The digital turn in planning and 'good enough' planning systems, data and outcomes

Carla Maria Kayanan[1], Samuel Mutter[2], Juliette Davret[3], and Rob Kitchin[4]

Maynooth University Social Sciences Institute, Iontas Building, North Campus, Maynooth University, County Kildare, Ireland

1. Carla.Kayanan@mu.ie, ORCID: 0000-0002-4359-3534
2. Samuel.Mutter@mu.ie, ORCID: 0000-0002-9246-7147
3. Juliette.Davret@mu.ie, ORCID: 0009-0005-7778-6595
4. Rob.Kitchin@mu.ie, ORCID: 0000-0003-4458-7299

Data Stories Working Paper 6
17 December 2024
datastories.maynoothuniversity.ie

The Data Stories project is funded by the European Research Council, grant no. 101052998.

Abstract

In this paper, we examine the digital mediation of planning through an in-depth case study of a multi-scale planning development and control data ecosystem that is used to manage and assess the pipeline of planning applications, appeals, building control, and the production of planning statistics and open data. The principal contributions of our analysis are three-fold. First, we highlight how planning work is rarely mediated by a single digital technology, but rather employs a constellation of software and data systems. Second, we chart in detail a planning data ecosystem and its constituent parts, and identify a number of technical, regulatory and socio-cultural data frictions that limit and hinder how a data ecosystem functions. Third, we make the case that individual data systems and data ecosystems may aspire to be perfect but are typically 'good enough' in nature. That is, they are functional and perform necessary tasks, but not always in an optimal manner. We contend that 'good enough' is a sufficient and reasonable workable solution given contextual factors and the technical, institutional and regulatory challenges of creating and maintaining a complex data ecosystem.

Key words: planning, digital turn, digitalisation, data ecosystem, data frictions, good enough

The digital turn in planning

The integration of digital technologies into planning has progressed in the Global North to the point where the digitalisation (shifting from paper-based to digital systems and processes) and datafication (the capture of planning information and tasks as digital data) of all aspects of planning practice is extensive (Daniel and Pettit 2021; Boland et al., 2022; Potts and Webb 2023). Planning work is organised and ordered with respect to its digital mediation, with tasks now predominately undertaken using a range of digital technologies such as online portals, email, spreadsheets, word processing, databases, planning application management systems, spatial decision/planning support systems, GIS, CAD, BIM (Building Information Modelling) and participatory consultation platforms. City and regional plans, and what gets built, are conceived, iterated, delivered and tracked using these and other technologies. Extensive data ecosystems have been produced, each consisting of a number of inter-related data systems that are functionally interlinked, sharing data to some degree and enabling collaboration between actors (van Schalkwyk et al., 2016; Oliveira and Loscio 2018), so that a related set of planning tasks can be undertaken. For example, a planning development and control data ecosystem consists of a set of interlinked data systems covering the pipeline from planning application to planning appeal, to building control, and the production of planning statistics. The aims associated with digitalisation and datafication are multiple: to increase efficiencies and reduce costs, gain new tools and enhance the range and sophistication of services delivered, create spillover effects through new data resources (e.g., evidence-informed practice and policy), develop more transparent, accountable and participatory decision-making processes, enhance citizen experience of government (through on-demand, online services) and ultimately improve public services (Silva 2010; Daniel et al., 2023).

This digital turn in planning extends beyond the mere adoption of digital technologies to a profound, embedded mode of thinking and acting digitally. In other words, how planning is understood and practised is shaped by the digital tools used to mediate planning practices and decisions; planning work is approached mindful of how it will be digitally mediated (Kuppler and Fricke 2024). Such thinking and acting has been thoroughly internalized and largely taken for granted in everyday practice and relatively little acknowledged beyond periodic reflections and debates about the application of specific digital technologies to planning (e.g., Lee 1973 on digital models; Nedovic-Budic 1999 on GIS; Kim et al., 1990 on expert systems; Falco and Kleinhans 2018 on digital participatory platforms; Kitchin et al., 2021 on 3D spatial media; Sanchez et al., 2022 on AI) rather than the use of mundane, routine digital technologies (e.g., word processing, spreadsheets, databases, email, application management systems); though see Klosterman (2012), Batty (2021), Daniel and Pettit (2021), Boland et al. (2022), Potts and Webb (2023) and Kuppler and Fricke (2024) for wider reflections on the digital turn in planning. In large part, this digital turn has progressed somewhat unhindered, despite some ambivalences and slowness in adoption, due to a wider shift in society wherein the digital has become an every feature of everyday life mediating work, consumption, mobility, leisure, and domestic activities (Ash et al., 2018), and the adoption of digital technologies across the public sector to manage and deliver services and enable e-government (Dunleavy et al., 2006; Falk et al., 2017).

Despite this digital turn, the processes of digitalisation and datafication are still underway, with paper-based procedures still evident in some planning work (though these mostly involve printed out copies of digitally prepared, rather than handwritten, documents). While some planning authorities have been first and second movers in technology adoption, others have been laggards (Daniel and Pettit 2021; Potts and Webb 2023). Such differential adoption is not necessarily the result of ambivalence and resistance by managers and workers, but can also be due to a prevalent neoliberal political economy creating austerity effects, reduced access to resources, and insufficient institutional capacities and skills base to seamlessly execute the digital transition, producing a splintering effect in roll-out and form (Graham and Marvin 2001; Kitchin et al., 2021). Moreover, where a transition has occurred, the digital landscape of planning might be far from being a seamless, well integrated set of digital technologies and practices. Digital systems might have been introduced at different times, with varying specifications and standards, supporting different data ontologies, managed across a number of units within and across organisations that have alternative priorities and governance, resulting data frictions and a fragmented data ecosystem that might hinder planning work (Kitchin and Moore-Cherry 2021).

Nonetheless, while a planning data ecosystem might not be optimal in its operations, it is typically functional, possessing ‘good enough’ processes and data (Collins et al., 1994; Gabrys et al. 2016; Bialski 2024) to deliver ‘good enough’ outcomes. That is, the data ecosystem enables informed decisions on planning applications and the monitoring of the construction process. Here, good enough is not used pejoratively (Bialski 2024). Given the complexity of the planning system, with its myriad laws, regulations, time rules, workflows and data systems that span multiple stakeholders, in a context of limited funding and understaffing, achieving a functioning system that delivers expected planning outcomes is laudable. Given contextual factors, good enough indicates sufficient and reasonable performance; it might even be an exceptional achievement if the severity of those factors is strong (Collins et al., 1994; Bialski 2024). Our contention is that the condition of 'good enough' is a reasonable expectation of digitally mediated planning, with a perfect, integrated system a mirage. We argue that this mirage is nonetheless worth pursuing as incremental improvements in the design, interoperability and operations of a data ecosystem create a number of effects, such as increased efficiency, better informed decisions, and new capacities and spillover effects (e.g., data repurposing).

