How to Create Public Value Through Open Data Driven Co-Creation: A Survey of the Literature

Colin Callinan
National University of Ireland, Galway
Ireland
c.callinan1@nuigalway.ie

Murray Scott
National University of Ireland, Galway
Ireland
murray.scott@nuigalway.ie

Adegboyega Ojo
Insight Centre for Data Analytics
Ireland
adegboyega.ojo@insight-centre.org

Eoin Whelan
National University of Ireland, Galway
Ireland
eoin.whelan@nuigalway.ie

ABSTRACT[1]

The drive for openness in government, with open data as a key component, has seen governments around the world devote a large amount of resources to publishing government collected and held data. Scarce resources are being devoted to this goal with the primary goals designated as economic growth and increased innovation. A somewhat overlooked aim is the creation of public value which can be deployed as an openness and trust enhancing apparatus. This preliminary work addresses this gap by aiming to develop the core knowledge of how public value can be co-created with open data. Through an extensive survey of the relevant literature, this research seeks to build an initial framework of public value as applied to co-created open data. Grounded in the structured literature review technique, the authors surveyed the pertinent literature to identify the primary factors that enable value co-creation from the citizens point of view. Furthermore, this research proposes an adapted collection of public values as they relate to open data.

CCS CONCEPTS

• **Applied computing~E-government**

KEYWORDS

Open data; co-creation; public value; value creation

ACM Reference format:

C. Callinan, M. Scott, A. Ojo, E. Whelan. 2018. How to Create Public Value Through Open Data Driven Co-Creation: A Survey of the Literature. In *Proceedings of the 11th International Conference on Theory and Practice of Electronic Governance, Galway, Ireland, April 2018 (ICEGOV'18)*, 8 pages.
DOI: 10.1145/3209415.3209457

1 INTRODUCTION

The increased presence of technology in everyday life and its' ubiquitous nature offers great opportunities to reshape the landscape of how citizens interact with the state through modes of governance [73, 59]. Open data is an example of an emerging ICT that offers prodigious potential in this space. However, we know that a large amount of information systems developments end in failure [32]. Much of the focus on open data has inclined towards the economic aspects [85], unsurprisingly given the financial investment involved. Researchers have now begun to investigate and pose questions about the value of open data [40, 42]. Value as a concept tends to be viewed through the prism of economics or society [42]. The creation of value has previously been investigated thoroughly in the private sector primarily through company sponsored value co-creation [77, 31, 89, 75, 66]. There exists a paucity of research examining value creation from the public-sector viewpoint, however, this is slowly gaining some attention in the literature [15, 60]. Furthermore, we know very little about the dynamics of value co-creation in the public sector and what form of value is being created. This research sets out to fill this gap by identifying what factors enable value co-creation from the citizens viewpoint and proposes an adapted set of public values as realized through value co-created open data.

The rest of this paper is organized as follows: we explicate the theoretical background of open data, co-creation and public value through an extensive survey of the pertinent literature. We elaborate on the methodology employed and conclude by proposing a research framework of public value co-creation.

2 THEORETICAL BACKGROUND

ICEGOV '18, April 4–6, 2018, Galway, Ireland

ACM ISBN 978-1-4503-5421-9/18/04…$15.00
https://doi.org/10.1145/3209415.3209457

In the following sections, we elaborate on the theoretical background of the key components employed to develop our framework.

2.1 Open Data

[38] define open data as 'a "philosophy" or "strategy" that encourages mostly public organizations to release objective, factual, and nonperson-specific data that are generated or collected through the delivery of public services, to anyone, with a possibility of further operation and integration, without any copyright restrictions' (pp. 14-15). Led by former US president Barack Obamas announcement in 2009 that his government would embark upon a transparency strategy that would see much greater levels of openness in government, many governments around the world have since followed suit with increased emphasis on open data as a key component [39].

