DATA USE PROMISES AND PRACTICES:
Exploring Scottish Local Government Data Work Culture

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Abstract

Data has always been used in the work of local government. Now, changes in the scale of (digital) data and technological affordances to derive insights from that data are changing the culture of data work. The data work changes are occurring in the context of pressure to 'transform' and be a better government. This study explores how local government public service delivery staff across six local authorities in Scotland experience these changes in calls to be data-driven and smart for reasons of 'digital transformation'. Empirical data was collected via 55 personal-professional accounts of working with data through digitalisation and in pursuit of public service delivery transformation. This new data supported a predominately qualitative analysis, complimented by a short survey, and extensive policy review.

The discipline of e-Government has produced academic outputs about information and technology usage in governmental settings since the Internet mainstreamed in the 1990s. This study focuses on the underattended-to concept of data itself within e-Government research, utilising a relational ontology to account for intricacies in the practice of data use at work at the local government level. A novel conceptual lens of 'data use' is developed and applied, to enable classification of varied types of work using data alternatively for reporting or intelligence purposes in local government operational activities. The framework categorises data use as preparatory and substantive, differentiating the quality and value of data use in service of the two main functions: reporting and intelligence. Through the use classification and epistemic expectations of data, where the broad data "promise" meets in-work practices, the thesis addresses the central aim to identify what characterises local government data work culture in Scotland, UK. This culture is found to be uneven, imbued with opportunism, inconsistency and paradox.

By focusing on the experiences of distinct data users, as operational public service professionals, the research draws attention towards requisite interpretive effort of public service specialists during their work in public services provision, highlighting ways that such effort is under-supported and misunderstood. Reporting remains the predominate purpose of data use in Scottish local government. In seeking public service delivery transformation through data, intelligence applications are necessary, with interpretation occurring through the values and purposes of varied types of data workers acting in service to the public. From exploration of data workers' practices, the study identifies six

expectations of data, which constitute the overarching data use "promise", and explores the extent to which this is achieved. Additionally, four fundamental factors are identified that alternatively support or limit data use for public service delivery transformation. It is concluded that there is over-attendance to data and technology in data use practice, at the expense of human elements. More support is required for local government workers to advance data work for public service related intelligence, building on operational workers' expertise by affording the time needed for intelligence work, alongside nurturing professional curiosity and enabling creativity.

Keywords: Data use; Data work; Data culture; local government; digital transformation; public services; Scotland

Acknowledgements

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Abbreviations

Abbreviation	Definition
AI	Artificial Intelligence
API	Application Programming Interface (a way for two or more computer programs or components to communicate with each other).
BI	Business Intelligence
BAU	Business As Usual
CASS	Complex Adaptive Sociomaterial Systems
CDS	Critical Data Studies
CEC	City of Edinburgh Council
Cosla	Convention of Scottish Local Authorities
DCC	Dundee City Council
DEG	Digital Era Governance
DDI	Data Driven Innovation
DTF	Digital Transformation Framework
DDaT	Digital Data and Technology
DIKW	Data-Information-Knowledge-Wisdom
e	Electronic
ERDF	European Regional Development Fund
FCG	Future City Glasgow
GCC	Glasgow City Council
GDPR	General Data Protection Regulation
GDS	Government Digital Service
gov	Signifying either / both "government" and "governance"
IS	Information Systems
ICT	Information Communication Technology
IT	Information Technology
IoT	Internet of Things
KPI	Key Performance Indicator
MDM	Master Data Management
ML	Machine Learning
NLC	North Lanarkshire Council
NPM	New Public Management
NHS	National Health Service
OECD	Organisation for Economic Co-operation and Development

ODI	Open Data Institute
PA	Public Administration
PKC	Perth and Kinross Council
PSO	Public Sector Organisation
PSD	Public Service Delivery
PSDT	Public Service Delivery Transformation
RTA	Reflexive Thematic Analysis
RQ	Research Question
SC	Stirling Council
SCA	Scottish Cities Alliance
SIT	Strategic Intelligence and Technology (team, Glasgow City Council)
SLB	Street Level Bureaucrat
STS	Science and Technology Studies
TRE	Trusted Research Environment
TK	Tacit Knowledge
UBDC	Urban Big Data Centre (at University of Glasgow)
UK	United Kingdom
UKRI	United Kingdom Research Institute
UNU-EGOV	United Nations University Operating Unit on Policy-Driven Electronic Governance

Author's Declaration

I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

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Signature:

Chapter 1: Data Work in Local Government

There is wide recognition of data's potential to catalyse a myriad of societal improvements. Information is vital for the successful functioning of society; data becomes information when put in context and used. Public sector organisations, including government, hold vast amounts of (often digital) data and information. The immense extent of data held by government is due to their privileged position as a public body charged with holding information and delivering services. There are various statutory mandates, across thematic public service areas, to obtain data that satisfies reporting requirements, accounting for governmental work in public service, alongside usage of data to inform policy and operational decisions undertaken for the public good. Data is also increasingly created through digitalisation as 'smart data' (UKRI, no date), that crosses over with administrative and traditional (research) data sources.

The past decade has seen a proliferation of data research, particularly in relation to digital transformation, across academic disciplines, covering topics like 'Big Data', 'Smart Cities' and most recently 'Artificial Intelligence' and 'Blockchain'. The centrality of the data topic (Lycett, 2013; Van Dijck, 2014) has also resulted in a wholly new area of scholarship: 'Critical Data Studies' (boyd and Crawford, 2012; Kitchin and Lauriault, 2014).

An older, foundational literature when exploring technology and data topics related to government work is 'e-Government'. A distinct academic field that arose following the mainstreaming of the internet in the 1990s, e-Government subjects remain of significance, often explored now as 'Digital Government Transformation' research (Liva et al., 2020; Fountain, 2004, 2019). In grey literature, calls to do more with data are abundant across numerous international, national, and local policy documents.

This PhD study looks at Scotland, within the United Kingdom (UK). To provide an example from Scotland's largest city, the Digital Glasgow Strategy[1] was published in 2017, covering 2018–2023 as a five-year plan,[2] with a '2020 Review'[3] and a new strategy expected imminently.[4] This first whole-of-city digital overview plan is a statement of how

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[1] GCC landing page Digital Glasgow: https://www.glasgow.gov.uk/index.aspx?articleid=17711
[2] 2018-2023 Plan https://www.glasgow.gov.uk/CHttpHandler.ashx?id=43572&p=0 (updated see footnote 4)
[3] 2020 review: https://www.glasgow.gov.uk/CHttpHandler.ashx?id=52977&p=0
[4] Published in May 2024, at time of thesis finalisation: https://www.glasgow.gov.uk/digital

the city will achieve digital transformation, referring to the city being *"fuelled by data"* (2017:4), building on early data and technology investments. Related to the aim of making Glasgow an innovative smart city, using innovation to transform public services, the strategy declares a key lever that all actors *"make better use of data"* (page 7), with *"data analytics [that] help people live independent lives … creating a living lab environment"* (ibid) to *"use data to transform public services"* (page 8).

This study does not challenge the necessity of strong data foundations where, as stated above, data forms a core basis for good information needed to determine courses of action across whichever topics. Rather, starting from the broad promise of data, dispersed across many sectors and settings, the study sets out to explore how that promise holds up in practice at the local government level. This is done is through an examination of the ways data is sought to be applied to transform public service delivery in work practices, with the local level of government chosen because many public services are delivered locally.

1.1 Problem Statement

1.1.1 Data in Local Government

Technological progress from enhanced computation has advanced data collection, storage, and analysis, resulting in multiple, potential, novel data applications. As an example, the miniaturisation of computing has led to an expanded deployment of sensor technology, with generated data transmitted constantly. New forms and sources of data are changing the way that data work occurs, both in terms of expectations from data and the realities of in-work data practices.

The scale of data able to be generated means that analytics[5] can theoretically afford new insights, where data translates into more information able to be applied in decision-making for public service delivery. Abundant claims about the benefits and opportunities within the public sector stemming from Information Communication Technologies (ICTs) generating data, data analytics tools, and increased data-led innovation heap pressure on local governments to 'grasp the nettle', stepping up to the plate to achieve new possibilities of the digital age. Where other sectors appear to leverage their data for the better, there is widespread expectancy that the public sector should do the same.

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[5] Analytical effort of whatever form, as digital or analogue – but with 'Big Data' computational aids for analysis are necessary.

Above all, local governments' main role is to serve the public to meet their core needs across a wide range of service areas. Drawing on available data and information during work processes to serve the public is not new: for instance, collecting and using data or information occurred in the UK Census, which is over 200 years old. Globally, the UK has a long history of data work within and across government. The UK's data stores are widely recognised within and beyond the British Isles as a huge trove, particularly National Health Service (NHS) data with historical patient record-keeping, and service to the totality of the UK population for over 70 years. The scale of data possible in the digital age has vastly increased and is ever-increasing. These changes are altering government data work culture. Given that local government constitutes the closest layer of government to governed, and the wide range of services provided at this level, the thesis explores Scottish local government data work culture.

1.1.2 Limitless Resource?

Data is increasingly viewed as a resource (Jones and Tonetti, 2020; Sadowski, 2019). There are benefits from gaining greater value from the myriad of data – and information – assets held by government. However, viewing data in a detached manner as a material artefact awaiting leverage and value extraction is not a straight-forward or uncomplicated stance. As argued and shown throughout this thesis, data's value derives from acts of use. Through use by data workers, who are further defined below in section 1.2.2, also with the full list of job profiles available in Appendix A, the socio-material form of data is revealed as a dynamic occurrence of in-work, task-based actions for purposes that set boundaries of appropriate use.[6] The concept of 'socio-material' is further considered in Chapter Three; for now, the term refers to the combination of the social actors (socio-) acting in relation to data as an artefact (material), where the 'material' entity is also created by social actors who determine specific data attributes and admissibility criteria for usage.

Whilst much is espoused about the endless variety, scale and possibilities of data, particularly in the digital age and with scope for synthetic data-making, the barrier to usefulness lies with the interpretative communities needed to obtain expected insights and make these useful in practical terms. Insights need to be made, as does data: neither are simply out there to be reached for, to be obtained without intention. Datasets may be more

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[6] 'Appropriate use' covers ethical and moral elements, legal requirements (like GDPR), methodological considerations and more prosaic technical aspects.

cheaply and speedily created due to technological advances, mined for patterns that suggest significance in an informational sense (in data's transference to information). However, applying any potential insights requires action to associate findings to contexts in which they are relevant. For government work providing for the public via core services, any interesting and potentially significant results from data require application in meeting public needs. As explored in Chapter Two, the public's needs through services provision does not well fit with the perspective that takes a 'products' view of services. Government is not a simple supply and demand entity: in a democracy such as the UK, governments embody and enact ideological values, with government acts undertaken politically.

Ultimately, data is a partial resource. The data itself is one part. The processes of data's transference towards knowledge for supporting better services provision is where value arises. Accordingly, the study examines the relationship data workers have to data, alongside the goals from data's use in public services provision. With pressures on local government (outlined in section 1.5.3 below), finding ways to do better and to fulfil obligations to the public is a major target. Therein, it is understandable to see frequent reference to 'transformation' given the term's association with change, and the objective of progression from problems and shortcomings in meeting the public's needs to accomplish improvement. The featuring of 'data' in this effort is evident – especially in 'digital transformation' – and the study sets out to better understand the phenomenon.

1.1.3 Opportunities

Benefits from increasing data levels and the associated applications cover a range of types. Much is said of economic opportunities, at different scales. There are apparent cost-savings to be made from better targeted public service delivery, a claim motivated by council budget pressures and long-running austerity policies. There is also expectancy of catalysing economic activity to strengthen the UK economy, as seen in the National Data Strategy (UK Government, 2020), seeking to build the UK into a world-leading data economy. Other benefits are political, such as claims about better policy implementation to achieve – and evidence – intended outcomes. Additional political benefits claimed are increased levels of public trust, since trustworthiness comes from the public sector better meeting needs via public service provision, and from increased awareness of how government resources (financial or otherwise) are used.

Taking a commoditised view of data, alongside the occurrence of great gains from data use in other sectors, highlights possible missed opportunities for the public sector. The rise and success of major tech companies, such as Meta/Facebook, Google, and Amazon, over the past 20 years, all of whom have built their competitive and economic advantage from leverage of (their)[7] data, arguably further pressurises government to better use data in work to meet public needs.

The thesis' focus on data usage in delivery of the public service, as opposed to other parts of public service provision like policy development, demarcates the research. To explore internal data work culture, attention is given to the central administrative core as a function and location for supporting the final delivery of public services as outputs (Bannister, 2015). In looking at delivery, the activity of staff in local authorities undertaking to provide services to the public is the primary topic, specifically giving attention to the manner and means of work processes and task structures relating to services being provided. This means that different types of public services can be included in the analysis because the key part for the purposes of thesis is exploring data work that purports to support delivery, by staff of those varied public services. Operating teams within a local authority are the subject matter analysed, as those who execute their functions directly.

This thesis explores how data work occurs within local government, to account for the culture therein, and to identify any drivers (supports) or barriers (limits) for data application that may enable public service delivery improvement, or in other words, data use for transformation.

1.2 Thesis Aim

The digitalisation agenda seeks to leverage opportunities and benefits from digitisation, meaning, via the consultancy Gartner, conversion of information to a digital format, to improve business processes.[8] Focusing on local authority staff and public service delivery, the thesis explores the concept of transformative data usage in the 'business' of

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[7] That the data does belong, in a traditional ownership sense, to companies is not uncontested; within a fully new digital age terrain (data superabundance and its usage), a great deal of aspects are in flux without clear ethical, moral, or legal definitions or positions. Scope to 'opt-out' is often a factor, which interestingly is not an option in public interface with government.

[8] Business world perspective on the distinction between digitisation, digitalisation and digital transformation https://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization-and-digital-transformation-confuse-them-at-your-peril/

government work. This is defined as the application of data in a manner that is radically different to how it has been applied previously, such as in *"new, more dynamic ways"* (Glasgow City Council Digital Glasgow Strategy, 2017).

Much attention has been paid during the last decade to the opportunities arising from data. This is evident in digital transformation terminology, complemented by and contemporaneous to the 'open data' agenda, both clear policy goals in Scotland, the UK, and globally. Pursuit of greater openness for data seeks to extend data availability, sharing data for additional, onward uses. Shifting focus slightly from data availability to the nuances of data use/s, this study examines the ways recent policy goals pertaining to an expanded and expanding presence of data, plus the perceived opportunities, are experienced by operational public services actors within local government. The study is presented in this thesis as an exploration of data work culture. Assessing data culture as an internal phenomenon requires considering experiences of and results from data work, covering worker skills and capability, alongside making, sharing, and application of data intra-organisationally.

1.2.1 Aim and Objectives

Aim

The main thesis aim is to identify what characterises Scottish local government data culture, linked to the primary research question. Additionally, the study investigates data work by identifying supportive or limiting elements pertaining to data use for public service delivery transformation, corresponding to two research sub-questions. To address the broad aim, the thesis explores data's role in working practices for operational public service delivery staff in Scottish local government. Through analysis of these practices, the promise of data is specified and the extent to which expectancies are achieved is laid out. Through an exploration of how calls for local government to become 'data-driven' are experienced during in-work data use for public service delivery transformation, the thesis determines what characterises data work culture. The two units of analysis are 'data use' and 'data workers'. The exploration is undertaken across: (i) individual professionals; (ii) public service teams; and (iii) organisational levels. Whilst public service delivery provides parameters for the research, the study was not designed to comment on whether transformation has occurred; instead, the analysis addresses staff's practice-based experiences in data work within their employer organisations. The term 'actionability' as

transformational-potential is utilised. The inclusion of many different services in the research allows for a wide view of local government data work and its characteristics but negates the possibility to make an evaluation of specific services. This approach means the research is wide in its view of data work as a phenomenon, then narrow and deep in conceptualising 'data' through the lens of use/s in the local government setting.