Our analysis is based on fieldwork conducted in 2023, undertaken on behalf of the Local Government and Management Agency (LGMA), the representative body for Ireland's 31 local authorities (LAs). The research consisted of: identifying all the various data systems in operation across the planning sector in Ireland and their relationship to each other; identifying how the data systems are used in the various stages of the planning process (e.g., pre-planning, application, outline permission, full permission, change of use, retention, extension of duration, appeals, enforcement, commencements, completions) and for varying types of customers (e.g., residential, commercial, strategic infrastructure development, etc.); charting what data are generated and used within each stage and to plot the work/data flow and timescale for each stage; assessing the level of standardized processes and data fields across local authorities using the same and different data systems; and producing charts of the generation and flow of data within and across data systems. The fieldwork consisted of interviews with 29 public sector officials within the planning system at local, regional and national scale across 13 organisations (6 local authorities, 2 government departments, and 5 state agencies). Six of these interviews were of a walk-through nature, wherein the interviewees undertook their usual data work, demonstrating and explaining how they used a data system and its various functionality (five demos of planning application management systems (PAMS) (iPlan (1), APAS (3) and Odyssey (1)) used by LAs, and PleanIT, a case management system, used by An Board Pleanála (ABP), the national planning appeals board. In addition, a close reading of the user manuals for data systems was undertaken, and a full data audit performed for five systems to reconstruct their data dictionaries: iPlan, APAS and Odyssey, as well as the Building Control Management System (BCMS) and planning.localgov.ie (an online application system). In addition, we examined local authority planning websites and citizen consultation web forms, and documented the data variables available in a number of downstream open data sites and planning/housing data tracking tools (e.g., Dublin Housing Observatory, Housing Delivery Tracker, Housing for All dashboard). This suite of methods enabled an understanding of the data architecture of each system, as well as how they were interconnected to form a wider data ecosystem.

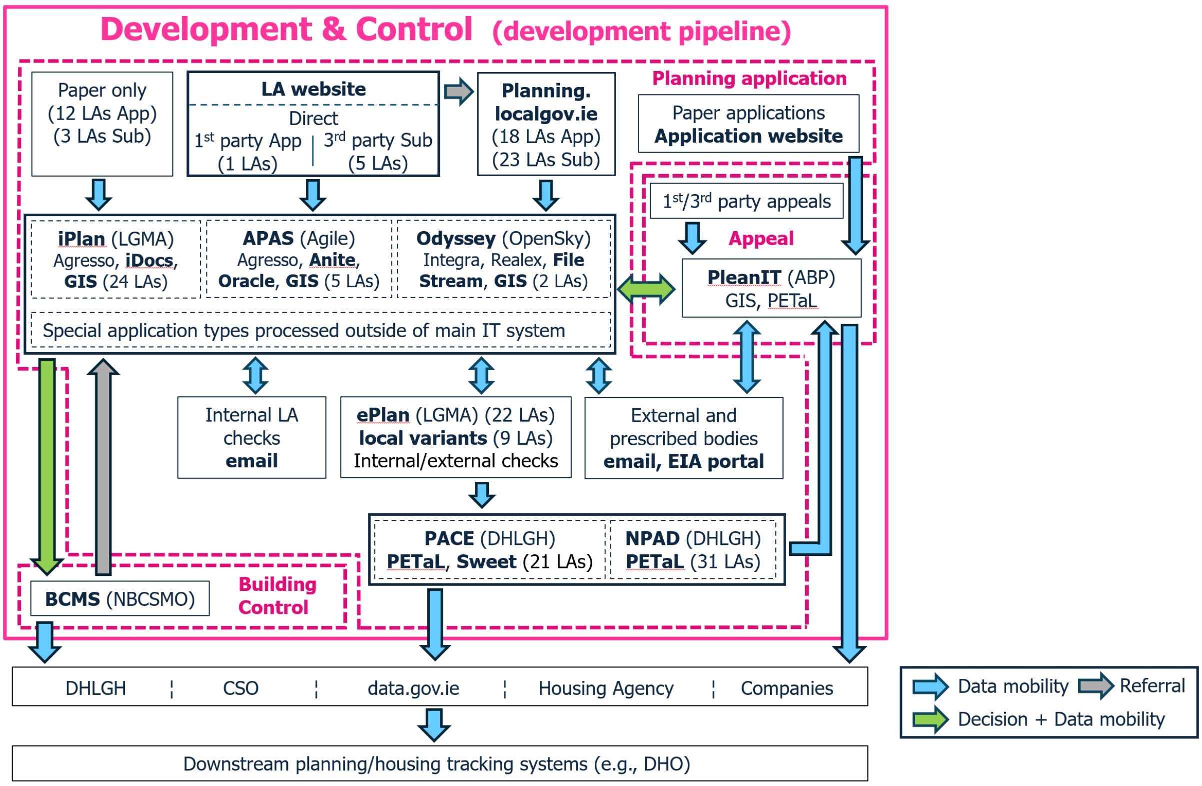
The Irish planning development and control data ecosystem

The Irish planning system is divided into three main blocks of work: strategic planning that focuses on plan making at local and regional scales and what will be developed in the coming years; development and control that assesses planning applications and appeals, and once permission is secured, monitoring building control compliance during construction; enforcement and compliance that involves checking whether a development complies with the conditions of planning permission and taking any necessary legal action. In all three blocks of planning work, key stakeholders in the system make extensive use of IT systems to undertake their planning function, and they generate, handle, process, analyse and share substantial volumes of data. In this paper, we focus on development and control given that it involves a number of interlinked data systems managed by a multi-tier set of public bodies that collectively form an extensive data ecosystem (see Figure 1).

This data ecosystem has been in place formally since the enactment of The Local Government (Planning and Development) Act (1963) that required LAs to assess and rule on planning applications. Prior to 2000, the planning application process was paper-based except for some use of email and the use of word processing and spreadsheets (Author et al., forthcoming). From 2000 onwards, the various tasks of development and control have been subject to digitalisation and datafication, with this unfolding in a relatively piecemeal manner. That is, the data ecosystem was not digitalised in a single transition, but rather various paper-based systems and processes were digitalised at different times and in different ways across actors.

The first element to be digitalised was the case management process, with the introduction of planning application management systems (PAMS) from 2000 onwards (at the time of fieldwork, these systems were APAS, iPlan and Odyssey used by 5, 24 and 2 LAs respectively). Internal and external requests for feedback on applications was sought through email, with responses logged. Significantly, up until 2022 planning applications could only be made using paper forms and documents posted in hardcopy, which were digitized and uploaded into a PAMS by planning staff on receipt. This remained the case for 12 LAs at the time of fieldwork. The introduction of ePlan systems in 2003 enabled citizens to access online selected components of planning applications in order to assess them, rather than having to visit planning offices to view them. Over time, PAMS were interlinked with financial systems to check payment of fees (e.g., Agresso, Integra), file management systems (e.g., iDocs, Oracle), and analysis systems (e.g., GIS) as part of the assessment and decision-making process.

Figure 1: The development and control data ecosystem in August 2023



Bolded text = Planning data system or digitally mediated means of capturing planning data. Anite, iDocs, File Stream, Oracle are document filing systems. GIS is used to view spatial data. Agresso, Integra, Realex are financial systems used for paying planning fees. PETaL is an extract, transform, load utility.