The defining characteristics of Open Data comprise three essential traits that must feature in order to fulfil the philosophy set out by practitioners and academics. While some researchers have cited additional characteristics such as the necessity for data to be non-privacy restricted and non-confidential, [40], at present there is a lack of definitional consensus on these characteristics. In general, there are three characteristics that must feature in order for data to be considered open. Firstly, it must be produced with public money, i.e. taxpayer money [38, 81, 87, 11, 40]. This type of data can take the form of primary data such as census data or secondary data such as economic trend data [38]. Other types include 'real-time (such as traffic or weather data) or offline (government spending), location-based (toxic waste dumps) or generic (regional healthcare costs), reports, maps, satellite photographs, pictures and paintings, the genome, medical data, scientific formula, public sector budgeting, food-safety information, and so forth' [38,68, 36]. Secondly, data should be made available without restrictions on usage or distribution [38, 5, 12, 40, 71]. Many countries are instructing their governmental departments and agencies to release data without any copyright obligation regarding usage or distribution [38]. In other words, 'certain kinds of data should exist beyond the limits of copyright, patents, censorship, or other parameters often placed around data. Data is disseminated openly so that it is freely available to use, republish, and transform into new products' [12]. An illustrative example is provided by the United Kingdom governments public data catalogue Data.gov.uk. As [71] explain, the catalogue 'points to thousands of datasets downloadable under a permissive open government licence. The datasets are often in comma-separated value (CSV) format or spreadsheets, but there is potential for increasing their utility by linking them using structured machine-processable formats'. They further point out that while hard-to-link formats are a problem, 'the regulatory setting of reusability is crucial: data needs an open licence to begin to count as open data' [71]. Finally, data must be published in a reusable format [38, 81, 39, 63]. The ability to tap into the potential of open data in the near future may depend on overcoming technological barriers such as 'data quality, accessibility, compatibility, credibility, processability, and lack of standards' [38]. Furthermore, owing to the necessity for anonymization, many governmental departments and agencies may choose to publish unstructured data because of a lack of resources. This in turn affects the quality of the data [38]. [81] take a slightly different view referencing leading countries such as the UK and US, where action has been taken to improve the ease of use and availability of data through machine readability and technical standards. However, their view is that the current situation will require that citizens possess a certain technical skill level. As they point out; 'The fact that there is no existing easy-to-use, proven solution, which can help citizens exploit open data for decision making (affecting day-to-day activities), or contribute to the wider public policy making debate, does not promote the widespread take-up of open data sources' [81].

There are many potential benefits, which have been categorised by [40] as firstly, political and social e.g. more transparency, creation of trust in government, more participation and self-empowerment of citizens etc. Secondly, economic, e.g. economic growth, stimulation of innovation, development of new products and services etc. Thirdly, operational and technical, e.g. counteracting cost associated with recollection and unnecessary duplication of data, optimisation of the administration process, improvement of public policies etc. Furthermore, McKinsey consulting estimate that open data can potentially stimulate $3 trillion in benefits throughout the global economy through better decisions and new products and services [56]. Open data is an example of an emerging information and communication technology (ICT) that as of yet has not been examined thoroughly from a surplus of angles [40]. One of these gaps that has yet to be explored to any great extent is that of the value of open data and how that value is co-created. The literature in this area is scant, however, there are some articles that address this area. [85] explored the economic value of open government data through the utilisation of design science research to develop a business model framework as a means to analyse existing open data business models. From a more abstract position, [4] address the co-creative aspects of data driven discovery by examining social versus the technological dimensions. They identify the recent capacity of 'using data and analytic capabilities to hasten the identification of previously unseen and unknown relationships within or across data sources', enabled by the 'availability of open data sources, cloud computing infrastructures and algorithmic developments' [4], (p. 3441).

2.2 Co-Creation

The relationship between information systems and/or technology and the concept of value has produced rigorous debate and varying ways of thinking about the nature of value [37, 17, 46]. From a more targeted perspective, this has taken the form of economic value [9, 74, 10], public value [33, 20, 70] and societal value [8]. A somewhat recent view of value is that of how it is jointly co-created between the customer/citizen and the producer/service provider [3, 77, 24, 25, 89, 66]. Co-creation is defined as 'the joint, collaborative, concurrent, peer-like process of producing new value, both materially and symbolically [30].

From an Information Systems perspective, co-creation has mainly been conceptualised as being mediated through online communities. For example, [65] examined customer initiated and firm sponsored value creation through virtual communities by employing trust as the critical mediator of value creation. [45] designed a virtual co-creation system to identify the key design principles that could be leveraged for user generated co-creation. [48] explored the interactions between co-creation and the sharing of digital products. They found that 'consumer sharing interacted with consumer-based co-creation to increase product variety and consumer surplus while reducing producer benefits from co-creation' [48], (p. 789). [29] looked at the issue of consumer empowerment through internet based co-creation. They found that the level of empowerment is correlated with the design of the interaction tool. In turn, the design of the interaction tool, furthermore, 'determines to what extent consumers with varying capabilities are able to solve the assigned co-creation task' [29], (p. 72). They also point to the importance for consumers engaging in co-creation to 'possess domain-specific knowledge and creativity relevant processing skills. Co-creation tools that lower the level of qualifications required for participation or that enable less skilled consumers to make valuable contributions can be considered as empowering tools' [29], (p. 93). [50] investigated how collective sentiment affects co-creation output in an online environment, specifically, by varying their communication style. They 'propose that collective sentiment can be used to predict the co-creation community's collective creativity and participation' [50], (p. 961). Most interestingly they found that 'positive collective sentiment has no impact on creativity, and it lowers the level of participation, whereas negative collective sentiment reduces creativity and increases user participation' [50], (p. 961). [69] studied the different underlying mechanisms of value co-creation within business to business alliances and the influencing factors on these mechanisms by employing a resource based view of the firm. They chose to look at the vendor-partner alliance surrounding an ERP product and were able to identify different enablers and barriers that influence value co-creation in different modes with a particular emphasis on IT value co-creation. [6] examined co-creation from the perspective of group composition and task conflict by studying their effect on the quality of Wikipedia articles. They found that diversity is to be encouraged as the creative abrasion it engenders leads to higher quality results while acknowledging the importance of conflict management. [54] studied the effects of technological environments, specifically social media, and co-creation on customer participation. They found that the site characteristics had a sizeable effect on co-creation experiences and subsequent intention to participate in co-creation in the future. Additionally, they found that customer learning value, social integrative value and hedonic value may be used to forecast future intention to participate. [18] article on company sponsored co-creation conceptualised it as a process of capturing consumers collective intelligence to develop a taxonomy and model of company-sponsored online co-creation brainstorming (COCB). [84], (p. 342) introduce the idea of innovation co-creation as a process whereby firms 'create simultaneous opportunities for innovation with consumers, rather than simply for them'.