Objectives

To answer the questions outlined at section 1.3, six objectives were set:

1. Examine how data work occurs, by determining the varied types of data use

2. Analyse the ways public service delivery work purpose/s influence the activities of data use within that work (looking at motivation and action, particularly in acts of public service)

3. Identify the factors that support or alternatively limit data use (sub-RQ 1)

4. Analyse the ways that different identified data uses link to public service delivery transformation (sub-RQ 2)

5. Investigate the role of data workers as they undertake (varied) data use/s

6. Explore commonalities in data work, through data use, to show key characteristics of local government data work culture

Methodologically, a qualitative approach was adopted. Following an in-depth literature review, then an extensive policy and strategy review covering national (UK and Scotland) and council levels, 58 semi-structured interviews were conducted. Thereafter, additional materials were scrutinised, as provided by respondents or mentioned during the interviews and sourced afterwards. The empirical phase lasted from Summer 2020 until Autumn 2021 (see Chapter Four for visual overview).

1.2.2 Research / Knowledge Gap

The gap this thesis addresses is how data work occurs operationally in Scottish local government public services delivery, taking a wide view to cover multiple thematic service areas and narrowly interrogate the nature (types) of data work. The study turns attention to look inside local government organisations, exploring how council entities – as organisations and individuals forming them – engage internally with opportunities from data. This is distinct to external facing data work, such as in efforts providing open data via council-run portals, since to date more attention has been paid to inter-organisational data

or information sharing, and on data work roles at the national government level. This thesis addresses the primary aim of identifying what characterises Scottish local government data work culture.

Building on the ideas introduced above, public sector organisations, including local government, have ambitions to be data-driven, a widely applied term. Being 'data-driven' is defined as being about data usage, leveraging the data artefact within operating environments, serving to enhance efficiency and effectiveness in public service delivery. To leverage data requires that it can be used, and thereby categories of data use are identified during the research process.

The 'Wise Council' report (Symons, 2016) from the UK Government's former National Endowment for Science, Technology and Arts (now simply Nesta) makes a comprehensive review of, and call for, councils to better leverage their abundant data to accomplish improved public service delivery. Seeking to make the most of data is also a core feature in UK Government Digital Service (GDS) publications: see UK Government Digital Strategy (2017) and UK Government Transformation Strategy (2017–2020). The data-leveraging goal is also stated both explicitly and implicitly in local authority data policies or digital strategies, for example Digital Glasgow Strategy (2018–2023), Glasgow's Business Intelligence Strategy (2019); and North Lanarkshire Digital Strategy (2017). Internationally, data as a catalyst in digital transformation is observable at a global scale, via Organisation for Economic Co-operation and Development (OECD) publications on member-state Digital Strategies (2014; 2019). The promise of data has also received abundant academic attention across disciplines (for instance, Mayer-Schönberger and Cukier, 2013; and literature review in Chapter Two).

The use of data and analytics to improve or foster new products, processes, organisational methods, and markets is referred to as 'data-driven innovation' (DDI) and viewed as a new source of growth. The concept is also claimed to represent a key opportunity for governments aiming to rebuild public trust through greater openness, transparency, and accountability of the public sector.

The OECD (2015) acknowledges that governments have major challenges and risks, at economic and societal level, to address before the benefits in DDI can be realised. Both being themselves data-driven and innovative, and supporting other entities for DDI, should be seen in a broader social and economic context where what is termed *"knowledge-based*

capital" (OECD, 2015:21) forms a foundation for knowledge economies in the 21st century. Data and software are recognised as a key pillar. Governments hold a critical role to guarantee DDI contributes to the well-being of all within the public they serve, not only some groups or sectors. The OECD (2013) identifies 'computerised information', defined as software and databases, as one of three main types of knowledge-based capital changing the face of economic activities, in conjunction with 'innovative property',[9] and 'economic competencies',[10] which include 'organisational know-how'. The study relates to this backdrop, at a global scale, albeit looking at a hyper-local geographic setting.

From a review of the e-Government literature, a blind-spot has been identified pertaining to the nuances of operational data work at a local government level. The thesis advances knowledge by beginning to address this through an analysis of how local government level data workers navigate transformation by means of digitalisation, within the landscape of (ongoing) public sector reform. Given data is presented as the key to unlock value and accomplish wide public benefit, focusing on the experiences of data workers is timely and important. The data workers with whom the thesis is concerned cover a wide range of roles that extend beyond arguably more prevalent, narrower conceptualisation of those who work with data in conventional or traditional data scientist type roles. The methodology as pertaining to 'data workers' as a core unit of analysis and the associated selection criteria are described in Chapters Four and Five (see Table 5.2 on page 133). A full list of job titles for the multitude of data workers included in the research is available in Appendix A. These job profiles include those at operational levels as well as strategic analysts or policy makers (for instance, on open data or information governance). The thesis describes data work culture through an exploration of data work and data workers doing that work.

The e-Government literature also highlights a gap around broad digital literacy and the capabilities of public sector staff in relation to digital transformation and associated data usage, deriving partly from work by scholars Dawes (2009) and Hu (2018; 2021 reprint).[11] This is also implicit in research from McBride and Draheim (2020) in their recognition of how e-Government studies will benefit from viewing the systems as complex and adaptive. The gap aligns with recent claims about the uses of data for public service delivery transformation, and through these scholars the 'people' part, what Dawes calls *"human elements"* (2009), is placed in greater in focus. For this study, the human part refers to

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[9] Covering patents, copyrights, designs, and trademarks.
[10] Also listing brand equity, firm-specific human capital, networks of people and institutions.
[11] Article now in Routledge book collection 'Digital Government and Public Management'.

government workers (services provider) as opposed to the highly researched public side (service beneficiaries or recipients) of government work.

Dawes (2009) identified a challenge of civil servants' skills in her conceptualisation of potential scenarios of society and government, offered to understand a future 'direction of travel' for the relationship between technology and society within dimensions of e-governance. In designing the future as a goal, Dawes called for more research into the development of roles for government professionals as co-creators (2009). By her description, these government professionals and civil servants include local government staff as part of the human element in her socio-technical e-governance framework. For Hu (2018), in research to establish the extent to which the curriculum for public affairs across USA universities prepares public managers for the digital age, e-Government failures can be partly explained when evaluated through an educational lens. Hu's research finds that university level courses to educate – or 'prepare' – public managers have still not achieved a balance between education about (a) the use of ICTs and (b) the nature or purpose of government. Therefore, there remains a mis-step between the 'e' and the 'government' in e-Government; a point also recognised by Homburg, (2018). Hu made a call for well-trained public administrators able to work with computer engineers and technology teams to translate public service needs for successful e-Government projects. This PhD builds on Hu's work by exploring local government staff's data work for digital transformation (a key goal in e-Government, in practice) and expectancy from new data opportunities, although not limited to public managers.

1.3 Research Questions and Intended Contribution

This thesis shifts the focus from data as a material artefact, as a tangible entity, to data in use/s. In this way, the research is positioned in relation to literature focusing on the data artefact alongside usage acts with a specific type of data – be that big, open, linked – but adjusting the perspective, to attend to ways of and reasons for using data by local government data workers in their jobs for public service/s delivery.

As above, considered closely in Chapter Two, there is a blind-spot or gap in e-Government literature and research, which I argue relates to the prevalent views of data being predominately a technical matter. This overlooks the social making of data (pre-use) and social shaping or translating of data (in-use). Emergent academic fields, such as Critical

Data Studies, better address social and political roles within data and its use, highlighted in the literature review. However, given the persisting centrality of e-Government in pursuing 'digital transformation', with associated application of ICTs and data in public service delivery efforts, the gap in the literature in this area remains significant. Overly mechanistic and linear views of data and its role may be casting an obscuring shadow on the subject, limiting perception.

Scholarship on the popular 'smart city' topic can offer rigour in identification of weaknesses and limitations for ICTs and associated data (in a material sense) achieving sustainability goals in city planning and public service provision. Nevertheless, there remains a shortfall of research considering the on-the-ground realities of data work practices. This has been highlighted by Ku and Gil-Garcia (2018), who offered a categorisation of local government data type (materially), and by Møller et al. (2020), drawing attention to the unseen work of data in the healthcare setting. Furthermore, an administrative emphasis on local authorities as governance centres has been associated to the role of technology in this undertaking (Meijer and Bolívar, 2016). In recent 'smart cities' review work, Zhao et al. (2021) found that the prerequisite for flourishing smart city ecosystems is that practitioners embrace a holistic approach, balanced across human, social, cultural, environmental, economic, and technological elements. The need not to fragment the 'picture' to comprehend it is clear.

The thesis sets out to understand general, overarching public services delivery transformation (PSDT) as a data promise, identified as Data Expectations through analysis of the study's empirical data (Chapter Six). The study then relates the PSDT data promise to data work practice, exploring how promise meets practice. The local government setting is rich as a focus of study, since this level of government is where higher, more abstract national scale policy and strategic intentions meet the 'real-world' delivery context, and the public for whom services exist. This governmental level has also been lesser attended to (Manoharan and Ingrams, 2018).

The thesis identifies the characteristics of data work culture, and data's use for PSDT in Scottish local government, to address the primary research question:

Research Question (RQ)

- What characterises Scottish local government data work culture?

As a further layer of granularity, the thesis determines the factors that support or limit data use for PSDT. This is undertaken via addressing two sub-research questions.

Sub-RQ (a)

- o What supports and limits data use for public services delivery transformation (PSDT) within Scottish local government?

Sub-RQ (b)

- o What data use supports and limits public services delivery transformation (PSDT) within Scottish local government?

Further developing these two sub research questions highlights the nuances and linkages between them. The reasoning for two similarly phrased sub-RQs is to permit 'systems' thinking (Meadows, 2008), as a holistic view. Data use may itself be supported or limited (e.g., organisationally) as a mechanism for PSDT, and in turn data use itself can be supportive or limiting. The intention is to avoid being linear, instead thinking in a system, accommodating interrelation and feedback loops.

Bringing the sub-research questions together highlights the central core on supportive or limiting dimensions:

(a) What supports or limits data use for PSDT?
(b) What data use supports or limits PSDT?

Both sub-RQs are addressed in the context of public service delivery and intended transformation. The goal of transformation is understood in the colloquial way that local government uses the concept to denote improvement or being / doing better, apparent from organisational documentation and at the individual staff-member level via respondent accounts.

Sub-RQ (a) concerns enabling or hindering influences for acts of data use. Put another way, if the aim is to use data, what are the elements – at organisational, work-team or individual staff level – that serve to make that data use more achievable, or oppositely serve to impede data use?

The second sub-RQ (b) follows the first, homing-in on the specific data use that either supports or limits the end goal of public service/s delivery transformation.

Figure 1-1 Interconnected sub-research questions
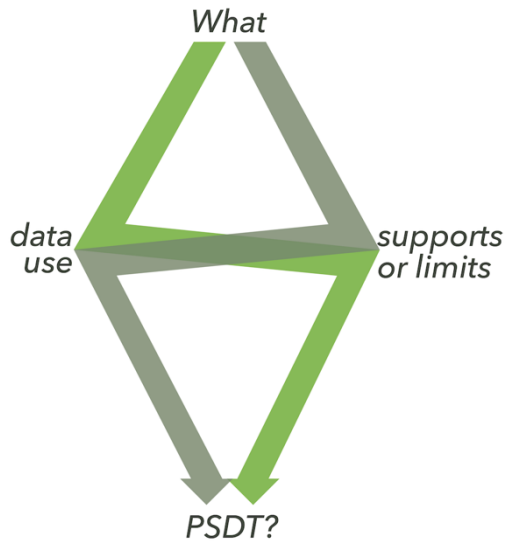
The visual above shows how the two sub-RQs interrelate, where the darker green 'path' corresponds to sub-RQ (a) and the lighter green path to sub-RQ (b).

1.4 Thesis Structure

Below is a visual overview of the thesis, split into three (unequally sized) parts.

Figure 1-2 The thesis as three parts
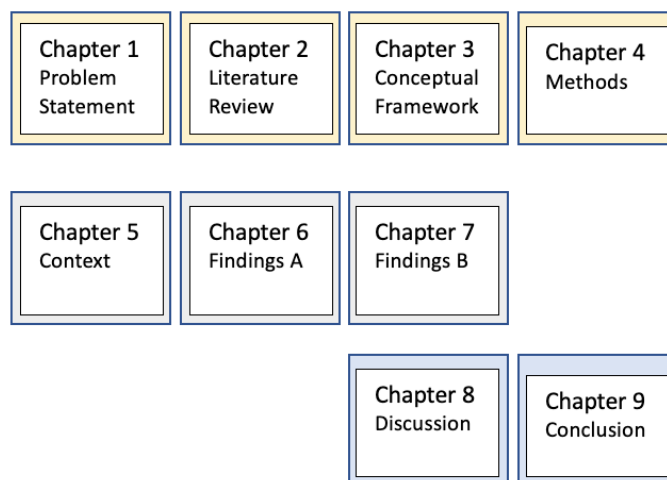
The study is a sociological exploration of data work culture. The first part of the thesis, besides this Introductory Chapter, sees Chapters Two to Four provide the academic basis for the project. The literature review sets out the corpus of scholarship in pertinent areas. The principal literature comes from e-Government, associated with goals of digital transformation, the influence of the internet, ICTs, and data / information in the provision of government.

The thesis also builds on foundations from public administration (New Public Management, and genesis of 'better government'), information systems, covering practicalities and best practices of data management, science and technology studies (data proliferation and disruption to established reference frameworks), critical data studies (challenge rhetoric of data as transformational, and that transformation as inherently 'good' or beneficial), and sustainable-development and urban studies linked 'smart cities' outputs (covering pressures on local authorities to better serve the public).

The study's conceptual framework (Chapter Three) is then laid out, leading into the methodological underpinnings (Chapter Four).

In the second part, Chapters Five, Six and Seven, the context for the research locations is provided, leading into two empirical chapters that describe the results from the study.

Finally, Chapters Eight and Nine offer discussions of the findings presented in the second part to highlight their significance. The thesis ends by addressing the research aims and objectives, with suggestions for future research.

Chapter 1

The current chapter introduces the study and describes the origins for the research. Relevant background is also provided, of both the researcher and the circumstances within which the study occurred. This chapter highlights the significance of the project via the problem statement, the thesis aim is presented plus objectives and research questions.

Chapter 2

Chapter Two places e-Government within the historical context of public sector and government reform, connected to the New Public Management ideology. Thereafter, data

and information, as the mechanics of e-Government, are presented and explored. The core purpose of the chapter is to address how data work occurs, including pre-digitally, citing Lipsky's seminal work on street-level bureaucracy. The impact of data superabundance due to smart applications and goals of transformation (specifically PSDT) are accounted for, ending by a positioning of data work in the local government context.

Chapter 3

Here, the conceptual framing for the research, a lens of 'data use', is laid out. Through this lens, it is possible to undertake a deeper exploration with an expanded perspective than merely the object of data. The concept of sociomateriality is utilised, requiring acknowledgement of the 'act of data' and the contextualisation of these acts, drawing on scholars Orlikowski and Leonardi, among others. Additionally, the chapter introduces core functions from data work in use, highlighting the interpretative work of data use – especially for actionable insights about public services. The framing is set for the second part of the thesis, the empirical phase, to detail how local government staff variously use data during public service delivery work.

Chapter 4

This chapter explains the methodology for the study, and admissibility of the empirical data sources gathered – and made – to address the research questions, aims and objectives. The criteria for selecting locations, with suitable smart or data-driven initiatives, and respondents are explained (developed further in Chapter Five). The categorisation of the staff members as research respondents is presented. This chapter includes an account of the research design adjustments made due to COVID-19, as well as ethical considerations.

Chapter 5

Through Chapter Five, the six council locations in the study are described, with reference to multiple (external) ICT partners involved in the delivery of better work with data whilst seeking to be data-driven for transformational public service delivery. In setting the context, reference is made to pertinent policies and strategies from the UK, Scotland, and the local level in the six councils, in pursuit of 'digital transformation' spanning more than a decade. In addition, influential legislation is highlighted, particularly the Local Government in Scotland Act 2003, which introduced a statutory framework for Best Value

for local authorities. The relevance of this enactment lies in (monetary) pressures experienced by council organisations and staff members pursuing 'best' results for the public as statutory duties, in delivery of public services.

Chapter 6

This chapter presents the substantive research findings, consisting of local government staff accounts being data workers using data in practice, obtained from 58 research interviews. The chapter draws out six expectations of data from the accounts collated. Where these expectations – the promise of data – appear realised, specific circumstances are interrogated during analysis to offer an understanding of how this occurred. The chapter provides interview excerpts, showing the ways data work occurs in practice for varied uses across several public service areas, identifying the commonalities.