The next significant phase of digitalisation took place after the global financial crash of 2007-08 and subsequent austerity measures. The crash was particularly severe in Ireland. The deep contraction of the economy led to a €85 billion IMF-EU bailout in November 2010 (Kitchin et al., 2012). Given the massive reduction in government revenue, LAs' net budgeted expenditure fell from 5.029 billion in 2008 to a low of 3.911 billion in 2015, a fall of 22.2% (DEHLG 2008, DECLG 2015). LA staffing fell from 35,007 in 2008 to a low of 26,630 in 2015, a reduction of 8,377 (23.9%) (DPER 2024). Those still employed by LAs saw a sizable reduction in salary that undoubtedly had a demotivating effect on staff. After an initial period of trying to manage the challenging situation of shrinking budgets and staff numbers on the delivery of services, attention was re-focused on the digitalisation of the development and control data ecosystem from 2014 on. In part, digitalisation was seen as a means to increase efficiency and to be able to do more with less. It was also seen as a way of increasing transparency and providing greater oversight of the development and control pipeline.

In 2016, the BCMS was launched as a shared national service, administered by the new National Building Control and Market Surveillance Office (NBCMSO) hosted by Dublin City Council. The BCMS enabled all LAs to track compliance with the Building Control Act 1990 during the construction phase (e.g., monitoring commencement, notices, compliance and completion certificates, statutory documents). Also in 2016, the National Planning Application Database (NPAD) was introduced by the DHLGH (Department of Housing, Local Government and Heritage) to collate basic information on all planning applications nationwide from 2012 onwards into a single database viewable using an online interactive map. Unlike other systems, this was an entirely new element in data ecosystem that did not previously exist in a paper-based form. In 2017, ABP launched Plean-IT, a management and GIS system, to aid the processing and assessment of planning appeals. Due to legal requirements, at the time of fieldwork, all digital material held by An Bord Pleanála (ABP; the national appeals body), including all emails, are also held in paper form. The Planning Application Capture Environment (PACE) system, developed by Ordnance Survey Ireland (now Tailte Éireann) and DHLGH, was launched in 2021 and provides a standardised tool for digitally capturing the site boundaries of planning applications. In 2022, planning.localgov.ie, an online portal for the digital submission of planning applications and third-party public feedback about applications, was launched in 2022, developed by the LGMA.

Austerity measures continue to affect the local authority sector, and planning departments in particular. LA staffing in Q4 2023 was 31,792, still 9.2% below 2008 numbers. Since 2021, the DHLGH have agreed to an additional 117 posts in ABP to meet existing needs, increasing the workforce by 50 percent (DHLHG 2024). In 2022, the LGMA and DHLGH identified a need for 541 new posts in local authority planning departments, a 35% uplift on staffing numbers at the time, plus for the 10% of already established but vacant posts to be filled (DHLHG 2024). In 2024, the DHLGH concluded that "there are strong signals that the pool of professional planners in Ireland is undersized by a factor of 25-30%, before the needs for other professional and expert skills related to planning (environmental etc.) are factored in" (p. 11-12). The levels of understaffing undoubtedly play a role in the capacity of LAs to undergo the expected digital transformation, as well as some of the data frictions discussed below, particularly related to workflow, standardisation, and the capacity to handle ever more schemes, programs, directives and requests from central government.

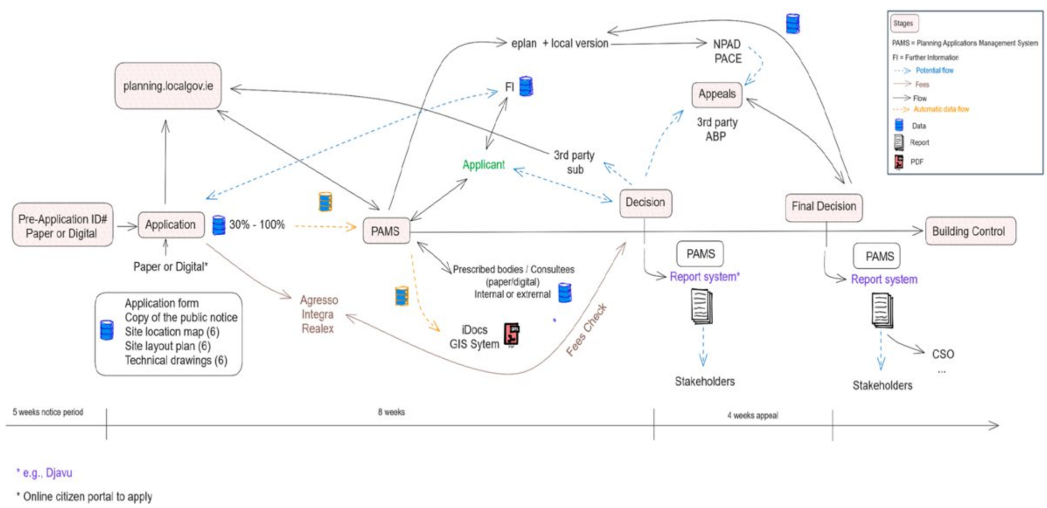
While the financial crash and austerity is an important contextualising factor shaping the development and operation of the data ecosystem, a number of the data frictions in the ecosystem exist otherwise, largely arising due to its jerry-rigged evolution and the commissioning and adoption of data systems by numerous actors that have varying aims and agendas. In the following section we discuss the various data frictions in the Irish planning development and control data ecosystem. We then consider the impacts of these data frictions and austerity measures on data practices and outcomes noting that, despite their effect, development and control exhibits the characteristics of being 'good enough' for making informed planning decisions, though this is less so with respect to providing data for policy making and producing official statistics. We finish by discussing three recent government initiatives that aim to reform the data ecosystem in order to address this data deficit.

Data frictions in the data ecosystem

The planning development and control data ecosystem detailed in Figure 1 is highly dependent on the sharing of data and decisions between data systems that enable a planning application to pass from submission to turn-key property. The diversity and complexity of the interactions between data systems is made clear when one charts them for just one part of the data ecosystem. For example, Figure 2 documents the interactions between actors and data systems for the planning application stage that manages and tracks the progress of an assessment along a prescribed timeline, including sourcing additional information and feedback, monitoring fee payment, tracking all communications with the applicant and third parties, and noting observations and decisions (we have produced such data mobility diagrams for the pre-planning, appeals and building control functions; see Author et al., forthcoming). In a seamless design, the seams (points of contact) between data systems enable the free movement of data, providing a clean, well-functioning data ecosystem (Vertesi 2014; Inman and Ribes 2018). Seamless design is aided by metadata, standards, protocols, documentation and communication that enable interoperability and shared understanding between actors. Data frictions, in contrast, are impediments or blockages that prevent, slow, or make difficult the sharing of data between data systems within and between organisations (Edwards, 2010; Bates 2018). Data frictions can produce inefficiencies in how processes work and place limits on the functionality and utility of data systems within a data ecosystem. They are not always negative in effect, however; for example, some data frictions exist for a good reason, such as protecting privacy or ensuring data security (Bates 2018).