Following previous successes in the private sector, interest in value co-creation has been gaining steadily in recent years as a means to jointly create public services and value between citizens and the state [15, 60]. Value co-creation relies on collaboration as the key driver of activity 'to integrate mutual resources into value configuration' [67], (p. 292). The move towards a more active and collaboratory citizenry is predicated on a few interrelated factors, including, but not exclusive to; the current climate of political economic governance, i.e. the neo-liberal state which includes '"degovernmentalization" of the welfare state, competition and consumer demand have supplanted the norms of "public service". Correspondingly, the citizen is re-specified as an active agent both able and obliged to exercise autonomous choices [49]; the deliberative turn in democratic theory as espoused by John Dryzek where 'democratic legitimacy came to be seen in terms of the ability or opportunity to participate in effective deliberation on the part of those subject to collective decisions' [23], (p. 1); and governments redefined relationship with citizens to address problem solving. This has been primarily based on three factors that are moderating the nature of this relationship; austerity has negatively affected resource intensive activities and problem solving; the increasing complexity of problems requires new collaborative approaches outside of government and especially with citizens and the existence of new technologies that has moderated the gap between government and citizens through distance and cost [60]. While there exists a large amount of literature on value co-creation from the private sector, literature examining value co-creation from the perspective of the public sector, by comparison, is sparse. Previous work has looked at citizens as end users in a production chain [77]; distinct roles for citizens in public service co-creation and problem solving defined as explorers, ideators, designers and diffusers [60]; collective intelligence, defined as groups of individuals doing things collectively that seem intelligent which, in addition, encompasses open innovation, crowdsourcing, wisdom of crowds, peer-production and wikinomics [83]; citizen science which encompasses collaboration with citizens in scientific research projects to address real-world problems [82]; partnership in public service delivery where services are coproduced by users and their communities [15]; co-governance (third sector participation in planning and delivery of public services) and co-management (third sector service co-production in collaboration with the state) of services [16].

Arising from a wide-ranging review of the pertinent literature, we were able to identify what we term the primary factors that facilitate citizens to co-create value. This is explicated in the table below.

Construct	Definition	Reference
Citizen Characteristics	Skills, intrinsic values and levels of education.	[77, 13, 28, 27, 61, 62, 1]
Citizen Awareness/Ownership	Taking part and being part of something.	[77, 28, 89, 27, 1]
Presence of Social Capital	Networks together with shared norms, values and understandings that facilitate co-operation within or among groups.	[13, 77, 89, 78]
Risk Aversion/Trust	Risk averse attitude/trust in process.	[77, 29, 27, 41 1]
Simplicity of Task	The ease in which the objective is completed.	[26, 87, 45, 35, 1]

Figure 1. Primary factors in citizen co-creation

2.3 Public Value

The theory of public value originated from Mark Moore's [58] seminal work, in which he laid out his theory for what public managers should do to create public value given the particular contexts that they find themselves in. He addresses the role of government in society, the role of public managers and the skills and methods public managers need to cultivate their roles [20]. Public value as a concept "requires a balancing of efficiency and effectiveness measures with improvements in democratic and social values such as engagement, participation and trust in government. The creation of Public Value is a function of both the value received from the service or product and the cost of consumption and resources expended to produce the service" [70], (p.190). Given its' elastic nature, the theory has permeated multiple disciplines, most extensively in the fields of political science and public administration [86]. It should be pointed out that public value "is not the property of particular political parties, public service institutions, academic disciplines or professions. Public value is defined and redefined through social and political interaction" [72], (p. 69).