Chapter 7

The second findings chapter, Chapter Seven, presents data from a pre-interview survey completed by respondents, enriched by conjunction to the interview accounts. The chapter highlights a fundamental finding: the central, conflicted role of the local government 'data professional'. The chapter then moves on to present two composite archetypes that illustrate variation across data use work. These personas align to the two functions of data in local government, presented in Chapter Three, serving purposes of reporting and intelligence. In addition, the chapter maps these onto a qualitative 'usefulness' scale, and the salient factors alternatively supporting or limiting transformational data use are described.

Chapter 8

In the discussion, Chapter Eight unpacks data's interlinkages to transformation via data use, building from findings in the preceding chapters. The chapter discusses how data, even in usage practices, tends to be viewed materially. The underappreciation of the human side of work gaining usefulness from data may be remedied by a greater emphasis on use types. Use includes decisive acts, for varied purposes, by a data use-enactor (defined in Chapter Three) who determines the admissibility of particular data as named datasets or specific data sources for tasks in hand. There is an integral role for a subjective

determination of utility by use-enactors in public service delivery work, necessitating space (meaning both places and permission) for discretion and judgement during data use.

Chapter 9

The final chapter concludes the thesis, summarising the findings and their significance in relation to the research questions. The chapter also outlines the study's contribution to knowledge, the use classification. Data work entails use contexts, to attain transformational usefulness and value; data does not speak for itself but is spoken for via usage for varied purposes. From the inherent subjectivity of data, a tension is evident in prevalent data work culture. The thesis closes with a simple policy recommendation and highlights the study's limitations, with articulation of potential avenues for further research.

1.5 Project Background

1.5.1 Personal Statement

As a former local government manager, my background in practice is pertinent to the research project. For one year I worked on the Future City Glasgow 'Demonstrator' in a community and engagement role. Subsequently I was employed by Glasgow City Council for three years to drive collaborative Smart Cities efforts across seven Scottish cities in partnership with the Scottish Government, under the auspices of an entity called the Scottish Cities Alliance. Additionally, during the latter stages of the thesis I was associated to the UNU-EGOV as a research consultant. This afforded me connection to many e-Government scholars, with whom I was fortunate to soundboard my ideas during the analysis and write-up stages.

Whilst practitioner experience brings positive aspects to my abilities to conduct the study, it also heightens the risk of unconscious bias and verification of previously held beliefs. For this reason, I have made additional effort to maintain high levels of reflexivity during the research process (May and Perry, 2014; Saldaña, 2018).

Additionally, my project has sought to handle the complex topic of data, at a high-level of conceptualisation and abstraction but through a focus on highly practical data work at the level of public service delivery (rather than as policies or strategies). At times this was hard to balance.

1.5.2 Project Funding

This doctoral project is part of the 'Collections Scholarships' based across several University of Glasgow Colleges, funded by the Leverhulme Trust ten years ago, at the time of writing. Through funding the initiative, the Leverhulme Trust sought to redefine how knowledge is shared in the digital age, via collaborative engagement between the arts and humanities, medical sciences, engineering, and social sciences.

Thereby, my study's proposed focus on data culture stems from the funding seeking to explore how various collections, like digitised governmental data broadly, can be utilised for a *"new twenty-first century enlightenment"* (Glasgow University, 2014).

The project title of the scholarship was already set as being 'Using data to transform public services'. Since the funding was for a topic of collections, I sought to interrogate data itself as a collection and its relationship to public services delivery broadly, rather than focus on a specific dataset pertaining to a singular public service.

1.5.3 Policy Context During Research

Austerity

Budget pressures from more than a decade of austerity have driven the need for greater cost-effectiveness, with a simultaneous strong imperative not to lessen quality and public satisfaction. Using data to derive greater insights is deemed a major opportunity to better direct scarce resources, for example via tools that support analytics and the generation of (business) intelligence. Advances in computation and the ubiquity of sensors, including in smartphone normalisation, has contributed to increased levels of data. The thesis explores this phenomenon through the lens of data use and adjacent concepts such as usefulness and value, in conjunction with PSDT.

See 'Work and Employment' scholar Arrieta (2022) for an overview of the recent history of UK austerity, also linking to the COVID-19 pandemic.

Eminent 'Internet, Society and Public Policy' scholars Margetts and Dunleavy (2013) considered the impacts of austerity on digital era governance, and the relationship to public

services provision as a core responsibility of government. They acknowledged the possibility of revival of New Public Management approaches. Furthermore, they highlighted the austerity-catalysed risk of *"escalating 'de-modernization' or permanent lag in the organisation of public services"* (2013:14).

COVID-19

The COVID-19 pandemic saw an increase in public managers' confidence in the capacity of ICT to help cities, as found to be the case in the context of Spanish municipalities' smart cities projects during that time (Barrutia and Echebarria, 2021). There may have also been an influence on the way that data was viewed by the public, since talking about the rate of disease spread and other public health indicators was more common. The UKRI-funded Urban Big Data Centre undertook research into the use of data during the pandemic (Glasgow University, 2021[12]) finding that local government developed novel applications for data use and capabilities to meet needs.

However, there may also have been an impact from the restrictive policies brought in to control the virus, and increasing public views that data is utilised for particular (politically motivated) agendas, seeing a rise in science scepticism (Simione et al., 2021).

Local government 'bankruptcies'

During the study, financial pressures resulted in several UK local authorities declaring bankruptcy. This has so far only occurred in England. Local authorities do not go bankrupt as a company or person does; rather a Section 114 Notice is issued. This notice is a report from a council's finance officer that the authority may imminently incur unlawful expenditure, according to the Local Government Finance Act 1988. Section 114 notices effectively limit spending to statutory services.[13]

Fourteen councils have issued Section 114 notices since the Local Government Finance Act 1988 became law.[14] Since 2018 several have been issued. Those from Nottingham have been particularly notable: on 29th November 2023, the issue was made because the

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[12] Data needs capabilities and uses project by UBDC https://www.ubdc.ac.uk/impact-story/scottish-local-government-during-covid-19-data-needs-capabilities-and-uses
[13] Local Government Finance Act 1988. Section 114 https://www.legislation.gov.uk/ukpga/1988/41/section/114
[14] Number of Section 114 notices issued https://www.instituteforgovernment.org.uk/explainer/local-authority-section-114-notices#footnoteref32_jr08tez

council could not balance its budget in 2023/24.[15] In previous instances, there has been indication of financial mis-management, but analysis suggests a worrying new trend, arguably impacted by austerity policies, high inflation and other factors.

The Convention of Scottish Local Authorities (Cosla) is a national association of Scottish councils. In advance of the Scottish Budget on 19 December 2023, Cosla published a briefing paper which offered comment on recent English council bankruptcies (Nottingham and Birmingham). Cosla declared it viewed a real risk that bankruptcy becomes the reality for Scottish councils due to growing cost pressures. Shaun Davies, the chair of the Local Government Association, was quoted as saying: *"My concern is that there is a wave of councils that will effectively return the town hall keys back to the government, because there is just no way out of this"* (via the Guardian Newspaper, 2023).[16]

With the above policy context in mind, the thesis now turns to the academic basis for the study to explore the pressures on local government to meet public needs, and the role for data in public services provision.

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[15] Nottingham Council press release on Section 114 notice in 2023
https://www.nottinghamcity.gov.uk/media/jmzb22b0/report-made-under-part-viii-s114-3-of-the-local-government-finance-act-1988-291123.pdf
[16] Commentary in the Guardian about Nottingham Council bankruptcy
https://www.theguardian.com/society/2023/nov/29/nottingham-city-council-wasnt-reckless-it-was-hollowed-out-by-austerity

Chapter 2: Local Government Public Services Provision – What Role for Data?

Introduction to the Literature Review

This thesis explores the various roles that 'data' is imagined to play in modern public service delivery, specifically in Scottish local government. This chapter offers a literature review that contextualises this present-day issue in academic and policy debates of the last several decades. The time period covers the popularisation of managerialist approaches in public administration and mainstreaming of the internet, including as a public services provision tool. The central literature area for the thesis is e-Government, which is not a monolithic concept and needs to be approached through several threads. I examine the history and current debates about e-Government as part of broader movements to 'reform' government through data, including the 'smart city' movement among others, and the role of the local government 'data worker.' Together, this literature provides a critical lens with which to unpack the nuances of the seemingly objective category of 'data' that features so heavily in current local government discourse. Drawing in additional academic fields follows advice from e-Government scholar Bekkers (2011), who argued that the explanatory power of e-Government studies can benefit from cross-fertilisation with other bodies of knowledge, namely innovation, technology, and governance studies.

The chapter is made up of three parts. Part One starts with historical background of New Public Management (NPM), and ongoing efforts towards reforming the public sector, including government. The distinctiveness of government as a part of the public sector is highlighted, and local government as a pertinent level is positioned. Shining the lens on local government is necessary due to the lesser attention afforded by the e-Government discipline, even though the vast majority of operational public services are delivered at this governmental level. Furthermore, the expectancy of undergoing digitalisation is endemic at the local level, where gains are viewed as a necessary means to continue service provision to the public amid financial reductions, to be solved by promised efficiencies and effectiveness in digitalisation and from data.

Part Two considers the longstanding role of technology in reform, and how data features particularly in a government setting, with considerations that stem from government needing to be accountable and transparent. In this part, the popularity of pursuing the goal

of smartness – such as in creation of a 'smart city' - is interrogated, drawing out the business element that is argued to misfit to the governmental context, when seeking to enable a 'good life' across multiple interpretations (and ideologies) thereof.

Part Three turns to the role of data workers, drawing in ideas about the role of a 'bureaucrat' operating at the local level, and seeking to connect this concept to interface with data in recent local government, public service delivery work. This Part closes with inclusion of recent pertinent policy sources and practical application of seeking to re- or up-skill public sector, including local government, workers to be more capable digitally in relation to their work with data.

Throughout the chapter, the documented imperative to improve government activities is described, specifically in relation to public services and transformation in their delivery. The concept of public services is defined as tangible duties from government to the public; however, it also covers the act of public service i.e., the work of a public servant. The topic of public service, including roles, duties, and responsibilities, alongside working parameters is significant when exploring work culture in the context of data's role for goals of public service delivery transformation.

In this literature review, I aim to demonstrate that there is a gap in understanding about how e-Government functions, specifically pertaining to what operational data work actually looks like at the local government level. This sets up the rest of the thesis to address that gap by analysing how local government level data workers navigate transformation by means of digitalisation, within a broad landscape of (ongoing) public sector reform.

2.1 Part One: Reforming Government

Government is part of the public sector, necessitating consideration of the enduring impact of New Public Management's public sector reform mechanisms, which is where the literature review starts. Section 2.1.1 positions the thesis in relation to reform efforts across the public sector via managerialist approaches. I highlight the nuanced ways in which government is a unique form of public sector organisational entity, especially at its local (*"street"*) level - see Part Three.

In section 2.1.2, the concept of e-Government is introduced, setting out debate within scholarship regarding Information Communication Technologies (ICT) usage in conjunction with reform. I specifically examine the role of data – digital data and otherwise – in the context of reform, i.e., how data has historically served as a means of managing service provision and quantifying accomplishment of success, through evaluation indicators.

Finally, subsection 2.1.3 offers the reader an orientation within the 'landscape' of the broad 'e-Gov' discipline, to surface tensions across the field due to its at times competing roots in Public Administration (PA) and Information Systems (IS), with an interdisciplinary basis.

In concert, these three subsections chart the limited ways local government reform efforts accommodate the data topic, tending to relegate its role to reporting, whilst nevertheless seeking to leverage data and utilise ICTs for better government. It is shown how data has a particular meaning in the IS context, and quite another in the PA context - but that for the latter discipline there has been a slowness in handling the data topic linking to administration in the public sphere, instead tending to view it as a more technical, or process, consideration.

2.1.1 New Public Management Foundations

The historical basis and perceived need for public sector reform is now considered through description of the advent of New Public Management (NPM). The idea that the public sector, left unmanaged, is an inherently inefficient mode of governance has become so naturalised that it is crucial to highlight the specific historical interventions and policy debates that have framed it as such.

Public Sector reform processes have been underway since the 1970s, when there was a sense of crisis in the public sector. Perceived problems focused on 'inputs', whereby across many countries it was deemed that public sector was needing an unsustainable level of public funding; 'processes' with examples of waste, delay, mis-management and corruption, which was linked to centralisation causing lack of accountability and transparency, with decision-makers thought to be too far from those affected by the decisions; and finally, 'outputs' whereby there was concern that within many countries the public sector was not delivering what it should. Managerialist approaches prioritising efficiency and effectiveness in service delivery provided an ideology to respond to the

perceived crisis, accompanied by political will and power to enact that response (Lapsley and Miller, 2019).

After the late-20th century reappearance of 19th-century political ideas associated with free-market capitalism, 'neoliberalism' promoted taking a business perspective of government, providing an ideological framing that appeared able to address the problems summarised above covering inputs, processes, and outputs. NPM's managerialist view of public administration afforded numerous business tools as methods for achieving more efficient public service delivery. Examples of those tools include marketisation; customer service focus; incentives for managers to reach performance targets; alongside construction of public and private partnerships in service delivery, blurring boundaries between these sectors.

Christopher Hood (1991) undertook one of the first academic accounts of how world-wide governments have pursued NPM across their public sectors. Clark (1996) develops Hood's characterisation of NPM, simplifying to three overarching concepts, termed as the three 'M's: use of Markets, Managers, and Measurement. The latter category 'Measurement', with a clear role for data, includes incentivisation. Categories of incentives include encouragement of greater entrepreneurialism; more results; overall greater efficiency with performance indicators; inducements for public sector staff to be more efficient via performance-linked pay; use of human resource management strategies; and ultimately *"deprivileging professionals and public sector workers"* (Clark 1996:24). This topic will be further considered in latter parts of the chapter.

Around the same time as Hood described the reform (the early nineties), Osborne and Gaebler published their NPM-aligned book 'Reinventing Government' (1992) where they identified a ten-point plan for achieving reinvention of government as a goal of NPM efforts. Each aspect of the plan relates to the overarching components of public sector reform, influenced by the NPM philosophy, seeking increased efficiency; decentralisation; increased accountability; improved resource management and marketisation.

The Osborne and Gaebler (1992) plan:

- Steering rather than rowing
- Empowering rather than serving
- Injecting competition into service delivery

- Transforming rule-driven organisation

- Funding outcomes not inputs

- Meeting the needs of the customer not bureaucracy

- Earning rather than spending

- Prevention rather than cure

- From hierarchy to participation and teamwork; basis for 'Joined Up Government'

- Leveraging change through the market.

Ten years later and following the invention of the internet with dissemination of the world wide web, e-Government scholar Heeks published his edited book 'Reinventing Government in The Information Age' (2002), which delved deeper into the Information Systems (IS) and electronic (technological) components of government reinvention. This book addresses the interface of IS, public management, and organisations. The collated models of information-age public sector demonstrate how deeply this NPM model of reform had penetrated by 2002, covering wide geographic ranges, from several African governments, the USA and the UK, and across services, such as healthcare, community development, back-office procedures and the democratic process.

All these approaches to NPM have continued the threads that Hood (1991) first presented in his seminal work on the topic when he argued that the ethos of NPM divides public services into self-contained products (1991:14). As Lapsley and Miller describe in their helpful recent overview of public sector transformation between 1998 – 2018, these self-contained products can be understood as interconnected and complementary components, developed as *"corporatised units organised by product"*, from *"unbundling of the public sector"* (2019:7). Furthermore, the reform comes from introduction of competition and internal markets, and service linked, fixed term contracts (with clear deliverables). Under this approach, there has been an increased application of private sector management styles in public service contexts, emphasising resource use parsimony, discipline, responsibility and accountability, hands-on senior (top-down) management, and – particularly relevant to the study at hand as a role for data – explicitly stated, formal, calculable standards for measurement of performance and success. By highlighting the roots of this policy approach, I have set the stage for how data came to be seen as both the means to and also the expression of a rationalised government.

From products to services: changing logics in determining public value

This literature review now turns to Normann and Ramirez's (1993) work on value, which is a crucial framework for understanding how data has come to play a crucial role in in public sector's business activities. Thereafter, the review returns to issues with a product-framing of public services provision.