Data frictions are not always technical in form (e.g., incompatible data formats, glitches), but can also be socio-material in nature, influenced by factors such as institutional capacity (e.g., skills, time, resources), organisational structures and cultures, workflows, habits, routines and affects (e.g., trust, enthusiasm, frustration) (Pink et al., 2018). Bates (2018) thus identifies three broad sets of factors that influence the nature and form of data frictions: data sharing infrastructure and management, regulatory frameworks, and socio-cultural factors. This socio-material framing acknowledges that data frictions "are constituted within complex and contested socio-material spaces in which various forces struggle to shape how data do and do not move between different actors…with different, and at times conflicting, interests" (Bates, 2018: 412-3). Data politics is thus active in producing and addressing data frictions, which are tackled through negotiation between stakeholders, systems of data governance, the adoption of data standards and data sharing agreements, as well as processes of data cleaning and wrangling. The aim of such tactics is not always to overcome data frictions through eradication, but rather to manage or circumvent them in order to enable a functional data ecosystem; to be 'good enough' rather than perfect.

Figure 2: The data mobilities of the planning application stage



In the rest of this section, we discuss Bates' three factors in relation to the planning development and control data ecosystem, examining technical infrastructure and management issues (specifically variations in data systems, workflows and glitches), regulatory frameworks (specifically standardisation issues), and socio-cultural factors (specifically data practices).

Technical infrastructure and management

The planning development and control data ecosystem is composed of a diverse set of data systems. In some parts of the ecosystem there is uniformity in system use. For example, ABP uses a single system, Plean-IT, for managing all appeal cases, regardless of origin LA; NPAD provides a single map interface to view all planning applications in the country; and BCMS is a single, shared service for tracking construction nationwide. However, in other parts of the data ecosystem a variety of systems are used, creating a fragmented technical infrastructure at the ecosystem scale. For example, with respect to PAMS, 24 LAs use iPlan (produced by the LGMA), 5 LAs use APAS (produced by Agile), and 2 LAs use Odyssey. In the case of the 5 LAs using APAS, each LA has locally configured the system to its own design and needs so that these five instances are quite different to each other operationally. What this means, in effect, is that there are 7 different PAMS being used across the 31 local authorities. In addition, the sharing of planning application information with the public also varies across LAs, with 22 LAs using ePlan (produced by the LGMA), the 4 Dublin LAs using planning.applications.ie, the 2 Galway LAs using geo.galwaycity.ie, and the remaining three using their own eplanning system.

The workflow for each PAMS is organized differently (see Table 1), though each is designed to achieve the same ends: a formal assessment of a planning application with respect to planning regulations and law undertaken within statutory deadlines. Even across LAs using the same data system (e.g., iPlan), different LAs might locally configure workflows, with modifications made to cater for localised ways of meeting local needs. In addition, while all PAMS can be used by LA staff to process and assess a standard planning application, such as permission to build a house or extension or a request for a material change of use (e.g., a shop to a home), not all types of planning applications can be managed in all PAMS. As detailed in Table 2, with respect to five LAs PAMS we examined, there were a number of special application types that were handled using other software such as Excel and GIS. At a local level, the variation in system design and operation have limited effects as the systems are directly interlinked and aligned to upstream data inputs (paper submissions or planning.localgov.ie) and downstream data output (eplanning system) and perform the tasks they are designed to achieve. However, the variation in data systems can cause data frictions at the data ecosystem scale by creating interoperability issues and data standardisation issues, particularly downstream from the PAMS.

Table 1: The workflows for iPlan, Odyssey and APAS

iPlan	Odyssey	APAS
Validate	New Application	Pre-Reg
Request Consultants reports	Admin Validation	Registration
Location details	Technical Validation	Validation
New development unit	Awaiting Validation	Allocation
Further information	Awaiting Recommendation	Referral
Submissions	Awaiting Liaison Officer	35 Days Assessment
Representation and Motions processing	Prepare MO	Additional Information Requested
Health & Safety Advice (HAS) Report	Prepare FI Request	Additional Information Received
Planning Decision	Awaiting Final Schedule	Clarification of AI Requested
Grant Application	Awaiting FI SignOff	Clarification of AI Received
Leave to appeal	Send FI Request	Significant AI Received
Appeals Processing	Awaiting Decision	Withdrawn Application
Appeal Financial Processing	Awaiting Managers Report	49 Day Planning Assessment
Extend application decision date	Send MO	Recommendation Review
Environmental Impact Assessment	Awaiting Decision Notification SignOff	Decision Review
Maintain Commencements	Send Notification of Decision	Issue Decision
Significant Case/Comments	Decision Made	Decision issued
	Awaiting Final Grant	Appeal lodged
	Awaiting FI Response	Planner RPT to ABP
	Awaiting Grant SignOff	Appeal decided
	Send Grant Documentation	Final Grant Review
	Application Invalid	Final Grant
	Application Closed	
	Application Withdrawn	
	Application Appealed	
	Prepare Invalid Letters	
	Awaiting Invalid Letter SignOff	
	Send Invalid Letters	
	SEP Assigned	
	SP Assigned	
	iPlan Pending	

Table 2: Special application types and whether handled by Planning Application Management Systems

Application Type	APAS (LA1)	APAS (LA2)	APAS (LA3)	Odyssey (LA4)	iPlan (LA5)
Declarations/referrals under Section 5 of the Planning Act 2000 (as amended)	Yes	Yes	Yes	Excel	SharePoint GIS
Section 35 (refusal of permission due to the track record of a developer)	Yes	Yes	Not stated	No	Yes
Section 42 (extensions of the duration of a planning permission)	Yes	Yes	Yes	Yes	Yes
Section 44 (revocation of pp)	Yes	Not stated	Not stated	No	Yes
Section 57 (declarations regarding protected structures)	Yes	Yes	CE order produced, unlikely to enter APAS	No	SharePoint GIS
Warning and enforcement notices, etc. under Part VIII	Yes	Yes	Not stated	No	i-enforce GIS
Development by state and local authorities (Part XI)	Yes	Yes	Yes	No	Yes + GIS
Section 247 (pre-application consultations)	Yes	Yes	Partially. Information is not made public	Yes	Yes + GIS (not public)
Part V	Yes	Yes	Divided	Housing Directorate	SharePoint Map

Note. LA1= Local Authority No.1

Glitches that can occur when feeding data into NPAD from eplanning systems is one such interoperability issue. NPAD is populated with data through the use of an automated ETL (extract, transform, load) process using PETaL (Planning ETL produced and managed by the DHLGH) that harvests up to 25 variables from LA eplanning systems. PETaL has to access the six kinds of eplanning systems, which are different in form, to extract data. The process is not straightforward and many planning applications displayed in NPAD do not have the full suite of associated variables. It can also be quite glitchy due to issues such as changes to firewall permissions, server configuration and data formats, software patches and upgrades, loss of permissions, and network issues. It is not uncommon for the data of one or more LA to be absent from NPAD while glitches are being addressed. This can take some time as many LA planning departments do not have the time and/or expertise to resolve such issues and it is left to the DHLGH to repair outages, which may involve site visits.