In this paper, we define the public as the users of open data in its various forms and the wider citizenry as the beneficiaries of co-created public value through open data. Since Moore's seminal work, there has been a plethora of publications examining the nature, scope, measurability and usefulness of public value as a theory and practice. [43] article inventories public values and pose a series of questions about the nature, hierarchy and assessment of public value. [21] assess government information technology through a public value framework. [2] view public values as a pragmatic evolution from the previously dominant new public management paradigm. [44] examined the factors for evaluating the public value of e-government in Sri Lanka through the perspective of public service delivery and public organizations efficiency. [70] employed the public value theory to reposition the DeLone and McClean IS success model to create an e-government net benefits scale. [7] examined the interplay between information and communication technologies and public values to develop a framework for future research.

Following an extensive review of the literature, this research proposes an adapted collection of public values as they relate to open data. Following [33], we propose *Outcomes* as the first public value. [33] refer to direct service related outcomes and more generic outcomes such as community well-being. In this research, we define outcomes as positive societal outcomes as experienced by the broader citizenry as a result of open data value creation. Secondly, we propose *Trust* as the next public value, adapted from [33] where they explain that it is "positively associated with community sustainability, including economic, social and psychological well-being" (p. 138). We further conceptualise open data as an example of an ICT enabler of trust. The third public value is that of *Effectiveness*, conceptualised as the success of Information Systems investments as espoused by [22]. Finally, we repurpose the public value of *Openness* [43], apply it to open data and conceptualise it as the resulting opening of the machinations of government through the publication of publically collected and available data. Openness is further related to values such as accountability, democracy and popular control of public administration [43].

2.4 Co-created Open Data

Given the relative newness of the open data phenomenon, the literature on the intersection between co-creation and open data is quite scant. However, there are a few articles in the academic literature which point towards this avenue as a fruitful direction to explore. [47] developed a conceptual framework that addresses the key strategies necessary for involving customers in co-creating new technology based services. [52] describe the co-creation of three urban apps in the city of Bilbao through conjoining the open innovation, open data and open services paradigms. This approach was in response to the administration centric approach of public service provision which no longer fits the need to move towards a more open model involving civil society. [88] tackles the problem of value creation in open data ecosystems by looking at what sort of policy guidelines can be enacted in support of this goal. They address the problematic current issue of focusing on publishing open data without considering that value is created in use of open data. [19] conducted a pilot study focussing on co-creation with open data in the city of Rotterdam. They point towards the collaborative potential of employing co-creation with public sector information as a means to foster innovation.

3 METHODOLOGY

The fundamental problem facing researchers of co-creation, public value and to a lesser extent open data is that of the vastness of the literature on these subjects. To address this, the authors employed a systematic literature review to cope with the unbounded and ever-growing number of papers published in this area. Fortunately, there exists a number of seminal Information Systems articles that offer different guidelines and approaches on how to operationalize a systematic literature review [80, 14, 76, 79]. The value of conducting a systematic review is laid out clearly by [14];

"The distinct feature of SLR is a protocol that prescribes how to identify, select, assess and synthesize evidence from the literature. By adhering to such a protocol, SLRs, it is claimed, provide a 'standardized method' for literature reviews that is *replicable, transparent, objective, unbiased* and *rigorous*". The first step involves selecting keywords and search terms. For this study, we selected the following keywords and strings: open AND data, co-creation and public AND value. Given the multidisciplinary nature of the topics under examination, the keywords were entered into renowned academic databases such as Web of Science, Business Source Complete and Science Direct. The databases were searched for citations from 1960 to present, while limiting the search of the keywords to titles only. Unsurprisingly, given the generic nature of the terminology the process resulted in the retrieval in a large amount of citations numbering 9420. The titles were then analyzed against pre-determined inclusion and exclusion criteria resulting in 320 citations. Where there was any ambiguity pertaining to the papers title, the abstract was examined to determine the relevance of the study. Duplicate citations and book reviews were further excluded. At this point, the authors would like to acknowledge the methodological limitation of analyzing only the titles. However, this approach was pursued owing to the generic terminology producing an inordinate number of results. Furthermore, others have followed this approach when dealing with a massive amount of citations [64].

	Open AND Data	Co-creation	Public AND Value
Business Source Complete	**847**	**561**	**1,028**
Science Direct	**520**	**223**	**329**
Web of Science	**3,077**	**786**	**2,049**

Figure 2. Literature review results

4 RESEARCH FRAMEWORK

Based on a thorough review of the pertinent literature, the authors argue that public value co-creation is conceptualised as co-creation in the public-sector domain. This research pitches public value co-creation as a value creation process mediated by an Information System/Information Communication Technology i.e. open data platform. Essentially, this is represented as a collaborative process, [67], where individuals/groups/citizens co-create value for the relevant stakeholders and the wider public at large. The overarching aim of this research is to create for the first time a research framework of public value co-creation through the utilisation of open data. The proposed research framework will enable researchers to examine how individuals co-create through utilising open data, what public values can be created as an outcome, resulting in public value co-creation.