By broadening the concept of economic activity away from the production of goods to the exchange of services, organisational studies and business scholars Normann and Ramirez argue that value is *"co-produced by actors who interface with each other"* within a 'value constellation' (Normann and Ramirez, 1993:54). Thereby, value is not to be viewed as something that can be captured by a price but better seen as a subjective assessment of utility. Building on these foundations, evolving work on Service-Dominant Logic (Vargo and Lusch, 2004) further explore the concept of value; *"value occurs when the offering is useful to the customer or beneficiary (value-in-use), and this is always in a particular context"* (Lusch and Nambisan, 2015:159).

In the following years, after turn of the century work analysing shifted perspectives from the 'product' towards a 'service' view of value, Osborne (2018; 2020) applied the ideas to the public administration context and wrote about the weaknesses of viewing public services as products. Osborne critically examines the idea that a public service organisation (PSO) creates value only through its performance. He shows how framing PSOs in this way doesn't reveal their true value as a 'facilitator' of value that *"must be added into the equation as a co-creator of value"* (2018:229).

The topic of value is a central theme in the widely cited service-dominant logic article from Vargo and Lusch (2008), drawn on by Osborne (2018). The argument made by Vargo and Lusch hinges on their giving voice to the increasingly apparent inadequacy of a goods-based classification system of businesses, offering a way to understand changes underway in economic activity. A key aspect is scope to separate out information – which could by implication refer to data - from embodiment in goods or people, and what is referred to as 'liquification' (Vargo and Lusch, 2008, citing Normann, 2001). This perspective was also developed by Lusch and Nambisan (2015) in their later work on service innovation, exploring innovation and value creation with a network-centric focus, where innovative activities germinate from an ecosystem - more than a singular innovation-benefiting organisation itself - grounding their research in the aforementioned service-dominant logic.

Lusch and Nambisan define a service ecosystem as – *"a relatively self-contained, self-adjusting system of mostly loosely coupled … actors connected by shared institutional logics and mutual value creation through service exchange"* (Lusch and Nambisan, 2015:161). The authors call for transcendence from tangible-intangible and producer-consumer divides, identifying that information is a complex, network-influencing element across the ecosystem.

In all this literature and the arguments therein, whilst highlighting novel outlooks and reimagining the role for public services organisations (including but not limited to public sector) undertaking public service value creation, primary attention within the research is afforded to the service recipient. This literature review considers how less attention has been paid to the in-work public service practices by internal, local level government staff workers who must navigate calls to draw upon, and even create, data. This is a distinct, under-explored topic. It is an important topic to address because in the e-Government context, the ways that the workers of the organisation undertake their working tasks remains a core part of how public service – and its value – is created. The ecosystem perspective is useful, but such does not negate need to interrogate the role of each part of the system. This point is especially relevant where one part is governmental and has a special (mandated) role in ensuring public needs are well met. Whilst more attention tends to be paid to inter- than intra-organisational e-Government diffusion and issues of interoperability (Zhang, Xu and Xiao, 2014), the topic of in-work public service practices is not un-considered. Osborne and collaborators attend well to the role for a public sector organisation within the service-dominant logic, although do not explicitly address governmental work as a distinct category.

In this value creation framework, good public management consists of distinct service delivery units that focus on distinct outcomes. This disaggregation goes along with an increased role for managers in public sector, supporting organisational level goals of accountability and transparency, for instance in the education context[17] with introduction of English academy schools target-hitting. Such an approach can precipitate unintended consequences, such as recent issues in Ofsted inspections (see Skinner et al, 2021; and Humes, 2023, in Scotland). The management of contained units is arguably easier than

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[17] Also, Australian school example noted in Chapter Three related to sociomateriality in data work in public service provision.

within a service-based ecosystem view, however it gives rise to issues where outputs measured are conflated with more intricate, complex outcomes sought.

As a result of focus on the demonstration of value, managers across the public sector have increasingly turned more to the use of data tools, particularly statistics for Key Performance Indicators (KPIs) metrics determining (and proving) success in public sector management, and in service delivery. This is undertaken in linkage to explicit standards and measure of performance, which Hood defined as being about definition of goals, targets, and indicators of success *"preferably expressed in quantitative terms"* (1991:4). However, managers are not the only category of worker in local government, and the range of data types being handled has expanded from the relative simplicity of high-level statistics, a topic further developed in Parts Two and Three below.

Many scholars (e.g., Dunleavy et al, 2006; Lapsley and Miller, 2019; Christensen and Lægreid, 2022) agree that the NPM model of public service management dominating public service reform since the late 1970s to the turn of the century (with vestiges presently) has both been a flawed model and failed in practice. Osborne, Radnor, and Nasi (2013) contextualise this rise of Fordist models of public service delivery in conjunction with trends in manufacturing and production literature, and demonstrate that this framework does not accurately represent the realities of public service management in an increasingly fragmented, complexly interdependent world. Thereafter, Digital Era Governance (DEG) emerged as an alternative toolkit to NPM for Public Administration reform, recognising the multiplicity of actors. The revised approach was based on reintegration, needs-based holism and – explicitly – digitalisation (Dunleavy et al, 2006:227). The recognition of interconnected groups as service providing organisations, as is the DEG outlook, is especially relevant in the context of smartness, further considered below. The linkage between services and the channels that enable provision is also addressed by Nicholls (2016), in empirical research about English local government.

The intention behind this shift was to move from dysfunctions of NPM, particularly fragmentation, and embrace the wider networks of the DEG outlook. There was also recognition of need for focus on the core values of bureaucracy, such as considered in 'eBureaucracy' (Persson and Goldkuhl, 2010). The post-NPM ideas and returning to the desirable elements of the Weberian ideal bureaucracy whilst accommodating changes from digitalisation – and opportunities thereof, including DEG - were revisited by Dunleavy with collaborator Margetts (2013). Their research considers this topic in relation to the rise

of 'Web 2.0'[18] as ways websites' form and usage enables user-generated content, with opportunities for easy use of services that supports a participatory culture with interoperability for end users, which Margetts and Dunleavy (2013) also consider in relation to austerity policies, as these were getting underway at that time (still in place).

Osborne's recent work (2018; 2020) and with co-authors Powell, Cui and Strokosch (2022) develops the 'public service ecosystem' across four levels—the institutional, service, individual, and beliefs. The authors offer public service management perspectives to better accommodate the complex interactions between provider and recipient. Albeit not explicitly attending to local government setting, given the blur of approaches there are insights to be gained. There is much attention on the processes through which value is co-produced and created during service provision. This applies in varied contextual settings, influenced and shaped by distinct framing in each instance. This matter of locating 'value' is of central significance and interest, since achievement thereof is a primary mechanism in determining success of intended modernisation and reform, defined as (quantifiable, tangible) improvement. Since, as presented in the next section, the overarching benefit from reform is achieving improvement as better government activities, understanding what qualifies as value - and how - is a core concern.

One key aspect of value is its monetary component. The public sector across the UK, including at local government level in Scotland, must conform to early 21st century legislation requiring 'parsimony'. Best Value was adopted in Scotland by the Local Government in Scotland Act 2003, introduced by the UK Labour Government. The aim was to improve local services in terms of both cost and quality: to comply, accounting for effective spend and public savings becomes paramount. There is a conundrum: with goals of reducing unitary cost (price), there is seeming inadequacy where public funds are not really saved if re-allocated to other areas of public service. On this topic see Ferry and co-authors, (2015), who demonstrated that demands of budgetary management have precipitated a recent shift towards misfit of accountability and transparency in English local government.

As is detailed in the following sections, mechanisms to achieve reform after the rise of the internet and new, highly distributed technologies (such as connected devices and smartphones) further pushed the promise and imperative of digital transformation, with the

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[18] Can be extended onwards in 'Web 3.0' as decentralized internet built on the blockchain.

possibility of link to 'best value'[19] parsimony to be achieved via digitalisation. Digital transformation become a specific form of reform, where data has increasingly played a core part. However, the different approaches discussed above have shown that data's role in this type of reform has been hampered by an overly transactional perspective of data tied into a pre-digital time, mapped to management and measurement. With marketisation's introduction of competition into the public sector, NPM is still apparent as a paradigm in reform efforts of Public Administration.

2.1.2 Defining e-Government

NPM is a persistent paradigm, and is one that imbues e-Government, However, this latter term – with more recent framing as digital government transformation - has its own form and has come to eclipse NPM as the gold standard of local government improvement. This section examines what is meant by 'e-Government', highlighting the different threads of scholarship from which the discipline has grown.

Definitions: phenomena and goal

Heeks and Bailur (2007) describe e-Government as a quasi-autonomous outgrowth of its referent fields of IS and PA. I will dive deeper into the discipline's roots in the next section. For now, I introduce Heeks and Bailur's characterisation of e-Government to show how many disciplines factor into this field of literature. When working with the concept of 'data', these opposed roots cause some definitional problems.

The OECD (Organisation for Economic Co-operation and Development), founded in 1961, played an important role at the turn of the century in defining e-Government, through sponsoring a long-standing working group on the topic in accord with their goals of promoting 'better' government. Among other outputs, the OECD's thirty-eight members have positioned the forum as a platform for analysing comparative policy experiences and disseminating good practices.

In 2003, after considering a range of definitions of e-Government, the OECD's e-Government Working Group landed on –

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[19] Note that the UK government recently ran a consultation for English local authorities on 'best value' https://www.gov.uk/government/consultations/best-value-standards-and-intervention-a-statutory-guide-for-best-value-authorities-consultation

> *"the use of information and communication technologies, and particularly the Internet, as a tool to achieve better government"* (OECD 2003:11)

This OECD definition states the broad aim of achieving *"better government"*. The definition serves as a normative instruction that more information and communication technologies (ICT) usage is an inherent good, which is a techno-optimist, deterministic outlook. In addition, the definition emphasises a practical, implementation-focused concept of good government. Recent advances in computing power and the superabundance of data add a further dimension of 'e-Government'. This invites a new approach to interrogate the way the concept does (and perhaps does not) support transformation to better government.

Now the section attends to various academic definitions that show the fluidity, of 'e-Government' as a concept. As shown below through several definitions, there are certain features that cut across these definitions, and others which conflict with one another. Highlighting these varied definitions goes far toward showing the historical situatedness of this concept that is both descriptive and proscriptive, and – arguably – lacking the rigour of a critical dimension on the shaping role of technology therein.

Yildiz cites Means and Schneider's work from the year 2000 defining e-Government as *"the relationships between governments, their customers, and their suppliers"* (2007:650), where customers and / or suppliers may be companies, other governments, or the public. This separation of stakeholder categories to distinct groups of customers and suppliers is a (fairly – in the history of government as a concept) new intervention in how to conceptualise of government in terms of partnerships. From the beginning, e-Government advocates have proposed a model in which 'partnerships' or 'interactions' are the main unit of governance. The interactions can cover government-to-government / G2G, government-to-business / G2B, government-to-citizen / G2C; and the reverse (Belanger and Hiller, 2006; Cullen, 2010).

The 'interactions' view, builds on the ecosystem idea that featured in earlier NPM approaches, in the 'public-private partnerships', and then became more prominent in discussions pertaining to value co-creation in public services. Arguably this has precipitated views of data that focus on data availability and movement (plus interoperability) as information sharing for data re-use across partnerships co-operating in public service delivery. Additionally, these partnerships have contributed to e-

Government's conceptual evolution to DEG (Dunleavy et al. 2006; Margetts and Dunleavy, 2013), or e-governance, as was introduced above. This is an important element in the rise of 'smartness', set out below, where multiple entities contribute to the efficient and effective provision of public services to the population at large.

Bélanger and Carter's (2012) definition also incorporates dimensions of the 'interaction' concept and the focus on service delivery. They define e-Government as *"the use of information technology to enable and improve the efficiency with which government services are provided to citizens, employees, businesses and agencies"* (Bélanger and Carter, 2012:364). Meijer and Bekkers (2015) offer a more detailed but comparable definition, one elevating the practical component, providing a range of e-Government aspirations that echo the NPM basis: *"e-Government as a practice can be described as the use of ICT to design new or to redesign existing information processing and communication practices to achieve a better government, especially in the field of electronic service delivery to companies and citizens but also for managerial effectiveness, and the promotion of democratic values and mechanisms"* (Meijer and Bekkers, 2015:237). Most recently, Twizeyimana and Andersson, in their literature review of public value posit that e-Government ought to be conceptualised as ICT usage by governments in conjunction with and for pursuit of organisational change in improvement of governmental operations and structures (Twizeyimana and Andersson, 2019), making a call-back to earlier business process re-engineering views, exploring transformational government via reimagined processes (Weerakkody and Dhillion, 2008).

Through these descriptions, I show that even after twenty years, there is still no united, comprehensive definition agreed upon among researchers. In each instance, thematic interests and priorities shape how the field is viewed by its researchers. This is further developed below. That said, there are common elements, such as the presence of ICTs (without much mention of interface with the associated data thereof); accomplishment of efficiency, effectiveness and better government; emphasis on multiple actors in governance for public service provision; and, focus on public recipient (and relationships between government / state, wider economic actors and public).

The enduring significance of e-Government roots

Public Administration literature (PA) is a body of research intended to aid policy makers dealing with major administrative issues, primarily as regards government. Homburg

(2018) describes how information technology (IT) tends to sit uncomfortably with PA. He attributes this to how IT / ICT scholars have tended to overlook the more difficult aspects of public sector reform and public policy making processes in their research (2018). Homburg sees this as reciprocated, with PA scholars similarly failing to afford adequate weight to the role of various ICTs. Prior to the emergence of e-Government as a field of study, those focusing on research about the machinations of government seemingly mainly regarded ICTs as peripheral to core activities (2018), as opposed to having a fundamental impact. How digitalisation, as a distinct (albeit related) phenomenon to dissemination of ICTs is occurring and shaping government work is an unfolding concern.

This ill-fit of public administration with ICT began to shift with the emergence of 'e-Government' in the 1990s, since before this concept, technology, management, policy and process were not considered together. The concept began pragmatically as governments the world over started to use the internet as a service channel, putting up websites and having an online presence, which is explored further through the literature review below. Bannister (2015) likened this to a public sector version of e-commerce. However, beyond this mechanical and technocratic view, e-Government also can be traced academically back to ideas of public sector reform (set out above). Heeks (2002), and other contributors to his book 'Government Reinvention in the Information Age', explore the existence of technological tools affording apparent opportunities to improve the public sector, tools that could all be deemed varieties of Information Systems and components therein.

Many views are expressed as to goals of e-Government, but simplicity and efficiency are frequent keywords. Layne and Lee (2001) claim that one of the goals that appear in all discussions of e-Government is faster and cheaper services for citizens. There is a prevailing emphasis on the experience from the citizen's standpoint. Whilst it is of central and vital importance to understand how the public experience core services (including practicalities, processes and logistics) as well as political elements (such as democracy and participation), understanding expectations and experiences of internal actors in the back-end of public services provision - supply-side - is also significant. These people are equally important to the network of how government is enacted, and how public services get provided, but they are rarely examined as actors in this ecosystem.

Coursey and Norris (2008) highlight the normativity in their critique of e-Government 'stages of growth' models (i.e., the prescriptive rather than descriptive implications of their analysis). They see these popular models pushing an agenda promoting more ICT usage in

government without tying into the realities on the ground, glossing over how the progression from one stage to the next could be achieved if deemed desirable to do so (2008:525). This critique has a bearing on the thesis research, viewing new opportunities from data as progression in ICT capability. It is intended to contextualise and deconstruct some of the broad claims introducing and using ICT and data analytics in the public sector will lead to (a somehow objectively) better government, a continuation of techno-optimism.[20]

Lips and Schuppan have argued that e-Government research has been dominated by technical focus (2009), whilst also being under-informed by public sector values, due to more attention on economic and administrative elements (Grönlund, 2010; in Yildiz, 2013). Therefore, the call is made to focus more on the 'gov' and less on the 'e' (Lips and Schuppan, 2009; Homburg, 2018). In my thesis, I see to undertake this task through exploration of intra-government activities with data and the work thereof, to offer rich description of the culture. Results from greater electronic activities within and across government bodies, and more recently expansive digitalisation trends (in and out of government, changing our society as a whole), are drawn upon to set up a project that explores how the greater scales and dynamics of data possible via proliferation of ICT and internet usage affects the work and workers at operational levels in local government. Whilst data might immediately conjure up linkage to the 'e' over the 'gov' (hence the blind-spot identified) my study explores data in relation to the governmental side, particularly at the local level, and with an operational focus.