Standardisation

Accompanying variances in data systems is a lack of data standardisation across them. At a base level, the data dictionaries for each PAMS vary quite substantially in terms of how and what data are captured. For example, there are marked differences in the number of required fields that planners must enter into each system (see Table 3). In the case of the three data systems for which we constructed data dictionaries, iPlan had 65 compulsory fields, Odyssey 40, and APAS 21 (these required fields might need to be entered multiple times in the system). This variance is important as it is only possible to compare equivalent data for every planning application across the 21 required fields for APAS, although not all 21 of these variables are also captured in iPlan and Odyssey. They also might not be required fields in other instances of APAS. Similarly, the three PAMS had a variable number of optional fields: iPlan 265, Odyssey 409 and APAS 194. Not only do the required fields vary, but also how the data are captured. For example, iPlan uses relatively few check boxes (9) compared to Odyssey (48) and APAS (55), and Odyssey makes greater use of dropdown menus than iPlan or APAS. The use of open text fields, used reasonable extensively in iPlan and Odyssey, enables bespoke information to be recorded, but also means that the data recorded lack standardisation. Again, this reduces the ability to compare data directly that have been captured in different PAMS without a substantive amount of data cleaning and data wrangling, which might be possible for a handful of variables but very challenging for full data dictionaries.

Table 3: Required and optional fields and mode of data capture in PAMS

Number	Sub-criteria	iPlan	Odyssey	APAS
Required field	Total	296	63	26
	without duplicate	65	40	21
Optional field	Total	961	616	215
	without duplicate	265	409	194
Type of field	Total **Free text** (number or text)	585	304	76
	without duplicate	163	190	68
	Total **Check box**	9	48	55
	without duplicate	6	42	50
	Total **Dropdown menu**	135	206	38
	without duplicate	57	135	31

Another two examples of standardisation issues relate to the use of reference IDs across systems and the planning application form used when first seeking permission. As a proposed development moves along the planning and construction pipeline, it is managed by a different data system. To log and track progress each proposed development is assigned an ID number. In the Irish case, a unique ID is assigned for each stage and system: planning application (PAMS), appeals (Plean-IT) and construction (BCMS). The two IDS (or three if it passes through the appeals process) allocated to the same proposed development is not necessarily shared across data systems making it difficult to track a development from start to finish along the planning and construction pipeline.

In 2013, in an effort to standardise the application process, a standard planning application form was adopted by all 31 LAs. Since 2013, there has been a drift in the composition of the form, with LAs altering, adding and deleting fields to suit their own purpose and their PAMS requirements. This is illustrated through a snapshot of the data captured in the planning application forms of 12 LAs (see Table 4). While such variation does not affect the task of assessing planning applications, it would hinder any attempt to construct a nationwide comparable dataset for some or all data fields.

Where this issue of comparability comes into sharp relief is with respect to the compiling of official planning statistics by the Central Statistics Office (CSO), the release of open planning datasets by the DHLGH, and the handling FOI (Freedom Of Information requests) made by the media and public. The CSO produce official planning statistics using data drawn from LAs' PAMS and ABP's Plean-IT system. They send an Excel template to each LA and ABP seeking information on 14 variables related to planning applications for the previous month (for each application they request info such as reference number, permission type, address, decision, number of units, floor area). The issue for LAs is that the PAMS system does not possess a reporting function that can automatically produce such data and a planner needs to manually open and extract the required information for each planning application and enter it into the spreadsheet (this issue arises also for special data requests from DHLGH and FOI requests). The data received by the CSO is variable across LAs in two respects. First, the data recorded might have different formats. Second, a number of local authorities either ignore the CSO template and use their own, or they return the data in a different media (e.g., as a pdf, screenshots or printed paper tables). The result is a CSO staff member typically spends up to a month cleaning and wrangling the data to standardise them across LAs.

Table 4: Drift from a standardised planning application form

Step	Sub-variable	Carlow CC	Cavan CC	Clare CC	Cork City (	Cork CC	Dublin Cit	Dún Laogh	Fingal CC	Galway C(	Limerick C	South Dut	Wexford CC
Name of relevant planning authority		x		x	x	x			x		x	x	x
Select the relevant Planning Office where you are lodging your application	Option 1					x (County Hall, Cork)							
	Option 2					x (Norton House, Skibbereen, West Cork)							
Location of Development / Proposed Development details	Postal Address	x	x	x	x	x	x	x	x	x	x	x	x
	Townland	x	x	x	x	x		x	x	x	x	x	x
	Location (as may best identify the land or structure in question)	x		x	x	x		x	x	x	x	x	x
	Eircode		x										
	Ordnance Survey Map Ref No (and the Grid Reference where available)	x	x	x	x	x		x	x	x	x	x	x
	ITM co-ordinates		x										
Type of planning permission / Type of permission sought	Permission	x	x	x	x	x	x	x	x	x	x	x	x
	Permission for retention	x	x	x	x	x	x	x	x	x	x	x	x
	Outline Permission	x	x	x	x	x	x	x	x	x	x	x	x
	Permission consequent on Grant of Outline Permission	x	x	x	x	x	x	x	x	x	x	x	x
	Permission for Continuation of Use								x				
Where planning permission is consequent on grant of outline permission	Outline Permission Register Reference Number	x	x	x	x	x		x	x	x	x	x	x
	Date of Grant of Outline Permission	x	x	x	x	x		x	x	x	x	x	x
Applicant	Name(s)	x	x	x	x	x	x	x	x	x	x	x	x
	Address								x				
Where Applicant is a Company (registered under the Companies Acts)	Name(s) of company director(s)	x		x	x	x	x	x	x	x	x	x	x
	Registered Address (of company)	x		x	x		x	x	x	x	x	x	x
	Company Registration No.	x		x	x	x	x		x	x	x	x	x
	Telephone No.				x					x		x	
	Email Address (if any)				x					x		x	
	Fax No. (if any)				x							x	
Person/Agent acting on behalf of the Applicant (if any):	Name	x		x	x		x	x	x	x	x	x	x
	Address					x	x		x				
Person responsible for preparation of Drawings and Plans	Name	x	x	x	x	x		x	x	x	x	x	x
	Firm/Company	x		x	x	x		x	x		x		x
Description of Proposed Development	Brief description of nature and extent of development	x	x	x	x	x	x	x	x	x	x	x	x
Legal Interest of Applicant in the Land or Structure	Owner	x	x	x	x	x	x	x	x	x	x	x	x
	Occupier	x	x	x	x	x		x	x	x	x	x	x
	Other	x	x	x	x	x		x	x	x	x	x	x
	Prospective Purchaser												x
	Where legal interest is "other", please expand further on your interest in the land or structure				x	x		x	x	x	x	x	
	If you are not legal owner, please state the name and address of the ow	x		x	x	x	x	x	x	x		x	x
			x				x				x		x
											x		x
Site Area	ha	x		x	x	x		x	x	x	x	x	x
Where the application relates to a building or buildings:	Gross floor space of any existing building(s) in m2	x	x	x	x	x	x	x	x	x	x	x	x
	Gross floor space of proposed works in m2	x	x	x	x	x	x	x	x	x	x		x
	Gross floor space of work to be retained in m2 (if appropriate)	x	x	x	x	x	x	x	x	x	x	x	x
	In the case of existing residential extensions, exempt or not, please state floor area						x	x					
	Gross floor space of any demolition in m2 (if appropriate)	x	x	x	x	x	x		x	x	x	x	x
	Address						x						
	Floor						x						
	Total non residential floor area (m2)						x						
	Proposed plot ratio						x						
	Proposed site coverage						x						
If the proposal involves the provision of Child Care/Creche facilities please stat	No. child care spaces						x						
	Total floor area (m2)						x						
In the case of mixed development (e.g. residential, commercial, industrial, etc.	Class of development	x	x	x	x	x	x		x (Comme	x	x	x	x
	Gross floor area in m2	x	x	x	x	x	x	x	x	x (for Exis	x	x	x
	Gross floor space of industrial/commercial class of development (sqm)							x					
	Gross floor space of demolition of residential class of development							x					
	Other							x	x				
In the case of residential development please provide breakdown of residenti	Number of	x	x	x	x	x	x	x	x	x	x	x	x

