital placemaking from other practices?</i>	Confirmation of characteristics/elements in digital placemaking	
	<i>What potential application/areas can benefit from implementing digital placemaking?</i>	Identification of fields of interest, stakeholders, impacts	
	<i>What areas should be prioritised in digital placemaking research in the future?</i>	Identification of future areas of development in digital placemaking	
EXPANDED EXPERTS	<i>How does technology influence your work?</i>	Identification of technological implications in a field of work	
	<i>How does nature influence your work?</i>	Identification of nature implications in a field of work	
	<i>How does mental health and wellbeing influence your work?</i>	Identification of wellbeing and mental health implications in a field of work	
	<i>Did you come across the term digital placemaking before? If so, explain</i>	Identification of fields of interest	
	<i>What is the role you envision of digital technology with nature?</i>	Identification of potential applications of technology in nature	

<i>What is the role you envision of digital technology with mental health?</i>	Identification of potential applications of technology in mental health and wellbeing	
<i>How could digital placemaking be used in your work?</i>	Identification of potential uses of digital placemaking in different fields	

ADDITIONAL AREAS:

Digital Placemaking

Place Attachment Theory

Place Branding

Social Identity Theory

Nature connectedness

Urban Nature

Nature-Based Solutions

Mental Health & Wellbeing Impact

**Note: Additional follow-up questions may be asked, as appropriate, with each participant, dependent on their previous response.*

Appendix E

This is an example of what a Delphi round will look like. We cannot give an exact version of what this will look like as each stage is shaped by the information provided in the previous stage. (1. Build Consensus, 2. Resolve Differences and 3. Prioritise)

We would envision that round 1. Build Consensus would start off large with anywhere between 50-100 characteristics which we would break down by round 3. Prioritise to 15-20 characteristics.

Please rate how important these characteristics are to the construct of nature connectedness:

	Very Important	Important	Slightly Important	Not Important
Digital Placemaking for Health & Wellbeing				
Hybrid environments in NBS				
Community engagement through location-based technology				
Open public spaces for climate resilience in cities				
Nature's benefit on mental health & wellbeing				
Hybrid nature's benefit mental health & wellbeing				
Nature as an identity element of the community				
Digital placemaking characteristics to be inclusion, community engagement, hybrid environments and sense of place				

Appendix F

References

- Braun, V., & Clarke, V. (2012). Thematic analysis. In APA handbook of research methods in psychology, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biological. (pp. 57–71). American Psychological Association.
<https://doi.org/10.1037/13620-004>
- Braun, V., & Clarke, V. (2021). Can I use TA? Should I use TA? Should I not use TA? Comparing reflexive thematic analysis and other pattern-based qualitative analytic approaches. *Counselling and Psychotherapy Research*, 21(1), 37–47.
<https://doi.org/10.1002/capr.12360>
- Keegan, B. J. (2021). Keeping Pace with the Digital Transformation of Place. In D. Medway, G. Warnaby, & J. Byrom (Eds.), *A Research Agenda for Place Branding* (pp. 163–179).
<https://www.elgaronline.com/view/edcoll/9781839102844/9781839102844.00019.xml>
- MacIntyre, T. E., Gidlow, C., Nieuwenhuijsen, M., Collier, M., Gritzka, S., & Warrington, G. (2019). Nature-based solutions and interventions in cities: A look ahead. In A. Donnelly & T. MacIntyre (Eds.), *Physical Activity in Natural Settings: Green and Blue Exercise* (pp. 335–348). Routledge.
- Nevo, D., & Chan, Y. (2007). A Delphi study of knowledge management systems: Scope and requirements. *Information & Management*, 44(6), 583–597. doi: 10.1016/j.im.2007.06.001
- Pang, C., Neustaedter, C., Moffatt, K., Hennessy, K., & Pan, R. (2020). The role of a location-based city exploration game in digital placemaking. *Behaviour and Information Technology*, 39(6), 624–647. <https://doi.org/10.1080/0144929X.2019.1697899>
- Schneider, P., Evaniew, N., Rendon, J. S., McKay, P., Randall, R. L., Turcotte, R., Vélez, R., & Bhandari, M. (2016). Moving forward through consensus: protocol for a modified Delphi approach to determine the top research priorities in the field of orthopaedic oncology. *Open*, 6, 11780. <https://doi.org/10.1136/bmjopen-2016>
- von der Gracht, H. A. (2012). Consensus measurement in Delphi studies. Review and implications for future quality assurance. *Technological Forecasting and Social Change*, 79(8), 1525–1536. <https://doi.org/10.1016/j.techfore.2012.04.013>

Appendix J: Digital Placemaking Toolkit for GoGreenRoutes (H2020).

Toolkit can be accessed below:

<https://gogreenroutes.eu/publication?t=D6.3%20Digital%20Placemaking%20tool-kit%20for%20all%20Cultivating%20Cities>