Concern with improving public services has, since the outset, been a major motivator in e-Government, both in practice and scholarship. Furthermore, the e-Government concept is intrinsically linked to transformation and reform of governments (Homburg, 2018), a position shared by Heeks (2002), Bannister (2015), and Lips (2017). Lips (2017) states that narratives of technological innovation always have 'transformation' as a major theme. Goldkuhl, (2008) examines calls for the simplification, efficiency and effectiveness of public services. He shows how these calls always foreground streamlining, include standardisation of decisions and automation across systems wherever possible. In some ways this does indeed seem optimal for the service recipient, such as in usage of single accounts that function across governmental departments, where the citizen as public users

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[20] There are two strands: one is data affording greater efficiencies/value for money through improved targeting and accountability, the other is the notion that better data sharing and better access to meaningful data will empower provider and user and improve the responsiveness and quality of service.

are not expected to understand inner workings of government departments. However, Goldkuhl does not consider how it is necessary to examine the trade-offs that this streamlining poses for public service delivery staff's ability to exercise discretion as specialists in the intricacies of public service. By streamlining and automating systems, seeking replicated, analogous provision, the nuances of hyper-specific circumstances may get lost.

The prevalent themes and concerns of e-Government over the past twenty years provide a necessary context for understanding the current state of the field today. Attention to the experience of service recipients is still dominant at the expense of attention to the back-end service worker. Customer satisfaction is still the main focal point in e-Government scholarship. This retail view stems from commencement of the discipline in the 1990s. with the introduction of the internet and opportunity (or imperative) that governments revise (update) public service delivery channels and information sources to include – and make the most of – the world wide web. Early e-Government work by governments was primarily about channel shifting to better meet their 'customer' needs and expectations following how other services and products were offered. The focus on public service delivery also included exploration of service design, with various researchers offering their take on the intended endgame, as a one-stop or even a no-stop shop for citizen service delivery (Scholta et al 2019; 2022). It is relevant to highlight that in recent years there has been an uptick of focus on e-participation, which may accommodate Cullen's 'G2C2G' – government-to-citizen-to-government, again – as a more holistic interactions concept (2010). This has coincided with the significant uptick in attention to how data should feature in e-Government.

2.1.3 e-Government Tensions

The various areas of interest broadly contained within 'e-Government', discussed above, have attracted ongoing research in several different fields. The field of e-Government covers domains of computer science, information systems, public administration, and political science, *"sitting at the crossroads"* of this range of disciplines (Heeks and Bailur, 2007:252). Whilst these authors assessed the domain fifteen years ago at the point of writing now, during the peak of e-Government's ascendance in academic literature linked to (multiple, global) government-side mandates to move service offerings online given the expanded day-to-day presence of the internet in lives of the public, their observation remains apt. Nowadays, there are additional disciplines to add. The field of Critical Data

Studies is of relevance addressing how data works in conjunction to e-Government activities and thematic topics, since the rise of Big Data and new media channels (among others) perpetuate ever greater data flows. Key authors writing about smart cities (see Part Two) such as Rob Kitchin (2015a; 2015b; 2022) have gone on to build on the work of danah boyd and Kate Crawford coining the Critical Data Studies. This is an emergent, vital research field that is in conversation with other Critical Studies departments that provide critical attention to the historical and theoretical contingencies of the practices largely taken for granted in the 'business world' (such as Critical Accounting Studies, etc.). Critical Data Studies connects traditional topics of concern in e-Government scholarship (themselves relatively new, since prevalence of the internet in the 1990s).

Other researchers, such as Janowski (2015), highlight the purpose of this research area as being to inform government digitisation efforts (as part of digitalisation), covering the electronic 'e' of e-Government. Janowski argues that progression of these digitisation efforts requires *"the simultaneous pursuit of (i) multidisciplinary research which itself is rooted in the administrative, economic, engineering, legal, social and other disciplines, (ii) policy and (iii) practice"* (2015:221). When working across disciplines and outside boundaries of academia to draw insights from policy and practice, close attention should be paid to terminology. The precise meaning of different terms used by different groups will vary. This has a bearing on what is meant by the descriptions and arguments advanced. The field may be suffering from talking at cross-purposes and overlooking thematic nuances.

Above, the point was made that e-Government research has been dominated by technical focus (Lips and Schuppan, 2009), with a deficit interlinkage to public sector values. Some argue that the emergence of e-Government activities as a governmental 'target', primarily as channel shift from analogue to online methods of interfacing with governmental services to increase internet and ICT-enabled public service offerings, contributed to the prevalent e-commerce perspective around the turn of the century (Bannister, 2015). This has arguably resulted in initial disconnect between e-Government topics and abundant older scholarship on the impact of computing in public service contexts (Bannister, 2015; Kraemer and King, 1976).

There are continued calls to shift e-Government attention to public sector values (Twizeyimana and Andersson, 2019; Homburg, 2018) and to connect to digital government transformation scholarship (Eom and Lee, 2022; Gil-Garcia and Flores-Zúñiga, 2020). Also, new research can move on from meso- and micro-level themes that have also

dominated e-Government research, given its prioritisation on achieving the phenomena it also describes, or detailing what has worked where and why in a literal sense. There has been less consideration of the macro, whole-system perspective, and theory-building, with debate about need for theory (Bannister and Connolly, 2015). Direction-setting for the field has been offered by Malodia, Dhir, Mishra and Bhatti (2021), who highlight how there are tangible and intangible outcomes of success, alongside presentation of macro-level moderating conditions, such as political stability and shared understanding.

It is out of scope for the review here to comprehensively address nuances between disaggregation of services, part of NPM's logic of improvement, within a more holistic approach taking a 'systems' outlook (Meadows, 2008). The key takeaway is the persistence of viewing service as self-contained units to be better provided to recipients highlighting the citizen, customer, client, resident, as user of the service. I agree that the public ought not to be (directly or indirectly) expected to understand back-end, complicated, even convoluted workings of government. However, focus on the service receiver with less attention on the giver, operationally at a micro level (tended to be grouped as the 'government' or work team/s) has perpetuated an imbalance or blind spot. In fact, the role of the service deliverer has been overtly called to be minimised, reducing contact between recipient and 'case handler' (Goldkhul, 2008; Scholta et al, 2019, 2022).

The identified blind spot has persisted over the past decades' conceptual transition from e-Government towards Digital Government, occurring with scant critical assessment of the role of data within the field. This is due to e-Government being either overly inward-looking, or perpetuation of focus on delivery without regard to the impact of ways digital technologies may 'revolutionise' public services. The idea of a revolution comes from Liva, et al (2020), who offer a recent review of e-Government / digital government literature. Their 'revolutionary' assertions about substantive gains from ICTs are not well backed up, containing only a light, essentially transactional perspective of the role of data for government as an enabler in policy-making and public governance to meet public needs. There is a pressing need to question the nature and extent of any apparent revolution, and whether the trajectory will lead to better government or not – especially in democracies that value dissent and pluralism, with their inevitable messiness.

Regarding transformation from reform efforts, as put by Ingraham in the north American setting, *"Reinvention is only the latest initiative in the enduring cycle of reform"* (1996:454). This Chapter points out that 'transformation' (of government) is the latest

reform buzzword: whereby 'reform', 're-invention' and 'transformation' are arguably all different versions of this same phenomenon whereby new practices make a noticeable departure from the status quo or 'business as usual' (BAU). Instead, a new way is pursued that consists of fundamental, total change. Bellamy and Taylor identify IT as the factor that could enable such a drastic reinvention in the modern era by reinvigorating public administration (1994:3). But Bannister positions the e-Government research field as an *"eccentric cousin"* (2019:103) in the mainstream of research about public administration, showing that it never has achieved that sense of urgency – and perhaps status - that related fields have received. In the ensuing decades (1990 – 2010) this meant that Bellamy and Taylor's prediction about IT achieving reinvigoration of public administration is debatable. Whilst there may not have been reviving of PA due to IT, it is clear that trends of digitalisation have provided many topics for academic consideration; the key matter is to weave these into other pertinent disciplinary bases, bringing forth insights from the edges of well-established fields of scholarship.

Descriptions of e-Government as an outsider in the mainstream PA research, *"interested in arcane questions about technology"* (Bannister 2019:103) frame it as somewhat disconnected from PA broadly. In comparison, IT / ICT have both tended to be seen, inaccurately, as the solution itself (Cain, 2001), in hyped technology expectations (Van Lente 1995, 2012; Borup et al, 2006). These ideas will be further explored below in Part Two charting the rise of Smart City applications across local government.

The persistence of NPM approaches is shown in practice, attended to in scholarship (Lapsley and Miller, 2019). Relatedly, specific focus on various ICTs as the solutions in and of themselves reveal the prevailing techno-optimist outlook in e-Government literature, tying to the central, defining role of the internet and ICTs to make governments better. This perspective aligns to both older parameters or more recent e-Governance, DEG and digital government transformation outlooks (Homburg, 2018; Bannister and Connolly, 2020). In more recent e-Gov research there is simultaneous description of and assumption about the trajectory of what is increasingly termed as 'digital government transformation' (Fountain, 2019; Eom and Lee, 2022; Liva et al, 2020). The scholarship indicates a blind-spot on critical dimensions, where techno-optimism and solutionism has continued as a normative practice (albeit rarely expressed that way, where technology usage is equated with advancement) unhindered in the policy world. Part One of this Chapter has examined the how the concept of 'data' and its role in local government public service delivery is often co-opted into these techno-optimism narratives. Whilst the e-Government field is

well-established as a distinguishable knowledge corpus (Kromidha and Cordoba-Pachon, 2014), design-reality gap problems (Heeks, 2006) continue and evade answer, inviting deeper examination of the practicalities in a different manner to describing e-Government interventions – or proscribing them.

In the following parts of the review, it is shown that NPM's reform mechanisms have restricted data's primary role simply to that of metrics. Taking a business view of public sector became normalised, extended to include direct government operations. The impact of disaggregation and goals for 'joined up government', a reaction to disaggregation, pursued by the Labour Government's Blair administration, linked to the Directgov2010 work reviewing the online presence of UK government services (Fox, 2010), and led to establishment of the Government Digital Service (GDS). This has continued important work to simplify public interface with government, at national level, maintaining public service recipient or 'citizen' experience dominance. However, this elevates satisfying public needs with an individualised outlook: meeting needs of each member of the public and lessening older perspectives of collective provision for enabling societal value universally (linked to core PA values; and associated to specific, normative standards of that society), which may have prevailed with less heightened (myopic) emphasis on customer satisfaction.

There is now arguably a blind spot regarding internal governmental workings in operational service delivery within digital advancements. Local governments need to point to more granular evidence of success (by whatsoever metrics) compared to other public sector and even national government bodies (where higher-level statistics may suffice). This is particularly apparent in the context of recent calls to be data-driven (Mayer-Schönberger and Cukier, 2013; Symons, 2016; Keller, Lancaster and Shipp, 2017; among others) and the expectation of a-political (albeit unachievable - see Green, 2021) evidence bases for policy development and / or service implementation operationally, day-to-day.

Part Two 'Data and Smartnes In (Local) Government Business' will now chart the rise of data in government work, predominately to show ways the work of government is increasingly in service of data since data itself makes promise – is expected - to catalyse multiple modes of improvement to the work of government.

2.2 Part Two: Data and Smartness In (Local) Government Business

The literature review now considers local government within continued public sector reforming efforts. In the section above, I have shown that reform agendas connect with oft-stated goals of transformation, achieving better government, which is a foundational, defining concern of e-Government. I now examine the longstanding role of technology in reform, and how data features particularly in a government setting, with considerations that stem from government needing to be accountable and transparent. This aspect is brought together with the outlook of good business practices, connected to topics explored in Part One.

Data's main role for information provision and streamlining is shown by drawing insights from literature addressing operational activity under auspices of 'smartness' gained via ICTs and data, such as Urban Planning, as very relevant at local level. In this set of debates, data availability and sharing are seen as a central concern to ensure multiple collaborating entities together achieve better outcomes. Nowhere is this more evident than in discussions of the smart city concept.

2.2.1 Technology and Data in Government

The public sector has sought to use ICTs for reforming purposes for more than 50 years (Garson, 2006; Meijer and Bekkers, 2015; Zhang et al, 2014). During the past decade, expansion of data – literally, in superabundance from datafication (Lycett, 2013; Van Dijck, 2014) - alongside promises of what data can catalyse, has moved debate about technology applications in public sector, including government, to new spaces. This invites consideration of novel challenges, for instance appropriate handling and use of various types of data (for example personal or crowd-sensed), cyber-security, alongside more existential matters pertaining to digital capitalism (Sadowski, 2020), and ethical parameters of synthetic data, Artificial Intelligence (AI) and Machine Learning (ML). More recently, there has been an uptick in debates about 'technological colonialism' (Magalhães, and Couldry, 2021; Lazem, et al (2021).

Data is fairly absent from early e-Government research, although the topic has come to the fore recently in conjunction with open data and open government goals. In early e-Government literature, where 'data' is present, it tends to be in the preliminary phases of

sought-after transformation as basic information management, shown in stages of growth models (Layne and Lee, 2001; Coursey and Norris, 2008 for overview). In more recent scholarship on 'digital government transformation', when data is addressed, it tends to be done in a transactional and extractive manner, such as in consideration of software or hardware for managing data resources, or issues and opportunities about open or big data, focusing on access to serve goals of transparency, accountability, and economic stimulation.

These frameworks position data as a necessary means to share information with and across services provision partnerships, elevating the data access view. They also frame data as a primary way to demonstrate that provision of services has been undertaken well, or show ways these have fallen short, serving accountability and transparency aims. Again, however, the (implied) role for data stalls at the stage of being a means of evidencing, providing report of activities undertaken to meet accountability and transparency aims, not considered in a more holistic manner. A greater data role than merely reporting is shown in the context of 'smartness' and 'smart cities', the focus of the next section. However, it is shown how the reverence of data detachedly and lauding of its objective worth as a panacea presents a flawed picture of what it means to work with data in the local government setting.

2.2.2 Smartness

A smart city is an ecosystem of stakeholders engaged in processes for sustainable transition and improvement, to achieve 'better' quality of life in a territory (urban or not), by using digital technologies to carry out related actions (Eurocities[21], n.d.). To achieve smart city goals requires integration of all those with vested interest into decision-making processes, covering public organisations, private companies, civil society, the public; essentially everyone as a member of the public in the locale, and myriad entities. This is asserted as achievable through using new technologies, via e-services, intelligent management, and provision of data, especially in management of big data. The extent that decision-making is collaborative and dynamic, versus introduction of touchpoints to these processes achieved via data (informational) inputs is uncertain.

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[21]European Union 'Eurocities' "smart cities" https://eurocities.eu/goals/smart-cities-digital-transformation/

Including the smartness topic is important to account for a strong line of scholarship running alongside e-Government literature from the turn of the century, starting from ranking of medium sized European cities in measurement of 'smart' by Giffinger et al (2007). Then followed Hollands seminal article in 2008 (reprinted in 2020, for 'The Routledge Companion to Smart Cities'), further developed by many other key authors, such as Giffinger and Godrun 2010; Schaffers et al, 2011; Leydesdorff and Deakin, 2013; Deakin, 2014; Vanolo, 2014, among others. They argue that governments have a role providing infrastructures that enable the public to live 'good lives', (not clearly defined, but addressed in an inclusive manner). Proponents of the smart city argue that becoming such is best way to achieve a strong economy and its associated 'good life.' Specifically related to big data in the smart cities context, work by Löfgren and Webster (2020) explores the value chain (2020:4 Figure 1) to evaluate promises from big data, considering themes of data quality and reliability. Additionally, Webster with another co-author interrogates the smart cities work as potentially re-generative in the Scottish context in a case study of how Glasgow delivers smart governance as a post-industrial city (Leleux and Webster, 2018).

Data is a central component to smartness. The above authors interrogate and critique ideas constituting the smart city ideal, particularly for achieving 'sustainability' – which due to the worsening climate crisis is increasingly placed centrally in smart urbanism, covering multiple tenets (social, economic, environmental). Governments have a role providing frameworks and infrastructures enabling the public to live good lives, accommodating myriad definitions of what a good life entails by reduction to core, facilitative elements. Furthermore, the 'big data' aspect in smartness corresponds to the genesis of e-Government itself which started out as a working group in *"l'informationalisation"* (from the French; see Bannister, 2019), concerned with ways to handle huge swathes of information in the Information Society (Castells, 1996), slightly pre-dating the 'Digital Age' before the widespread presence of the internet.