Socio-cultural factors

We have already discussed some socio-cultural factors that produce and shape data frictions by placing limits on resources and capacities, such as austerity measures. Other socio-cultural factors might include a reluctance to share information due to concerns about confidentiality, security or data ownership, or to resist governance relations. In the Irish case, the latter is evident in an on-going tension between local and central government and the lack of devolved powers to local authorities who have reduced autonomy in planning work compared to other jurisdictions in Europe. As a result, LAs can express a 'defensive demarcation' of work and responsibilities (Hastings and Gannon, 2022), clinging to what autonomy they do possess to use the data systems of their choice, and to organise and undertake their workflows and data management as they see fit, so long as the planning service meets statutory requirements, and to resist change management and standardisation initiatives. At a more individual level, socio-cultural factors include the data practices of planners, which are shaped by wider austerity and governance issues.

Data practices consist of the behaviour and actions of individuals in relation to the data lifecycle and the use of data (Ruppert and Scheel 2021). Data practices are embodied, performed through bodily action, but also affective, inflected by mood, feelings, and precognitive thoughts (Pink et al., 2017). They are ways of doing that are framed within wider social norms, data regulations and governance arrangements, and which can become routine and habitual in their execution. For example, data entry and processing are often scripted, following a set pattern that is dictated by task requirements. As a consequence, the execution of data practices is seen as mundane and often overlooked or forgotten. Yet, data practices can have substantial effects on the operation of a data system, also being the means to manage, resist or simply 'get through' data work (Plantin, 2019; 2021). Indeed, in performing data work, planners may (whether more or less consciously) express different forms and degrees of subjection, adaption, resistance or ambivalence to certain technologies or the particular structures or programmes into which those technologies are enrolled (Kuppler and Fricke 2024).

Austerity measures have led to understaffing and some fatigue, frustration and demoralisation in LA planning departments in Ireland where the workload is increasing but the resources have declined and timelines to process each application remain static. This is translated into practices of refusal or prioritisation, such as focusing on absolutely necessary and urgent operational functions. One expression of such tactics is staff varying in how much data they record for each application case, with few entering all relevant data and some recording the minimal viable amount (e.g., required fields), leading to patchiness and inconsistency of data capture across applications. These pressures are also evident in the variable data practices with respect to preparing the submission of planning data to the CSO. Moreover, capacity and resource issues also mean it is more difficult to find the extra time to address system issues as staff are too busy firefighting to meet existing workload and deadlines. Likewise, it is more challenging to innovate and find alternative solutions. Socio-cultural factors then can be a significant factor maintaining data frictions.

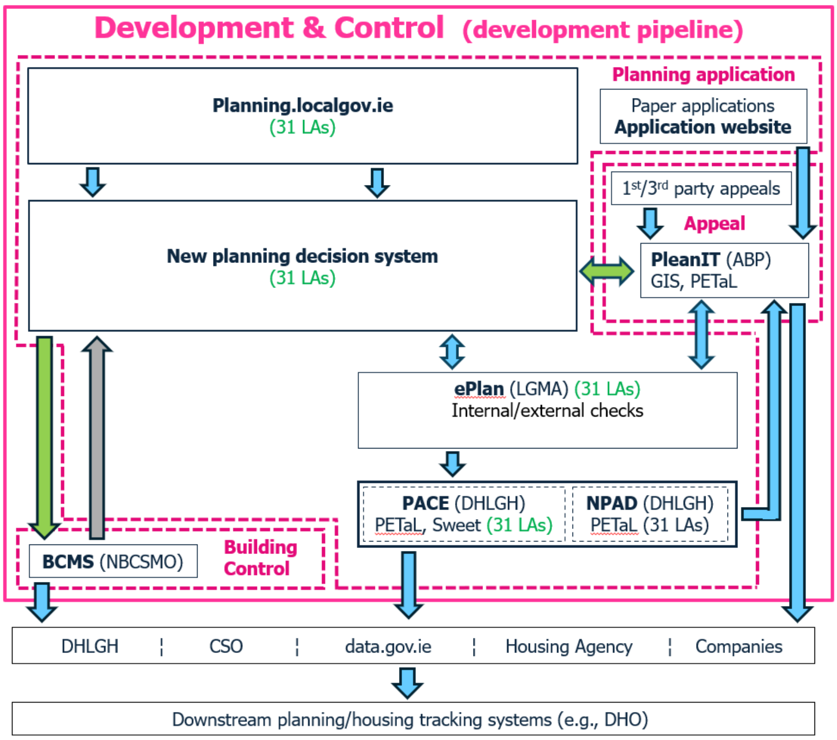
Good enough systems, data and planning outcomes?

While we have documented a number of technical, management, regulatory and socio-cultural data frictions operating within the Irish planning development and control data ecosystem, the system is nonetheless functional and does enable actors to fulfil their statutory role and deliver services. Planning applications are being processed, assessed and decisions made, appeals are being lodged, investigated and adjudicated. Construction and compliance with building control measures is being tracked. In this sense, at a base level, the data ecosystem does appear to be 'good enough' with respect to the technologies supporting planning work and the planning outcomes. As Bialski (2024) contends, the notion of 'good enough' does not deny that a situation might be better but acknowledges that the situation meets acceptable expectations, or in Collins et al.'s (1994) terms is 'reasonable', given contextual factors. In relation to our case, those factors include a gradually evolving process of digitalisation and datafication, involving multiple stakeholders with varying agendas, nearly all of which has taken place during austerity measures, with reduced resources, staffing and capacities for care and innovation. Indeed, one of the characteristics of 'good enough' identified by Bialski (2024) is an-going tension between care and compromise; of wanting to improve but settling for patching and a workable solution.