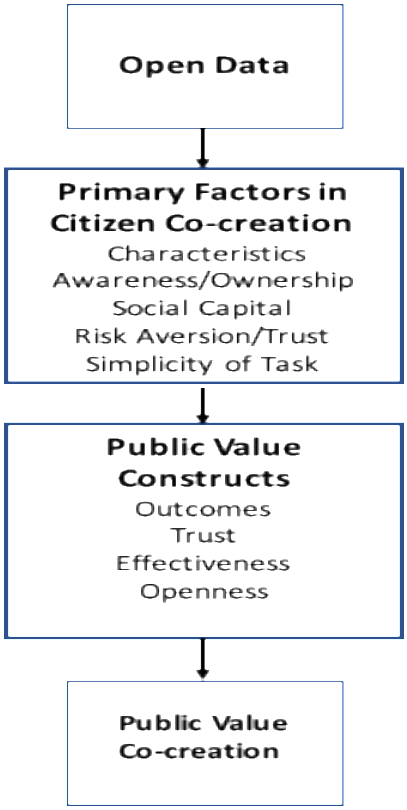

Figure 3. Proposed research framework

5 CONCLUSION

Having identified the paucity of research in the areas of value co-creation from the citizen/public sector aspect and the dearth of research addressing the intersection of open data and public value, we attempted to fill this gap by proposing a new framework for further research in this space. As reflected in the need to address the economic aspects of open data [85], the relative newness of the open data phenomenon has not allowed deep and wide-ranging research into its' multi-faceted nature as yet. The contribution of this research is threefold. Firstly, we attended to a previously under examined area of value co-creation by focusing on the public sector as opposed to company sponsored co-creation to identify the factors that support value co-creation. Secondly, we identified and adapted an inventory of public values as they pertain to open data. Finally, we proposed the term public value co-creation as the result of a collaborative process, enabled by an ICT, in this case open data, where citizens engage in value creation for relevant stakeholders and the wider public at large.

ACKNOWLEDGMENTS

This publication has emanated from research supported in part by a research grant from Science Foundation Ireland (SFI) under Grant Number SFI/12/RC/2289.

6 REFERENCES

[1] Alford, J. 2002. Why Do Public-Sector Clients Coproduce? Toward A Contingency Theory. Administration & Society, 34, 32-56.

[2] Alford, J. and Hughes, O., 2008. Public value pragmatism as the next phase of public management. The American Review of Public Administration, 38(2), 130-148.

[3] Alves, H., Fernandes, C. and Raposo, M., 2016. Value co-creation: Concept and contexts of application and study. Journal of Business Research, 69(5), 1626-1633.

[4] Anderson, L.C. and Kieliszewski, C.A., 2015. Co-creative aspects of data-driven discovery. Procedia Manufacturing, 3, 3440-3447.

[5] Attard, J., Orlandi, F., Scerri, S. and Auer, S., 2015. A systematic review of open government data initiatives. Government Information Quarterly, 32(4), 399-418.

[6] Arazy, O., Nov, O., Patterson, R. and Yeo, L., 2011. Information quality in Wikipedia: The effects of group composition and task conflict. Journal of Management Information Systems, 27(4), 71-98.

[7] Bannister, F. and Connolly, R., 2014. ICT, public values and transformative government: A framework and programme for research. Government Information Quarterly, 31(1), 119-128.

[8] Bannister, F. and Remenyi, D., 2003. The societal value of ICT: First steps towards an evaluation framework. Electronic Journal of Information Systems Evaluation, 6(2), 197-206.

[9] Barua, A., Kriebel, C.H. and Mukhopadhyay, T., 1995. Information technologies and business value: An analytic and empirical investigation. Information systems research, 6(1), 3-23.

[10] Bassi, J. and Lau, F., 2013. Measuring value for money: a scoping review on economic evaluation of health information systems. Journal of the American Medical Informatics Association, 20(4), 792-801.

[11] Bates, J. 2013. The Domestication of Open Government Data Advocacy in The United Kingdom: A Neo-Gramscian Analysis. Policy & Internet, 5, 118-137.

[12] Bertot, J. C., Gorham, U., Jaeger, P. T., Sarin, L. C. & Choi, H. 2014. Big Data, Open Government And E-Government: Issues, Policies and Recommendations. Information Polity, 19, 5-16.

[13] Bharti, K., Agrawal, R. & Sharma, V. 2014. What Drives the Customer of World's Largest Market to Participate in Value Co-Creation? Marketing Intelligence & Planning, 32, 413-435.