Drawing together smartness and e-Government, the foundational dimensions of the smart city are now presented in a widely recognised categorisation. Giffinger and Gudrun (2010) highlight a model of six smart city dimensions. The model builds on smart cities ranking analysis of European cities (Giffinger et al, 2007), to propose classification of smartness in themes, covering Economy, Mobility, Governance, Environment, People and Living. Given governmental role in public provision, the government contribute to all dimensions, although the 'governance' dimension has explicit mention of governments' part in co-

ordinating effort, where arguably data plays a major role via (timely, accurate) information availability to all partners. Overtly, the Smart Governance dimension highlights participation and transparency, whereby smart city actors focus on making public actions (covering services to the population, as well as decisions) more open and transparent. Data is conceived of as a discrete entity for communicative purposes, essentially as reporting, with the intention of enabling better decision-making.

There are multiple examples of the smart city being heralded as the means to achieve a better society, and the thesis attends to these in the Scottish context within Chapter Five. These occur in the face of vast challenges, from ageing infrastructure, reduced public sector budgets, and even proportionately less working-age population, all with implications for physical and social systems. Additionally, technical affordances of sensors allow monitoring and analysis of that which was previously unable to be, for instance traffic flow, down to vehicle type, or pedestrian activities, all at great granularity, accuracy, and scale. These computational advances and increased urbanisation are smoothly folded together to make a case that a smarter approach to living is better.

This approach to smart cities, as the best solution to aforementioned systemic challenges, is presented as technological. This reflects the same narrative frameworks in which e-Government could achieve better delivery of public services by streamlining operations to give a smooth user experience. The technology and data 'user' here can be both city managers, as local government employees, or members of the public. In academic smart cities literature, councils' own plans, or outputs from 'GovTech' providers in technology companies and management consultancies developing and promoting innovation for government, reference is made to benefits for those who live, visit or work in a geographic locale. The term 'GovTech', using the World Bank's definition, refers to a technology-based government approach to public sector modernisation covering three core ideas: universal accessibility, citizen-centric services, and the delivery of efficient and transparent government. Oftentimes outputs read like marketing materials, and it has been widely acknowledged that major stakeholders stand to gain, so the smartness narrative may embody some aspects of corporate storytelling (Söderström, Paasche and Klauser, 2020).

In contrast to cities own strategic plans, supported by technology providers, many authors depict the smart city movement in more critical terms. Alongside the widely cited work of Söderström et al. (2020; first published in 2014), Odendaal (2016) also accounts how slick, marketing-related conceptualisation of a 'smart city' can be misapplied to the detriment of

the broad cross-section of people in an urban area. Furthermore, it pushes a certain type of urbanism, of a transactional variety that seeks to eliminate real-world's messiness stemming from diversity and pluralism; to sanitise and streamline. This perspective is further explored in the article 'From "Smart in the Box" to "Smart in the City": Rethinking the Socially Sustainable Smart City in Context'. In this text, Aurigi and Odendaal (2022) demonstrate how the visual language of corporate smart city visions promote a type of 'ideal city' - a single, seamlessly connected unit whole enabled by its ICT infrastructure and data flows - shown through examples and analysis of the Innovate UK generated 'cities of the future' video. Aurigi and Odendaal (2022) emphasise local context for the purposes of strengthening social sustainability, arguing that the concept of the smart city may leave out important nuances encompassing the social and spatial aspects that make places unique and serve local needs. They distinguish between a *"pre-packaged, product-like version of the smart city"*, i.e., 'smart in a box', and how a city could be deemed smart out of the box to be 'smart in the city'. This, the authors posit, would be a context-sensitive city-making approach that would apply digital technologies and media to be significantly more socially sustainable (Aurigi and Odendaal, 2022). Thereby, they highlight deficiency of technology-driven solutions to complex social issues that serve to weaken claims on improving social sustainability within these places.

Computing science scholar Ben Green has written extensively about the smart city and the problems of a techno-solutionist outlook. In his book 'The Smart Enough City' (2019), Green puts forth his *"tech goggles"* perspective, which is grounded in two beliefs: first, that technology provides neutral and optimal solutions to social problems, and second, that technology is the primary mechanism of social change. Moving from technology to address the specific topic of data, Green subsequently has written a strong argument about the inevitability of normative constructions of society in data science work, and the imperative that data scientists do not see themselves as a-political actors (2021). Continuing on the topic of data, scholars in the tradition of Science and Technology Studies (STS) have questioned claims of objectivity in data altogether (in Muller et al, 2019) and it has become more common to highlight bias in data and associated algorithms, aligning to arguments that data is not inherently objective, raw or factual (Green, 2021; O'Neil, 2017; Gitelman, 2013).

Data supports opportunities for insights. However, data and technology are not detachedly a panacea (Sætra, 2023), and nor are statistics (Miller, 2005). Scope for permitted improvements is not solely dependent on having the data, and nor even deriving insights

from data. Any insights necessitate transference to information and knowledge of relevance in the system. Questioning techno-determinism in smartness, this section draws out what smart is versus what it ought to be, in goals of doing better, what 'better' refers to, and who may win or lose with this goal.

Consolidating these points of view on smartness, its main promise in the lens of a local government locale (city or otherwise) emerges in how technology can and should provide solutions, with objective truth in its associated data. This occurs when data is more effectively analysed, for instance when enabled for smart city purposes via APIs for data access by multiple partners, used to create dashboards that streamline efficient running (management and oversight) of complex networks (Kitchin and McArdle, 2016). The implication is that workers need only read data on the dials via selected indicators for easy decision-making, devaluing the interpretative work required in other paradigms. Note, this point need not only apply to urban settings; there are examples of smartness as a policy and strategic goal in many geographies and domains. Dashboards have become a popular management tool in the digital age given widespread sensor usage and data abundance.

The main strategic result sought is streamlined delivery of city services, not only as physical infrastructure but across other more nebulous, amorphous domains, such as democratic participation of a 'smart citizen', across Giffinger and Gondrun's (2010) dimensions in the multiple domains; be the topic education, care, leisure, all is ready to be - in business terminology – streamlined and optimised. On dashboards and data usage, Sadowski (2024) offers recent ethnographic work investigating two data dashboards used by strategic planners in an Australian city. Viewed as a techno-political process, the exploration of recent dashboard failures highlights how dashboards are seen as an object of desire, to achieve the promise of the urban imaginary that the technology and data visualisation control console symbolises, challenging 'plug-and-play' promises of frictionless application in real-world settings (Sadowski, 2024). My thesis takes these discussions of smartness as a jumping off point, to show that these objective-seeming technologies and the data they both create and apply are not in fact as objective a source of truth as they may seem.

The next section looks more deeply at the 'business' motivation for local government, and data's role therein.

2.2.3 Doing Business

Despite obvious disanalogies with commercial organisations, over the last two decades the neoliberal political climate across the UK has persuaded public sector bodies to conduct themselves as a 'business' (Fuller and Geddes, 2008; Hartley et al., 2002). This is the business of serving the citizen — or society broadly — whilst allocating resources prudently (read: effectively and efficiently). Consequently, it is not surprising that local authorities have attempted to emulate businesses in making more effective use of their data as part of a broader modernising agenda.

The dominant in-work framing for government, still impacted by NPM and heavily influenced by private sector perspectives of 'good' business, has accompanied a rise of deference to numbers - and certain, methodologically privileged forms of data - for confirmation (evidence) of public provision success. This is not a new phenomenon. The etymology of 'statistics' comes from 'state' (Beer, 2016a gives historical overview), indicating a longstanding genesis for the role of state-sanctioned information to support governmental activities. But although placing trust in numbers is not a recent phenomenon (Porter, 1995), this conflation of numeric trustworthiness and 'truth' eclipses the different ways knowledge gets made (ibid; also, Van Meter, 2020).

Whilst DEG's toolkit of providing holistic services via reintegration, accommodating digital changes in administration (Margetts and Dunleavy, 2013) emphasises core PA values of accountability, transparency (see Hood, 2014; Mabillard and Zumofen, 2020 on complexities), and public participation, NPM values also permeate 'good' in government work with business-derived efficiency styles, such as streamlining and customer satisfaction. However, governmental work is inherently complex and efforts towards efficiency can fall short by missing outcome-achieving effectiveness. Indeed, Hood has researched NPM for many decades and in work with Dixon shows how its claims remain unfilled (Hood and Dixon, 2016). Similarly, Kirkpatrick et al. (2018) show how hospitals advised by external management consultants on improving efficiency were beleaguered with cost overruns and inefficiencies. However, governments can select particular metrics and thereby claim successes using biased data and statistical outputs (often highly aggregated), in unavoidably political settings, with intense scrutiny and consequences of inadequacy. Additionally, mandate local government act as digital businesses[22] (Audit

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[22] See: https://audit.scot/uploads/docs/report/2021/nr_210114_digital_progress_lg.pdf page six: *"In 2015, the Scottish Local Government Digital Partnership (Digital Partnership) was established by SOLACE and the Local Government Transformation Board to drive the ambition for all councils to be digital*

Scotland, 2021:6) is national policy, deemed optimal for meeting public needs. This follows from early e-Government expectancies of services provision utilising channels available after diffusion of the internet and connected, personal devices.

The review now considers views of the core purpose of the 'local' arm of central government. John Stuart Mill, writing in the Victorian era, stated elected local government is needed since local-level knowledge, interest, and expertise increases ability to oversee provision of services in that locale in more effective and efficient ways than at distance from the base of a national central governing entity (Mill, 1975). Building on Mill, Chandler (2008) highlights two overarching justifying views local government, which are presented and worked through to the 'data role' focus at hand:

- *expediential justification - value to the extent that the activity or institution serves purposes of another activity or institution* (2008:356).

In this context, local government is instrumental and functional, pragmatically providing business support to central government. For data, a transactional view fits well here, reporting updates on activities undertaken on behalf of central government. This demonstrates how to be 'data-driven' (i.e., led by data's factual basis) is often seen as a way of bypassing the act of creating / interpreting meaning.

- *ethical justification - values an institution or activity because it fulfils a morally desirable purpose in itself, regardless of its value to other organisations* (ibid.).

This perspective encases the ideology of local government workers undertaking moral acts of service, including operationally, at the 'edges' between the state and the public at closest point of contact. Subjectivity and normativity related to data's role is more evident. In this framework, data creates knowledge in-situ, by providing the raw materials for interpretation into insights. These ideas are further described in Chapter Three, but it is worth highlighting now that data use and the values thereof shapes understanding, rather than purely vice versa.

Chandler concludes that (Mill's) expediency has won out over ethics (2008). He makes no direct comment on data's role therein, writing before the ascendance of 'big data' as a

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businesses by 2020. *It is a collaboration between all local government organisations involved in digital transformation, including all 32 councils in Scotland."* [emphasis added]
Also see IBM's 'Business of Government' Centre and associated 'smart' and GovTech outputs and techniques.

societal phenomenon since approximately 2010 (Lycett, 2013 Kitchin, 2014; Beer, 2016b). When data is valued primarily in its metric capacity, this well serves an outlook of expediency. Therefore, discourses about being data-driven (often quantitatively) eclipse the ethical and translative work fulfilling moral purpose. I argue that in data work, local government has been viewed as an outpost for operational activity, with far less intentional scope for discretion in advancing services delivery. Thereby, the primary role for data has been in reporting back to the central base: data is collected to go 'out' and is not seen so much as an ingredient for decision-making 'within'. This is partly linked to the fact that in operational work, the decisions are seen as more mundane since they are not in policymaking but rather implementation.

Whilst it is out of scope to give a comprehensive overview here, following the localism agenda across the UK since 2010 and its academic consideration (e.g., Evans, Marsh and Stoker, 2013; Eagle et al, 2017; Jupp, 2021), there is no unanimity about which fundamental local government justifications are preferable. Additionally, given the close interface with the public across multiple services that must be delivered at the street-level (considered in Part Three below), and following experiences during COVID where the local level was critical to addressing local needs in an emergency (Gangneux and Joss, 2022), this remains unsettled. Additionally, this is a political matter, pertaining to ideology and the ruling administration's stance.

Purandare (2021) highlights, in the Indian smart cities context (a major effort in the Modi administration) how local level nuance and contextual sensitivities can bring out the relevance of data or information in seeking smart applications, as has Loukissas (2019) emphasising the hyper-local in how data is made and applied with need for critical engagement. Purandare (2021) further cautions the promise of management consultant smart city 'experts' who parachute into a locale without local, cultural sensitivities. Haveri (2006) applies a similar local-sensitised approach in the Finnish context, where he addresses complexity in local government reform to highlight limits to a rational outlook given the politicised nature of the municipality as an institution. Pedersen (2016) considers the topic in the Danish context, finding considerable bricolage. More recently, authors Castelnovo and Sorrentino (2024), drawing on Italian context, argue for a shift from reducing complexity to embracing complexity in relation to local government reform.

Overall, whether ideally justified by expediency or ethical action, operating as a business has been a prevalent approach for many decades across all levels of government and the

public sector in the UK (including Scotland). Expediency as a justification corresponds to pragmaticism in achieving parsimony, and customer satisfaction in service provision, as opposed to more complex matters of what is 'good' in a normative, ethical sense.

2.2.4 Measuring Success: Complexity in Public Needs and Service Provision

Public Administration scholars addressing management topics have concerned themselves for a long while on matters of improvement and reform in public services, considered in Part One. Delivering services is a core, fundamental activity of government and these services are 'public' in their nature: they are for the whole public.

However, whilst some services are fully public, provided to all, there are others that are provided only to some, those who qualify for that service, be that due to age, financial status, or other criteria. The point is to emphasise variability of public services coming down the line. The local level is where the vast majority of services finally reach their recipient. Public services being available in some contexts for the whole public (roads and refuse collection, voting) and in others for specific groups (parents, the destitute, car-owners) shows the widely varied manner of determining success and satisfaction in provision. For instance, are the roads fit for purpose? Perhaps in some areas they are not due to proliferation of potholes. Is the individual supported in their housing needs? Perhaps yes in that they are not officially homeless, but not since the solution to the situation was to transfer them to an area with more social housing, hundreds of miles from their support networks.

In such a complex context for local government, with many, widely varied public services provided, the attractiveness of metrics to determine both the 'optimal' solution and to evaluate the subsequent success of that course of action is strong. These metrics are deemed available via data availability and analysis. This overlooks work setting boundaries of data use. Proponents of smart systems, as in section 2.2.2, present how technological and data-led work permits clarity of problems and their answers. Without dismissing the broad value of data in supporting problem articulation and highlighting possible solutions, this work of creating solutions to meet the public's (collective or individual) needs requires acts of interpretation, so courses of action are placed in hyper-specific social contexts. Public service requires interface to collective and individual social lives. It is therefore an act of social interpretation, not simply reflection of objective truths. And yet, by lauding detached truth in data, efforts by workers at the street level (Lipsky, 1980; more in Part

Three below) are dwindled or even intentionally eliminated. Local government staff may have a role increasingly serving technology, rather than the people they are intended to help, so the technology serves the people. At the same time, discretion has shifted to system designers, who invariably lack domain specific service expertise - albeit they may be skilled at UX and UI (Hupe, 2022, citing Bouvens and Zouridis, 2002). Street-level bureaucrats are subjected to e-Government imperatives for better government service offerings to the public, ideally always improving. This push for greater automation in bureaucracy reflects a view that chance is a potential unreliability, and increases the risks of bias or prejudice.

Public life is comprised of messy co-existences. Some situations exist for 'greater good'. Car usage provides a good example: local governments perpetuate car use by providing many roads that permit private cars, and on-street parking (off street parking too, but this is often privately delivered). When an authority wishes to progress an agenda that prioritises other transport modes, this will be deemed inconvenient to many. However, others may be supportive. The point in this is that balancing is always required. Not all public services are apt to be evaluated on individual recipient satisfaction. Policy decisions and services may serve wider purposes, like improving air quality or promoting active travel for public health benefits. This shows that not all decisions can come directly or solely from data since multiple data can be applied supporting opposite sides, depending on preferences and weightings applied to the policy, strategic, or legal goal. This can perpetuate risk-aversion, which ironically can lead to a culture that compels incremental changes over transformative innovations (Brown and Osborne, 2013) despite a near constant invocation of the term 'transformation'.