At higher level, however, the data ecosystem is less than optimal for performing tasks that extend beyond assessing and making decisions on applications and tracking building control compliance, such as repurposing the data held within the data systems for the compilation of official statistics and open datasets that would aid policy making. This should be of no surprise. The original design specifications of APAS, iPlan and Odyssey did not include the production of official statistics or to be able to easily answer FOI requests. The ability to extract data via an ETL process for inclusion in NPAD was not anticipated in the design of the ePlan system and other eplanning systems. The data ecosystem has never had a masterplan with a clearly defined set of technical specifications, roles and responsibilities, workflows, governance and management structure, and standards and protocols. Instead, the data ecosystem has been jerry-rigged together over a 25 year period, with different data systems commissioned and adopted at different points by numerous, independent actors that have varying aims, agendas and constraints, and who configured the systems to suit their specific needs. It is little wonder then that multiple data frictions exist in the data ecosystem.

What is evident is a tension between data systems being 'good enough' to perform the original intent and providing 'good enough' outcomes, and the data ecosystem as a whole being sub-optimal to perform the new tasks demanded of it. This is a situation well recognised by managers and policy makers at the national level in the LGMA, the DHLGH, and the Department of the Taoiseach (Prime Minister's Office). There are three initiatives underway at the time of writing aimed at significantly reducing data frictions and to expand the expected functionality of systems. First, an inter-departmental group led by the Department of the Taoiseach has been scoping out a major overhaul of the BCMS to address its two primary weaknesses: the lack of shared ID reference tying the BCMS to PAMS; and the lack of standardisation and data quality due to open text fields and self-reporting. The proposed solution is a shared ID reference number which when entered into the BCMS on building commencement will pre-populate fields with relevant information from the associated PAMS (removing duplication and mismatched data) and replacing open text fields with drop-down menus with fixed categories for selection. Second, the LGMA and DHLGH have been producing a plan to create a new, standardised national development and control system. While the detail of this plan is not yet published, if it were to progress to implementation it would see all 31 LAs using the same set of IT systems, configured in the same way, with standardised data ontologies, workflows, and no option to individually tweak, and from which it will be much easier to run bespoke reports and extract data (see Figure 3). Third, there is a commitment to address the understaffing issue by filling vacant posts and increasing the number of planners by 350-400 in the next 3-5 years and increasing the number of planning graduates to a minimum of 120 per year (DHLHG 2024). In other words, these three initiatives aim to ensure that the data ecosystem as a whole is 'good enough' to meet present expectations.

Figure 3: The likely proposed development and control ecosystem for 2027 if approved and adopted



Conclusion

The digital turn in planning means that planning work is predominately produced through and by digital technologies, from the mundane use of operating systems and file storage, word processing, spreadsheets, email, and video calls, to the everyday use of web portals and management systems, to the employment of more specialised software such as CAD, GIS, planning support systems, BIM, 3D spatial media, and participatory consultation platforms. Mass digitisation and datafication has meant the transition from paper to digital systems is almost complete in the Global North, but as we have illustrated it is still under way and the digital landscape being produced is far from seamless in nature. In this paper, we have examined the digital mediation of planning through an in-depth case study of the development and control functions in Ireland, its associated data ecosystem and data frictions. The principal contributions of our analysis are three-fold.

First, we have highlighted that planning work is rarely reliant on single technologies or systems, but rather employs different forms of IT to perform the plethora of tasks required to fulfil planning functions. Receiving and recording a planning application might involve digitising paper documents, lodging the digital files in a document filing system, viewing them in a pdf or image software, entering and processing data in a PAMS, acknowledging receipt or requesting further information via email. As the application passes through the assessment process a range of other digitally mediated practices are performed using multiple software packages, systems and web services (using laptops, smartphones, servers, etc.). Very few of the tasks involved are purely analogue in nature. Analysis of the digital mediation of planning has, to date, largely focused on the adoption and effects of specific technologies on planning practice (such as GIS, planning support systems, digital twins, AI), but has focused less on the ways in which constellations of digital technologies are assembled to undertake suites of related tasks. We think that more attention needs to be focused on understanding the assembly and effects of these constellations on the organisation and operations of planning.

Second, we have detailed what we believe to be the first in-depth mapping of a planning data ecosystem and the set of data systems and digitally mediated practices that are used to perform a complex set of inter-related planning tasks, and identified a number of technical, regulatory and socio-cultural data frictions that limit and hinder how a data ecosystem functions. As well as consisting of a number of data systems, the data ecosystem spans organisations and scales: PAMS and eplanning are organised and delivered at the local government scale, BCMS is a shared national service delivered by one LA, planning.localgov.ie is a national portal for the submission of applications to specific LAs run by a state agency, Plean-IT is administered by a national appeals body, and NPAD is run by a national government department with its dataset sourced from LAs. The development and control data ecosystem in Ireland is undoubtedly a complex constellation of data systems and governance arrangements that collectively enable a planning application to progress from submission to a turn-key property. We believe it would be instructive to chart other planning data ecosystems (e.g., relating to strategic planning, consultative/participatory planning, etc.) and identify their features and characteristics, particularly of those that are thought to work well that might inform best practice.

Third, we have made a case that individual data systems and data ecosystems only ever aspire to be perfect and are usually ‘good enough’ in nature. They are functional and perform necessary tasks, but not always in the most effective or efficient way. Given the complexity and contested politics of planning, with its various stakeholders, laws, regulations, austerity measures, and piecemeal development ‘good enough’ is an achievement. Planning data ecosystems have rarely been produced in a single transition, following a well-crafted masterplan. Rather, different digital systems are introduced at different times, for varying purposes, with different standards and governance arrangements, and are jerry-rigged into place with respect to each other. Consequently, planning data ecosystems, especially those spanning organisations and scales (local to national), are fractured in their makeup and possess data frictions that are technical, regulatory and socio-cultural in nature. Nonetheless they are functional. That said, while each data system employed within a data ecosystem might be ‘good enough’ in performing its original sets of tasks (in the case of development and control: assessing and awarding planning permission; adjudicating on appeals; and tracking building control), the data ecosystem as a whole can be sub-optimal in its organisation and operation and might struggle to effectively deliver with respect to new demands. In our case, the state has recognised that a review and reorganisation is necessary in order to render the data ecosystem as a whole ‘good enough’ for current operational and policy expectations. We think it would be productive to consider further what constitutes ‘good enough’ systems, data and practices in planning, what are the acceptable bounds of ‘good enough’, and are these ‘good enough’ for all constituencies.

Acknowledgements

The research reported in this paper was funded by the European Research Council (no. 101052998) and the Local Government Management Agency. The research received ethical approval from Maynooth University Research Ethics Committee and the Ethics Review of the European Research Council. During the research regular meetings were held with the LGMA Research Advisory Group and we are thankful to Dr. Bernie O’Donoghue Hynes, Tom Elders, Tara Kerrins, and Holly Morrin for facilitating access and providing direction and constructive advice and feedback. We are grateful to all the interviewees for spending time to explain and demonstrate their work and the systems they use. Thanks to Mairéad Phelan and Ronan Glynn of the National Building Control and Market Surveillance Office for insights into BCMS.

References

Ash, J., Kitchin, R. and Leszczynski, A. 2018. “Digital turn, digital geographies?” *Progress in Human Geography* 42(1): 25-43.