[14] Boell, S.K. and Cecez-Kecmanovic, D., 2015. On being 'systematic' in literature reviews in IS. Journal of Information Technology, 30(2), 161-173.

[15] Bovaird, T., 2007. Beyond engagement and participation: User and community coproduction of public services. Public administration review, 67(5), 846-860.

[16] Brandsen, T. and Pestoff, V., 2006. Co-production, the third sector and the delivery of public services: An introduction. Public management review, 8(4), 493-501.

[17] Chan, Y.E., 2000. IT value: The great divide between qualitative and quantitative and individual and organizational measures. Journal of Management Information Systems, 16(4), 225-261.

[18] Chen, L., Marsden, J.R. and Zhang, Z., 2012. Theory and analysis of company-sponsored value co-creation. Journal of Management Information Systems, 29(2), 141-172.

[19] Conradie, P., Mulder, I. and Choenni, S., 2012, June. Rotterdam open data: Exploring the release of public sector information through co-creation. In Engineering, Technology and Innovation (ICE), 2012 18th International ICE Conference on (1-10). IEEE.

[20] Cordella, A. and Bonina, C.M., 2012. A public value perspective for ICT enabled public sector reforms: A theoretical reflection. Government information quarterly, 29(4), 512-520.

[21] Cresswell, A.M., Burke, G.B. and Pardo, T., 2006. Advancing return on investment, analysis for government IT: a public value framework. Center for Technology in Government, University at Albany, SUNY.

[22] Delone, W.H. and McLean, E.R., 2003. The DeLone and McLean model of information systems success: a ten-year update. Journal of management information systems, 19(4), 9-30.

[23] Dryzek, J. S. 2000. Deliberative Democracy and Beyond: Liberals, Critics, Contestations, Oxford University Press.

[24] Durugbo, C. and Pawar, K., 2014. A unified model of the co-creation process. Expert Systems with Applications, 41(9), 4373-4387.

[25] Edvardsson, B., Tronvoll, B. and Gruber, T., 2011. Expanding understanding of service exchange and value co-creation: a social construction approach. Journal of the Academy of Marketing Science, 39(2), 327-339.

[26] Elina Jaakkola, A. H., Dr Leena Aarikka-Stenroos, D. & Verleye, K. 2015. The Co-Creation Experience from The Customer Perspective: Its Measurement and Determinants. Journal of Service Management, 26, 321-342.

[27] Etgar, M. 2008. A Descriptive Model of The Consumer Co-Production Process. Journal of The Academy of Marketing Science, 36, 97-108.

[28] Füller, J. 2010. Refining Virtual Co-Creation from A Consumer Perspective. California Management Review, 52, 98-122.

[29] Füller, J., Mühlbacher, H., Matzler, K. & Jawecki, G. 2009. Consumer Empowerment Through Internet-Based Co-Creation. Journal of Management Information Systems, 26, 71-102.

[30] Galvagno, M. & Dalli, D. 2014. Theory of Value Co-Creation: A Systematic Literature Review. Managing Service Quality: An International Journal, 24, 643-683.

[31] Gebauer, H., Johnson, M. and Enquist, B., 2010. Value co-creation as a determinant of success in public transport services: A study of the Swiss Federal Railway operator (SBB). Managing Service Quality: An International Journal, 20(6), 511-530.

[32] Goldfinch, S., 2007. Pessimism, computer failure, and information systems development in the public sector. Public Administration Review, 67(5), 917-929.

[33] Grimsley, M. and Meehan, A., 2007. e-Government information systems: Evaluation-led design for public value and client trust. European Journal of Information Systems, 16(2), 134-148.

[34] Grönroos, C. & Voima, P. 2013. Critical Service Logic: Making Sense of Value Creation And Co-Creation. Journal of The Academy of Marketing Science, 41, 133-150.

[35] Haichao, Z., Dahui, L. & Wenhua, H. 2011. Task Design, Motivation, And Participation In Crowdsourcing Contests. International Journal of Electronic Commerce, 15, 57-88.

[36] Hendler, J., Holm, J., Musialek, C. and Thomas, G., 2012. US government linked open data: semantic. data. gov. IEEE Intelligent Systems, 27(3), 25-31.

[37] Hitt, L. and Brynjolfsson, E., 1994. The three faces of IT value: theory and evidence. ICIS 1994 Proceedings, 20.

[38] Hossain, M. A., Dwivedi, Y. K. & Rana, N. P. 2016. State-Of-The-Art in Open Data Research: Insights from Existing Literature and A Research Agenda. Journal of Organizational Computing and Electronic Commerce, 26, 14-40.