Often presented as utopian, for public servants the smart city arguably represents relief from pressures of balancing competing public needs and ideologies, by drastic and myopic reconceptualisation of cities into technology problems. However, in blocking off legitimate political debate in the name of technological progress, presumptions of neutrality tend to bolster the status quo and obstruct more systemic reforms (Green, 2019). The mirage of objectivity is a common fallacy when quantitative and technical methods are involved - *"A decision made by the numbers . . . has at least the appearance of being fair and impersonal"*, explains the historian Theodore Porter, since *"Quantification is a way of making decisions without seeming to decide"* (1995:8).

This Part of the chapter presented motivations in data work, with associated expectancy of and from its usage as a government concern. This was linked to management of performance targets and in delivery of services broadly, governance goals, strengthened evidence bases for policy decisions, and various core public administration values of accountability, transparency, and reliability (Twizeyimana and Andersson, 2019). The particularities of the local level were also considered, and core tensions including the basic justification for local level government as an outpost for national government, or something vital on its own merit. The purpose is to consider (varied, multiple) roles for data in government.

The highlighted over-focus on locating, making, and sharing data - aspects of data availability - arguably links to presence of multiple public services delivery partners, all needing access to information, common in smart city approaches with collaboration to reach societal goals, and looking to the market for provision, or support, of certain services. This is a direct result of NPM reform, strengthened by expectancies that smartness, with core features of ICTs and associated data interoperability, support better service provision. Gains from leveraging data assets - and smart applications creating ever more data (data superabundance) – are an inevitability, following from data existence and access. However, focus on mobilisation of data risks dilution or even elimination of necessary interpretative and translation work in handling data for public service delivery transformation, in making data useful and valuable in named contexts, within political settings which are not devoid of ideological identities.

Next, Part Three of the Chapter more closely considers the 'giver' within public service delivery acts, especially at the local government *"street-level"* (Lipsky, 1980), building from other authors' discussions of the lack of attention given to the internal intra-organisational elements in data work (Zhang, Xu and Xiao, 2014). Instead, e-Government has attended mainly to the interactions between the state and business, citizens (the public) and other public sector entities. The e-Government focus is shown to have largely attended to management, information systems, technology application and direct concerns of public administration, addressing democracy and public participation, largely ignoring operational level actors (not in official policymaking) working in local government, or calling for their roles to be altered in business process re-engineering, streamlining of services provision and automation.

2.3 Part Three: Local Government's Data-Work Workers

The final Part of the chapter develops ideals of local level government workers at street-level in public service/s delivery, pointing to staff roles interpreting meaning when context-specific value is co-created between the service provider and recipient. Co-created value-building occurs in direct and indirect ways, depending on whether the service occurs face-to-face with the public at the point where data associated with operational activities happens, with such data able to be drawn upon and made useful through adjustments that improve provision. The main point is that interpretative effort will occur, such as in application of service specialism and discretion within the unique circumstances to make the data useful in action, and not only theoretically valuable.

2.3.1 Data Work at the Street Level

The concept of 'street-level bureaucracy' (SLB) is attributable to Michael Lipsky (1980), who theorises working practices and beliefs of front-line workers in public services and the ways in which they enact public policy in their routine work. The SLB term has germinated its own sociological theory (Hupe and Hill, 2007). A core element of the concept is the ways that policy implementation, or informal shaping, occurs in operational settings *"at the street-level"* by actors in direct interface with the public accessing services provided. These actors are public service workers who interact directly with citizens in the course of their jobs, and who have substantial discretion in the execution of their work (Lipsky, 1980). The concept pre-dates the internet, although for the 30th anniversary re-print in 2010, Lipsky confirms his view that the idea remains relevant. It is noteworthy that the ascendence of data has occurred since that date, as considered above; nevertheless, the concept remains in frequent application across literature (e.g., Wang et al, 2024; Hansen et al, 2018; Chang and Brewer, 2023).

A great deal of scholarship applies SLB ideas to various thematic public services, such as health or education (Finlay and Sandall, 2009; Erasmus, 2014; Bell and Smith, 2022), and research outputs exploring how the concept applies where digitalisation is a policy for digital transformation of government (Hansen et al, 2018). For this study, SLB is relevant where government actors are expected to draw on data during their operational, public-facing activities: being data-driven in alignment to strategic imperatives at local and national levels, achieving policy goals. This applies both in direct contact with the public,

and back-office since e-Government trajectories catalysed greater automation and usage of digital platforms as methods to serve the public.

Hupe and Hill (2007) see Lipsky's stress on autonomy of street level actors as public service professionals indicating awareness they work relationally in a micro-network, in varying contexts. The authors posit that the *"conception of 'governance' adds a particular aspect to this: the multi-dimensional character of a policy system as a nested sequence of decisions"* (Hupe and Hill, 2007:279). This emphasis on networked decision-making in social settings is important, inviting consideration of whose decisions matter, and how undertaken, with 'data' (howsoever conceptualised and defined) a foundational component in decision processes. This point links back to Chandler (2008) at 2.2.3 in Part Two on expediency or ethics as justification for local government, where expediency is the logic, consigning local level government actions occurring within an operational outpost for central governments' policy implementation via services provision, rather than recognised as occurring on their own merit as the closest point of contact between the public and the state. This is an important element, given the conceptual progression from NPM, through New Public Governance to Digital Era Governance (Dunleavy et al, 2006), and now digital transformation of government (Luna-Reyes and Gil-Garcia, 2014). Continued effort is necessary to understand government's role given the rise of (digital) data, alongside ongoing claims that governments do not do enough with their data (digital or otherwise).

In the field of PA, researchers such as Meijer et al (2021) consider data in its role for algorithmic policing with call for caution in instituting automated systems in political and social contexts by highlighting interpretation and judgment, and risks in locating decision-making control in black-box systems. Algorithms are explored explicitly in relation to public value in big data by Andrews (2019). Furthermore Meijer (2018) looks at data topics as 'governance games' covering the politics of data collection, data storage, data usage, data visualization and data access, to highlight significance of socio-technical structures in 'smart cities' work.

In the context of the overarching PA concerns, research about the role of government and the interface with the public in relation to information is addressed in one side of e-Government's root literature (Chadwick, 2009). On the other side, the subjectivity of concepts like discretion are mainly avoided, since IS concerns itself mainly with information systems (re-)engineering and objective improvements, ring-fencing as distinct more political aspects. It could be argued that more transactional concerns of the IS root

influenced e-Government discipline, pulling focus away from existential, democratic themes.

Arguably, this oversight in e-Government research stems from a view of e-Government as both a goal and an area of study. E-Government is often seen as an application-oriented field, and thereby prone to making such an error of substituting the daily concerns of e-Government applications for core subject matters; in this way e-Government should aim to achieve a better integration with the public administration literature (Yildiz, 2013), and also with new disciplines such as CDS, to facilitate application of a critical perspective to the broad domain.

In 'Digital Government at Work', McLoughlin and Wilson (2013) consider the role of data within digitalisation, advising usage of federated models for data management and data stewardship in a government organisation, due to dangers of too much integration and centralisation of data. This makes an interesting point about data in use and re-use across local government. The NPM philosophy of disaggregation, outlined above, may have contributed to the tribalism and 'silo mentality' (Tett, 2015) whereby in relation to public services delivery, operational staff overlook how their data and information has value elsewhere in the organisation. This silo structure exists where staff based in one information system or subsystem strongly identify with their narrow work unit, and do not operate in effective connection to other work units within a broader organisational whole where work units should be related. In Tett's book, she cautions against organisational siloes (2015), and her stance resonates well with the 'open data' and 'open government' trend, as well as reintegration from DEG's toolkit. Whilst siloes are detrimental to joined-up approaches, expertise is needed to translate and interpret meaning in specific data work contexts. Part of the challenge are rigid public service bureaucratic structures, often necessary to ensure democratic standards. The suggestion of federation for government databases has merit in retaining greater user-relevance for those who apply data for support delivering services and helping manage data (including retaining control where necessary).

At the operational level many public servants perhaps perceive some relief from the overtly political. The policy is set, and the matter for street-level actors, across whichever thematic domains, is merely to implement, delivering courses of action. However, in drawing upon data, politicised complication is not removed since all is political and all data science engages in normative constructions of society (Green, 2021). Expertise is a

core component in bringing forth value from data, and for government work that requires sensitivity interfacing with the public as a neutral, but fair enabler of service provision.

2.3.2 The Goal of Transformation

Having introduced the concept of street level bureaucracy, the chapter turns to articulate where digital transformation goals exist, and of what type, to position how public service delivery activities are impacted by data and its use at work in public services provision. This connects to the tech goggles view (Green, 2019) in section 2.2.2, of societal improvements and problem-solving, considered in relation to smartness. There is also a known expectancy of benefits – advances – from using technology (Van Lente, 2012; Borup et al, 2006). Overarching mandates for transformation are understood as requiring radical change for improvement (West, 2004), via digitalisation to completely alter an entity's core value proposition (Wessel et al, 2021).

Transformation in most e-Government outputs focuses on transformation of the customer, service recipient experience, towards a result of the full integration of the e-Government experience, in stages-of-growth models (Layne and Lee, 2001). This is shown in a proactive outward push of services, as a *"one-stop"* (joined-up) or even *"no-stop"* (proactive services) shop (Scholta et al, 2019; 2022). This perspective corresponds to a view of public services as units to be delivered and does not well accommodate how street-level local government work occurs, undertaken through acts of service in a more multifaceted way than in direct 'giving' of services to recipient 'takers'. The needs of the public are rather co-constructed in a dynamic exchange between the two sides, in a 'G2C' and 'C2G' manner (Cullen, 2010), requiring translative work particularly on the side of the authority. This work is not done (solely) in an institutional way but is also progressed by individual public servants as bureaucratic street-level actors.

On the matter of transformation, better government is a political matter where there should be room for dissent, but the data-as-answers framework shows contempt for politics (Greenfield, 2017). It seeks to tidy up the messiness of real-world pluralism by seeking deterministic and positivistic answers. The streamlined objectives of effective and efficient service provision risk obfuscating the bigger picture and the normative constructions of society made by actors in the various data spaces (Green, 2021).

The purpose of this thesis is to build on earlier foundations to develop how government reform connects to possible transformation, considering digitalisation with its associated data. Warner and Wager (2019), publishing in the strategy journal 'Long Range Planning' present their qualitative study exploring how incumbent firms in traditional industries build dynamic capabilities for digital transformation. The authors use Fitzgerald et al. (2014)'s definition of digital transformation as *"the use of new digital technologies, such as mobile, artificial intelligence, cloud, blockchain, and the Internet of things (IoT) technologies, to **enable major business improvements** to augment customer experience, streamline operations, or create new business models"* [emphasis added] (2019:326; citing Fitzgerald et al., 2014:2). Warner and Wager's (2019) findings point to agility as the core mechanism for an organisation's strategic renewal. Following this approach the 'business' of government runs into a philosophical quandary given it is fundamentally not a business, and is unable to be satisfactorily framed in business terms and still achieve transformation, without an undoing of the governmental conceptual core. Even with absence of profit motive for government, parsimony and frugality as best-value public service provision that offer a form of monetary gain (not profits, but savings), get emphasised as key transformational goals.

Business terminology and ambitions matter in part because a successful business emulates what other successful business do. In the context of digital, data and transformation thereby, the most successful businesses are heavily leveraging data assets to improve service offerings to their customers or client base. There are many, across scholarship and practice, who point out the vast data troves held by government, no less by local government where a lot of the operational work gets done, and therefore generates data of various types (Robinson, Yu, Zeller and Felten, 2008; Keller., Lancaster and Shipp, 2017). Furthermore, in the private sector handling of data is direct and exploitative, where the data is leveraged by being manipulated and wrangled, to goals of increased sales, user satisfaction, and suchlike. Whilst local governments don't make sales, they do want their services to be well used: if there is an entitlement then a best-case scenario is that the entitled recipient gains that service, with ease. Local governments also want 'customer' / public satisfaction, as a means of obtaining trust and approval from the public. It is directly mandated that they must effectively and efficiently meet the public's needs ('Best Value' in the Local Government in Scotland Act 2003 – and see revised guidance[23]). Above I

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[23] Scottish Government 'best value' statutory guidance https://www.gov.scot/publications/best-value-revised-statutory-guidance-2020/

showed how e-Government literature is primarily concerned with getting services to the public (via the internet and usage of ICTs as channels), and ways to improve this and be 'better'.

Where, drawing lessons from business planning, strategic operations, and management, as considered above, the improvement of government via the use of ICTs / internet is conceptualised in a business-linked manner, the advice is to ape private sector practices – or more generously – to advance its own business arrangements and utilise resources available. In the language of business, resources are capitalised. This connects to the section on smartness, where it was shown how 'data' itself is viewed as a vital – and under-leveraged – asset in council management.

2.3.3 Worker Abilities in Digitalisation

I now turn to literature on data work itself. Hu (2018; 2021 reprint) writes about preparing public sector staff for the digital era, using frameworks borrowed from e-Government research to make his study. The research looks at the levels that information management, information use, and technology are incorporated into the graduate curriculum for students of Public Administration subjects across universities in the USA. Hu argues that when 'data' and 'information' are differentiated, this enables dedicated attention to be given to the necessity of data collection and the importance of informatics (2018:784). This point about what constitutes 'data' and 'information' respectively is an interesting one. Hu (2018) uses Bardach and Patashnik (2015) to define the two: *"Data refer to the raw facts – or 'representation of facts about the world'. Information consists of data that have been processed to have 'meaning' and to 'help you sort the world into different logical or empirical categories."* (2018:783; page 13 in original). Gitelman may bristle though at their assertion of data constituting raw facts (Gitelman, 2013) as would various STS scholars who question innate objectivity in data (Bates, Lin and Goodale, 2016; Gray, Gerlitz and Bounegru, 2018; Kemper and Kolkman, 2019).

Hu is right to emphasise the need to separate out data from information, where the latter is processed from the former via informatics. However, in critique of his otherwise useful and timely research on steps needed to address the lack of digital skills,[24] Hu omits to give reflection on the 'data and information' dimension when going through the findings from

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[24] Skills connected to 1. digitised information management and use, as well as skills explicitly 2. relating to new technologies usage. Both related to the internet as part of the broad 'digitalisation' agenda.

the empirical study. The five dimensions he uses for understanding the field of e-Government research are: (i) management, (ii) context, (iii) technology, (iv) data and information, and (v) politics and policy. These are borrowed by Hu from Garson (2006) and Gil-Garcia, Dawes and Pardo (2018) then expanded with the addition of 'politics' alongside policy and 'information' alongside data (2018:770). As noted above, although Hu rightly emphasises the importance of the data dimension, further differentiating it from information, he does not include as much analysis as he gives the other four dimensions (2018:778).

Borrás and Edler (2020) offer insights on transformative agency of the state as exercised through mixes of roles, by examining state digitalisation work across cryptocurrencies, smart cities, automated vehicles, and nuclear power. Borrás and Edler identify thirteen different roles of the state (observer, warner, mitigator, opportunist, facilitator, lead-user, enabler of societal engagement, gatekeeper, promoter, moderator, initiator, guarantor and watchdog), concluding that the role of the state in the transformation of socio-technical systems is underexplored. In my analysis, I will take up this call to further consider the ways in which data enacts the state's role in socio-technical – or sociomaterial (see Chapter Three) - transformations.

Data work skills

Working with data requires a range of abilities and these vary in relation to the type of data work being undertaken. It is unrealistic (and unreasonable) to expect any single worker would possess all the skills. Broad 'data' skills cover, for example: technical competency in computation for analysis; methodological proficiency; collection (creation) techniques across multiple formats (longitudinal, survey, ethnography, work with vulnerable or 'elite' groups); and other discipline-related aspects out with social science, since transdisciplinary is emphasised as a means of strengthening knowledge, and real-world impact from research. Indeed, some sought-after skills may be incompatible, but a wide range of skill-types are needed for ethical, responsible data work in the government setting.

For Johnston (2015), introducing the ideas of Policy Informatics, to even begin to utilise data in the manner now possible from digitisation and computation advances enabling data analytics, *"digital literacy must be valued in the same way as other forms of literacy"* (2015:9). Digital literacy is not limited to capabilities in digital realms; in includes the critical thinking to enable working within a bigger picture, taking a holistic view of the

government and societal systems with widened perspectives on persistent social, economic, and environmental problems. For many local government staff, the issue is not the rights or wrongs of pursuing transformation as reform agendas, instead it is about implementing those initiatives (Heeks, 2001). This is highly contextual and requires a dual macro-micro focus that considers the specific policy intentions as a burden or weight of duty borne by public servants, alongside the minutiae of the ways they work operationally to implement policy in acts of service and for delivery of particular services to the public.