Batty, M. 2021. “The digital transformation of planning.” *Environment and Planning B: Urban Analytics and City Science* 48(4), 593–597.

Bates, J. 2018. “The politics of data friction”, *Journal of Documentation* 74: 412–429.

Bialski, P. 2024. *Middle Tech: Software Work and the Culture of Good Enough*. Princeton, NJ: Princeton University Press.

Boland, P., Durrant, A., McHenry, J., McKay, S., & Wilson, A. 2022. “A ‘planning revolution’or an ‘attack on planning’in England: Digitization, digitalization, and democratization.” *International Planning Studies*, 27(2): 155–172.

Collins, W.R., Miller, K.W., Spielman, B.J. and Wherry, P. 1994. “How good is good enough? An ethical analysis of software construction and use.” *Communications of the ACM* 37(1): 81–91.

Daniel, C. and Pettit, C. 2021. “Digital disruption and planning – use of data and digital technology by professional planners, and perceptions of change to planning work.” *Australian Planner* 57(1): 50-64.

Daniel, C., Wentz, E., Hurtado, P., Yang, W. and Pettit, C. 2023. “Digital technology use and future expectations: A multinational survey of professional planners. *Journal of the American Planning Association*, 1-16.

DECLG. 2015. *Local Authority Budgets 2015*. Dublin: Department of Environment, Community and Local Government. Gov.ie, https://assets.gov.ie/111386/41aa9b02-446d-4188-8e5e-d86ea87faca0.pdf

DEHLG. 2008. *Local Authority Budgets 2008*. Dublin: Department of Environment, Heritage and Local Government. Gov.ie, https://assets.gov.ie/111397/f4ede5e2-1f1c-4491-b3f6-300b49506d8c.pdf

DHLGH. 2024. *Ministerial Action Plan on Planning Resources, October 2024*. Dublin: Department of Housing, Local Government and Heritage.

https://www.gov.ie/en/publication/51194-ministerial-action-plan-on-planning-resources-october-2024/

DPER. 2024. *Databank*. Department of Public Expenditure & Reform, https://databank.per.gov.ie/Public_Service_Numbers.aspx?rep=SectorTrend

Dunleavy, P., Margetts, H., Bastow, S. and Tinkler, J. 2006. *Digital Era Governance: IT corporations, the State, and E-Government*. Oxford: Oxford University Press.

Edwards, P. 2010. *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming*. Cambridge, MA MIT Press.

Falco, E. and Kleinhans, R. 2018. "Digital participatory platforms for co-production in urban development: a systematic review." *International Journal of E-Planning Research* 7, https://doi.org/10.4018/IJEPR.2018070105.

Falk, S., Rommele, A. and Silverman, M. (eds) *Digital Government*. Berlin: Springer.

Gabrys, J., Pritchard, H., and Barratt, B. 2016. "Just good enough data: Figuring data citizenships through air pollution sensing and data stories." *Big Data & Society* 3(2): 1–14.

Graham, S. and Marvin, S. 2001. *Splintering Urbanism*. London: Routledge.

Hastings, A. and Gannon, M. 2022. "Absorbing the shock of austerity: the experience of local government workers on the front line." *Local Government Studies* 48(5): 887-906.

Inman, S. and Ribes, D. 2018. "Data streams, data seams: Toward a seamful representation of data interoperability." Paper presented at Design Research Society, University of Limerick, 25–28 September, https://dl.designresearchsociety.org/drs-conference-papers/drs2018/researchpapers/16

Kim, T.J., Wiggins, L.L. and Wright, J.R. 1990. *Expert Systems: Applications to Urban Planning*. Berlin: Springer-Verlag.

Kitchin, R. and Moore-Cherry, N. 2021. "Fragmented governance, the urban data ecosystem and smart cities: the case of Metropolitan Boston." *Regional Studies* 55(12): 1913-1923.

Kitchin, R., O'Callaghan, C., Boyle, M., Gleeson J. and Keaveney, K. 2012. "Placing neoliberalism: The rise and fall of Ireland's Celtic Tiger." *Environment and Planning A* 44(6): 1302-1326.

Kitchin, R., Young, G. and Dawkins, O. 2021. "Planning and 3D spatial media: progress, prospects, and the knowledge and experiences of local government planners in Ireland." *Planning Theory and Practice* 22(3): 349-367.

Klosterman, R.E. 2012. "E-Planning: Retrospect and prospect." *International Journal of E-Planning Research* 1(1), 1–4.

Kuppler, A. and Fricke, C. 2024. "Between innovative ambitions and erratic everyday practices: urban planners' ambivalences towards digital transformation." *Town Planning Review* https://doi.org/10.3828/tpr.2024.41

Lee, D.B. 1973. "Requiem for large-scale models." *Journal of the American Planning Association*, 39(3): 163–78.

Nedovic-Budic, Z. 1999. "Evaluating the effects of GIS technology: Review of methods." *Journal of Planning Literature* 13(3), 284–295.

Oliveira, M.L.S. and Loscio, B.F. 2018. What is a data ecosystem? In *Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age*, edited by A. Zuiderwijk and C.C. Hinnant (eds) ACM, New York. Article 74.

Pink, S., Sumartojo, S., Lupton, D. and Heyes La Bond, C. 2017. "Mundane data: The routines, contingencies and accomplishments of digital living." *Big Data & Society*, 4(1): 1-12.

Pink, S., Lanzeni, D. and Horst, H. 2018. "Data anxieties: Finding trust in everyday digital mess." *Big Data & Society* 5(1): 1–14.

Plantin, J-C. 2019. "Data cleaners for pristine datasets: Visibility and invisibility of data processors in social science." *Science, Technology & Human Values* 44(1): 52-73.

Plantin, J-C. 2021. "The data archive as factory: Alienation and resistance of data processors." *Big Data and Society* 8(1): 1-12.

Potts, R. and Webb, B. 2023. "Digital planning practices: benchmarking planners' use of information and communication technologies (ICTs)." *Planning Practice and Research*, online first, https://doi.org/10.1080/02697459.2023.2216492.

Ruppert, E. and Scheel, S. 2021. "Data practices". In *Data Practices: Making Up a European People* edited by E. Ruppert and S. Scheel, 29–48. London: Goldsmiths Press.

Sanchez, T.W., Shumway, H., Gordner, T. and Lim, T. 2022. "The prospects of artificial intelligence in urban planning." *International Journal of Urban Sciences* 27(2), 179–194.

Silva, C.N. 2010. "The e-planning paradigm–Theory, methods and tools: An overview." In *Handbook of Research on E-planning: ICTs for Urban Development and Monitoring*, edited by Silva, C.N, 1-14. Hershey, PA: IGI Global.

van Schalkwyk, F., Willmers, M. and McNaughton, M. 2016. "Viscous open data: The roles of intermediaries in an open data ecosystem." *Information Technology for Development*, 22(S1): 68–83.

Vertesi, J. 2014. "Seamful spaces: Heterogeneous infrastructures in interaction." *Science, Technology, & Human Values*, 39(2): 264–84.