[39] Huijboom, N. & Van Den Broek, T. 2011. Open Data: An International Comparison of Strategies. European Journal of Epractice, 12, 4-16.

[40] Janssen, M., Charalabidis, Y. & Zuiderwijk, A. 2012. Benefits, Adoption Barriers and Myths of Open Data and Open Government. Information Systems Management, 29, 258-268.

[41] Jaworski, B. & Kohli, A. K. 2006. Co-Creating the Voice of The Customer. The Service Dominant Logic of Marketing: Dialog, Debate and Directions, 109-117.

[42] Jetzek, T., Avital, M. and Bjørn-Andersen, N., 2013. Generating value from open government data.

[43] Jørgensen, T.B. and Bozeman, B., 2007. Public values: An inventory. Administration & Society, 39(3), 354-381.

[44] Karunasena, K. and Deng, H., 2012. Critical factors for evaluating the public value of e-government in Sri Lanka. Government Information Quarterly, 29(1), 76-84.

[45] Kohler, T., Fueller, J., Matzler, K. & Stieger, D. 2011. Co-Creation in Virtual Worlds: The Design of The User Experience. MIS Quarterly, 35, 773-788.

[46] Kohli, R. and Devaraj, S., 2003. Measuring information technology payoff: A meta-analysis of structural variables in firm-level empirical research. Information systems research, 14(2), 127-145.

[47] Kristensson, P., Matthing, J. and Johansson, N., 2008. Key strategies for the successful involvement of customers in the co-creation of new technology-based services. International journal of service industry management, 19(4), 474-491.

[48] Lang, K., Shang, R. and Vragov, R., 2015. Consumer Co-creation of Digital Culture Products: Business Threat or New Opportunity?. Journal of the Association for Information Systems, 16(9), 766.

[49] Larner, W., 2000. Neo-liberalismi policy, ideology, governmentality. Studies in political economy, 63(1), 5-25.

[50] Lee, H.H.M. and van Dolen, W., 2015. Creative participation: Collective sentiment in online co-creation communities. Information & Management, 52(8), 951-964.

[51] Leroy, J., Cova, B. & Salle, R. 2013. Zooming in Vs Zooming Out on Value Co-Creation: Consequences for BtoB Research. Industrial Marketing Management, 42, 1102-1111.

[52] López-de-Ipiña, D., Emaldi, M., Aguilera, U. and Pérez-Velasco, J., 2016. Towards citizen co-created public service apps. In Ubiquitous Computing and Ambient Intelligence: 10th International Conference, UCAmI 2016, San Bartolomé de Tirajana, Gran Canaria, Spain, November 29–December 2, 2016, Part II 10 (469-481). Springer International Publishing.

[53] Lourenco, R. P. 2015. An Analysis of Open Government Portals: A Perspective of Transparency for Accountability. Government Information Quarterly, 32, 323-332.

[54] Luo, N., Zhang, M. and Liu, W., 2015. The effects of value co-creation practices on building harmonious brand community and achieving brand loyalty on social media in China. Computers in Human Behavior, 48, 492-499.

[55] Magalhaes, G., Roseira, C. & Manley, L. Business Models for Open Government Data. Proceedings of the 8th International Conference on Theory and Practice of Electronic Governance, 2014. Acm, 365-370.

[56] Manyika, J., Chui, M., Groves, P., Farrell, D., Van Kuiken, S. and Doshi, E.A., 2013. Open data: Unlocking innovation and performance with liquid information. McKinsey Global Institute, 21.

[57] McLaverty, P. 2011. Participation. The Sage Handbook of Governance, 402-418.

[58] Moore, M.H., 1995. Creating public value: Strategic management in government. Harvard university press.

[59] Mulgan, G., 2005. Reshaping the State and its Relationship with Citizens: the Short, Medium and Long-term Potential of ICT's. The Network Society From Knowledge to Policy, 225.

[60] Nambisan, S. and Nambisan, P., 2013. Engaging citizens in co-creation in public services: Lessons learned and best practices. IBM Center for the Business of Government.

[61] Oreg, S. & Nov, O. 2008. Exploring Motivations for Contributing to Open Source Initiatives: The Roles of Contribution Context and Personal Values. Computers in Human Behavior, 24, 2055-2073.

[62] Payne, A. F., Storbacka, K. & Frow, P. 2008. Managing the Co-Creation of Value. Journal of The Academy of Marketing Science, 36, 83-96.

[63] Peled, A., 2011. When transparency and collaboration collide: The USA open data program. Journal of the Association for Information Science and Technology, 62(11), 2085-2094.

[64] Pittaway, L., Robertson, M., Munir, K., Denyer, D. and Neely, A., 2004. Networking and innovation: a systematic review of the evidence. International journal of management reviews, 5(3-4), 137-168.

[65] Porter, C.E., Devaraj, S. and Sun, D., 2013. A test of two models of value creation in virtual communities. Journal of Management Information Systems, 30(1), 261-292.

[66] Prahalad, C. K. & Ramaswamy, V. 2004. Co-Creation Experiences: The Next Practice in Value Creation. Journal of Interactive Marketing, 18, 5-14.

[67] Ranjan, K.R. and Read, S., 2016. Value co-creation: concept and measurement. Journal of the Academy of Marketing Science, 44(3), 290-315.

[68] Rohunen, A., Markkula, J., Heikkila, M. and Heikkila, J., 2014. Open traffic data for future service innovation: Addressing the privacy challenges of driving data. Journal of theoretical and applied electronic commerce research, 9(3), 71-89.

[69] Sarker, S., Sarker, S., Sahaym, A. and Bjørn-Andersen, N., 2012. Exploring value co-creation in relationships between an ERP vendor and its partners: a revelatory case study. MIS quarterly, 36(1).

[70] Scott, M., DeLone, W. and Golden, W., 2016. Measuring eGovernment success: a public value approach. European Journal of Information Systems, 25(3), 187-208.

[71] Shadbolt, N., O'Hara, K., Berners-Lee, T., Gibbins, N., Glaser, H., Hall, W. & Schraefel, M. C. 2012. Linked Open Government Data: Lessons from Data.Gov.Uk. Ieee Intelligent Systems, 27, 16-24.

[72] Smith, R.F.I., 2004. Focusing on public value: Something new and something old. Australian Journal of Public Administration, 63(4), 68-79.

[73] Torres, L., Pina, V. and Acerete, B., 2005. e-Governance developments in EU cities: reshaping government relationship with citizens.

[74] Van Wegen, B. and De Hoog, R., 1996. Measuring the economic value of information systems. Journal of Information Technology, 11(3), 247-260.

[75] Vargo, S.L., Maglio, P.P. and Akaka, M.A., 2008. On value and value co-creation: A service systems and service logic perspective. European management journal, 26(3), 145-152.

[76] vom Brocke, J., Simons, A., Riemer, K., Niehaves, B., Plattfaut, R. and Cleven, A., 2015. Standing on the Shoulders of Giants: Challenges and Recommendations of Literature Search in Information Systems Research. CAIS, 37, 9.

[77] Voorberg, W. H., Bekkers, V. J. J. M. & Tummers, L. G. 2015. A Systematic Review of Co-Creation and Co-Production: Embarking on The Social Innovation Journey. Public Management Review, 17, 1333-1357.

[78] Wasko, M. M. & Faraj, S. 2005. Why Should I Share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice. MIS Quarterly, 35-57.

[79] Watson, R.T., 2015. Beyond being systematic in literature reviews in IS. Journal of Information Technology, 30(2), 185-187.

[80] Webster, J. and Watson, R.T., 2002. Analyzing the past to prepare for the future: Writing a literature review. MIS quarterly.

[81] Weerakkody, V., Irani, Z., Kapoor, K., Sivarajah, U. and Dwivedi, Y.K., 2017. Open data and its usability: an empirical view from the Citizen's perspective. Information Systems Frontiers, 19(2), 285-300.

[82] Wiggins, A. and Crowston, K., 2011, January. From conservation to crowdsourcing: A typology of citizen science. In System Sciences (HICSS), 2011 44th Hawaii international conference on (1-10). IEEE.

[83] Wise, S., Paton, R.A. and Gegenhuber, T., 2012. Value co-creation through collective intelligence in the public sector: A review of US and European initiatives. Vine, 42(2), 251-276.

[84] Wong, T.Y., Peko, G., Sundaram, D. and Piramuthu, S., 2016. Mobile environments and innovation co-creation processes & ecosystems. Information & Management, 53(3), 336-344.

[85] Zeleti, F.A., Ojo, A. and Curry, E., 2016. Exploring the economic value of open government data. Government Information Quarterly, 33(3), 535-551.

[86] Zhang, J., Cid, G.P. and Gil-García, J.R., 2015. Creating public value through Open Government: Perspectives, experiences and applications. Information Polity, 20(2&3), 97-101.

[87] Zuiderwijk, A., Janssen, M. and Dwivedi, Y.K., 2015. Acceptance and use predictors of open data technologies: Drawing upon the unified theory of acceptance and use of technology. Government information quarterly, 32(4), 429-440.

[88] Zuiderwijk, A., Janssen, M., van de Kaa, G. and Poulis, K., 2016. The wicked problem of commercial value creation in open data ecosystems: Policy guidelines for governments. Information polity, 21(3), 223-236.

[89] Zwass, V., 2010. Co-creation: Toward a taxonomy and an integrated research perspective. International journal of electronic commerce, 15(1), 11-48.