This also must be understood in the context of many governments' agendas for open data and open government (Bertot et al, 2014). Such ambitions are important and have strong justification. Efforts at 'opening up' government as a substantive public good must accommodate space for translation of data therein (from whichever deemed admissible source). Sometimes these efforts take place in protected, closed spaces because much data falls into protected categories (such as personal data). These efforts are only as effective as the extent to which recipients trust in the governmental institutions and processes. The following thesis presents accounts from practice of local government data work to highlight how the expectations are experienced in practice, showing that the application of discretion and data users' tacit knowledge in speaking for that data has been underappreciated given the dominant view of data as material and factual.

Digital and data literacy

In the academic literature, digital and data literacy gets examined from a range of stances. Data literacy necessarily includes critical thinking skills that question the data, sensitive to both the provenance and the specifics of the usage context. There are increasing calls to upskill the workforce to strengthen and expand analytic capacity and get more out of data assets (Mateos-Garcia, Windsor and Rosevare, 2015; UK Government, various; Scottish Government, various). It is possible that these perspectives are placing data first, with worker roles applied in service of data, rather than elevating problems and ways of solving these. Although perhaps not exactly tech goggles (Green, 2019, above), the starting place of 'data' rather than in problem articulation and enhancement of service area specialism appears to be placing perhaps excessive trust in the data itself by reducing emphasis on the translative work (see also problems with inductive approaches, following the data, Frické, 2015). This bypasses the fact that that data analysis and interpretation need contextual knowledge and wisdom for data to become at all informative and effective.

The 'Digital, Data and Technology' (DDaT) jobs framework has been around since 2015 and matches to a central UK government imperative to re- and up-skill civil servants for the digital age. At the Scottish Government level, this is also evident. In Scotland, a Digital Academy has been established to support the wide array of Public Sector Organisations (including local governments) to develop the skills and capabilities deemed necessary to keep pace with changes, and to access the opportunities from more and better data use. This is considered in the next section.

2.3.4 Government-Promoted Data Work

This final section primarily references 'grey' literature, to describe how government has recently positioned and advanced data work. After laying down the outlook as a need to increase data skills of a certain type, the section goes on to consider data 'form', since this has bearing on how to gain value from data via improved data work, risking a perpetuated transactional view.

UK DDaT Professional Capability Framework

The Government Digital Service has recognised the need for a specialized digital and data profession in the UK government. Accordingly, the DDaT Professional Capability Framework, which appeared in 2015[25] outlines a clear set of 'job families' and the skills needed to perform those roles. This framework is composed of six employment categories including data, IT operations, product, quality assurance testing, technical, and user-centred design. In the data family, roles are: Data (1) analyst, (2) engineer, (3) ethicist, (4) governance manager, (5) scientist, and lastly - not including 'data' the job title - (6) Performance analyst.

Usage of 'DDaT' framework also applies at the national Scottish Government levels, covering local authorities (councils) and all public sector organisations. It aligns to the ambitions set out in the UK Government's National Data Strategy (2020), with a central ambition to make the UK a leading data economy.

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[25]As stated by Jenny O'Connor, Head of DDaT Capability, UK Government's Central Digital and Data Office see: https://digitalpeople.blog.gov.uk/2021/10/27/supporting-digital-data-and-technology-ddat-professionals-to-progress/

Scottish Government Data Transformation Framework (DTF)

At the strategic level the DTF sets out to deliver a high-level vision for the Scottish Public Sector, to help organisations to develop their actions for data improvement. At the organisational level, the DTF intends to support organisations to improve their data capability, with the framework acting as a scaffolding, providing support, and breaking down the concept of 'good data' into pillars to aid organisations in their data transformation process. Also, as part of the DTF, relevant related to data work and workers, there is the 'Data transformation framework: data personas report' (Scottish Government, 2021) that offered several data user personas, including six highlighted as priority areas for improvement across the Scottish public sector (including local government). These roles are Data novice, Data analyst, Leader, Data transformation lead, Technology specialist, and Data management specialist. They all come from the stance of operating in service to data, with the reasoning that in turn this will achieve results for service provision improvement.

Running in parallel to the DTF, or as a component thereof, the Digital Academy has been established to support DDaT, with the primary objective of enabling greater data maturity across the Scottish public sector, including in councils. Public sector targeted courses include 'Data Maturity', 'Data Science Accelerator', 'Driving Value from Data', 'Data analytics pathways', delivered by various partners including The Data Lab and the Local Government Digital Office, which are both mandated themselves to promote data-driven endeavours. The overt goal of data maturity does include reference to data use acts (only as high-level purposes that align to goals of transformation generally) but starts from data capability as an evaluation of DDaT aligned skills, to establish data work abilities at the individual level, and advises public sector organisations (PSOs) to undertake assessment of the particular data resources they hold, in order to improve management of the data. There is, however, a missing critical additional element pertaining to interpretative communities that work to draw out (or create) the insight and thereby value of data during use.

What data type: tangible data as an (under-leveraged) asset

DDaT makes explicit mention of statistics and of KPIs. Without an unequivocal statement of such, it appears the view on data is that it should be discrete and tangible since statistics and KPI data forms are quantifiable. Datasets are understood as fixed items. However, data is interactive in its making and usage. Decisions are made about what to 'capture' and measure, so exploring how and who does the choosing, alongside technical mechanisms of

and socio- processes for data admissibility is important. As addressed in Chapter Three, the socio-technical approach in digital transformation (Dawes, 2009) may not go far enough when considering 'data'. Similarly, across the Scottish Government civil service, including in the DTF, reference is made to public-sector held data as an asset that must be capitalised upon.

The data of government can be that which is made during governmental activities, or can be drawn from elsewhere, extending to other sectors and sources. There is a lack of restriction on what counts: being whatever is admissible. Those acting in public service, elected or not, have a role in determining admissibility, also speaking for data in acts of use within the context of 'government business', for instance in making laws, deciding policies, delivering services in managerial or operational ways - for the public. Some see better government decisions stemming from new technologies and open data (Puron-Cid, Gil-Garcia and Luna-Reyes, 2012). There is a chartable trend where discretion translating data is viewed as better relocated from the street-level (Hupe, 2022), since subjectivity risks prejudice and bias, instead granting decision-making control to technical systems and algorithms to help extract answers from data. This view of data is popular for those (data) scientists asserting their remove from politics, a problematic perspective due to the inevitable normative constructions of society undertaken in the work of data science (Green, 2021). Moreover, this emphasis on the scientific aspects of data is not even reflective of how most people think: Newman et al (2020) find that algorithmic decisions are perceived as less fair than identical decisions by humans, although focused on human resourcing contexts. Overall, there is merit to more exploration of the human aspects of data work in the Digital Age.

This Part of the chapter has considered work and workers conjunctive to data in government. There are multiple categories of government work, workers, and data in relation to data work activities or roles. Many groups use government data, for instance as official state sanctioned statistics, as open data for multiple uses and users, or as shared data applying highly sensitive data used in Trusted Research Environments (TREs). Since governments as organisations have as their main 'business' the good of all, the best for society, there will always be admissibility for anyone in said group (society) to comment, which in a democracy requires mechanisms and processes for public participation, and other fora such as public panels, and economic boards. This is also subject to mechanisms and processes, including the bureaucratic and democratic, to proactively deliver public benefit.

2.4 Conclusion: Work in Service of Data

Using a primary literature basis from e-Government, evaluating the role of government with data - or government data itself – highlights how little attention has been paid to data in substance, beyond matters of (objective) quality indicators, levels of openness, or other data availability concerns. Furthermore, data is frequently referred to in tangible terms, explicitly or implicitly. It is only by drawing in research from CDS and STS scholarship that questions are raised about implications of data proliferation, actual definitions of data (not solely tangible), and the re-making of our societies in an Information and Digital Age.

Closer linkage to other academic fields is beneficial because data is a central feature of digitalisation, and transformation through data is a major phenomenon of the digital age. However, data is not (only) the discrete, material artefact as framed by e-Government's IS root, focusing on technical systems and feedback loops in a computer engineering or information management sense; nor is it (only or primarily) rankings or metrics permitting evaluation of success detachedly via KPIs, where statistical and quantified information are deemed to enable better government. The PA perspective frames technology and data primarily as tools for accomplishment of public administrative tasks, with less attention to operational implementation and process as this topic has traditionally been addressed in other disciplines. However, there is a growing recognition that data – and digitalisation broadly – is having has material effects on core democratic issues.

The nuances of digital data, not only as an artefact but a concept at the base of knowledge-making emphasise the need for trusted institutions progressing public good. This leads to another thing data is not: a purely true, accurate representation of a society as an uncomplicated and factual contribution from citizens, for instance using sensors, surveillance or more positive crowdsourcing initiatives of citizen science, and other accepted processes to gather data (such as the census). Data is made and remade, holding within it the nuance of these acts of making and remaking, in translating the 'item' of data in acts of use. Data making parameters are set in methodological choices of obtaining that data (Albert et al, 2021).

The increasing presence of Digital Data and Technology roles reflects one way that governments have attempted to address claims of weakness in data usage. Here 'data literacy' and 'data quality' (further addressed in the next Chapter) are relevant concepts. Both the literature and government programmes, outlined above, tend to focus on the

objective qualities of data (such as availability, access and architectures of data), and less on how it works in practice. Overall, the question of how precisely useful data can be is under-interrogated. Techno-optimism and techno-solutionism prevail, and eclipses some of the potential for these more critical arguments. Data security and privacy or surveillance topics are well covered, bolstered by GDPR impacts, but there is little scholarship on the translative element of data use in government work. The literature on this topic must be drawn from many different fields, navigating the complex terrain of definitional nuance and variation, risking perpetuated fragmentation.

Addressing 'what role for data' in the context of public services provision necessitates roles for data workers in partnership to 'the' data, since data is not immutable, discrete nor objectively factual. Data holding a contributory role is evident in the way users shape data's meaning, supporting the increasingly popular public value 'ecosystem' perspective (see, for instance, Osborne et al 2022). In the public service setting, emphasis of data's contributory role highlights the translative work, acknowledging discretion and judgment as moral, normative assessments in data work by those serving the public in acts of public service. That translative work often occurs at operational staff level, albeit there is a trajectory seeking to relocate translative work to automated digital systems, viewing answers as lying true and factual within data. Hence there is more encouragement of data-serving roles, and less recognition of the contextual specialisms in non-data or un-digital roles, where deep domain expertise is often found.

The chapter sought to bring out the role for the local government worker, borrowing Lipsky's (1980) street level bureaucrat working in conjunction with the public in meeting their - both individual and collective - needs; needs that may be complex and outside the parameters of rigid services' systems in a technical sense and necessitate working with policy directives in a practical (not abstract) way. However, the trend towards streamlining, automating, and ultimately continuing pursuit of objectivity in public service delivery may undermine translative aspects. This is arguably the point: eliminating what gets called guesswork and hunches to achieve *"erosion of determinism, taming of chance"* (Hacking 1991:189; in Beer, 2016a:55), fundamentally shifting the role of government. Thereby, government is transformed towards a different base logic, in plain sight, seemingly 'a-political' under auspices of becoming 'better' councils, as digital businesses and increasing customer (public) satisfaction with the services provided.

Promises from data as expectations to enable a better a-political government risk undercutting ethically desirable working processes. The dichotomy is of new against old, with pressing need for improvements, arguably catalysing changes that disrupt certain core tenets of government in its role as guardian of the public good and in prevision of public service, not only unitary public services.

Above it was shown that calls have been made for e-Government studies to develop a stronger tie to the root discipline of Public Administration and attend more to the 'gov' aspect. That association can follow - at least partly - by recognising the significance of e-Government (and adjacent) topics to this large body of research, accepting the central role of ICTs and digital technologies (including data) in government work. Widely cited e-Government scholar Mete Yildiz argued 10 years ago that it is not possible anymore to discuss the issues between politics and administration, government reform, globalization, governance, public policy, citizen participation, accountability, citizen-orientedness, government service-quality, and many other topics without including technology (Yildiz, 2013). Yildiz's point is further strengthened by rapid proliferation of digital data from expansion of digital channels, in the government context directly, and beyond, over the past decade. This reality heaps pressures on government actors to do more with their data, be that archival, newly sourced, analogue, and 'born digital'. This is also relevant due to increased public expectations given utilisation of digital mechanisms and data tools within other sectors, especially across the private sector, such as in retail and entertainment / social media.

Given the wide-ranging ways data is presented as the key to unlock value and accomplish wide public benefit, focusing on experiences of data workers is timely and important. The thesis describes data work culture through exploration of data work and data workers doing that work.

Chapter 3: Using Data - The Framework

There are three main parts to this chapter. First, an overview of the sociomateriality concept is given, alongside a statement of the core concepts of data use, usefulness, and access. Next, the chapter presents two functions of local government work with data, enabling differentiation between workers' preparatory and substantive data use acts. Lastly, an account is given of value though the 'actionability' of public service/s-related insights, significant for scope to achieve Public Service Delivery Transformation (PSDT). Throughout, the chapter emphasises the role of data workers' actions during data use, interpreting and applying data to specific purposes.

3.1 Building the Conceptual Framework

The framework sets out the ways in which data and the work thereof has been addressed and conceptualised to date. After stating the concepts forming the framework, two overarching worldviews of data show the distinction between dominant and emergent (novel) views of data work at the local government level.

Central to construction of the conceptual framework is differentiation between (a) preparation for and (b) substantive acts of data use in operational work for public service delivery. The framework highlights the user role in the context of 'instances of data use' by applying the concept of sociomateriality and interlinkage between data, data work and data workers, relational *"all the way down"* (Slife 2004:159). What Slife means by this is to reject *'ontology-abstractionism'* that views theories, techniques and principles as embodying the fundamentally 'real' of the practices they seek to explain. Instead Slife posits that practices do not exist except in relation to the concrete situations and cultures from which they are constructed, which he terms a *"relational ontology"*. In being relational throughout, there is not detachedly 'real' element: the realness stems from the relations, applying to alternatively preparatory or substantive work acts. The chapter also positions the crucial 'public service' element of any data-derived insights' actionability, defined as the scope to realise the intended outcome, to achieve sought-after and promised value from data work, again closely related to the practices to which the data-derived insights might refer (section 3.2; Figure 3-1).

Throughout the chapter consideration is given to data workers' interpretative contribution during data use, to translate the data into significance by drawing in their Tacit Knowledge (TK) and critical thinking. This shows ways interpretative acts underpin data work, elevating the significance of data workers' role during use/s. A focus on interpretative efforts by data workers emphasises their subjective determination of utility, covering topics of usefulness, value, and quality, which must be considered within specific acts of use.[26]

3.1.1 Sociomateriality and Data Use

This section begins with consideration of how 'sociomateriality' supports the study's framework. The intention is to express how fundamental entanglement or mangle of practice (Pickering, 1993) occurs in use acts by use-enactors (workers)[27] as the socio-element, which emphasises the roles of a person or group within data use processes. The mangle of practice conceptualisation was adopted and extended by Venters et al. (2014), examining digital infrastructure emergence as an *"unstable and evolving sociomaterial configuration"* (2014:931), and is an appropriate conceptual tool for the study.

The notion of sociomateriality articulated by Orlikowski (2007, 2010) and Orlikowski and Scott (2008) is founded on the agential realist philosophy developed by Barad (1998, 2003, 2007). Key is the significant shift from the previously dominant stance that saw entities, people, and technologies as having given, inherently determinate boundaries and properties, to instead be seen as being constituted of relational effects, continuously performed in a web of relations. This shift comes from the Information Systems (IS) discipline and management research underpinning of 'substantialist ontology' – that has dominated the philosophical framing – moving to a 'relational ontology', made up from different foundational assumptions (Introna, 2013).

The analytical lens for the thesis befits an exploration of ways that a relational ontology impacts data and the scope for its use within the local government setting. The overall point is that data is infrequently (purely) 'discrete' and that data workers constantly interface to shape data, and data's meaning in uses. Data workers and data interact, and the

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[26] With limited scope for objective measures of each.
[27] The term 'data use-enactor' is offered to clarify the essence of the work in enacting, bringing to fruition the use, in a specific manner, rather than the term data actor or stakeholder which does not sufficiently emphasise the active element in data use acts. In the latter terminology, a data actor or stakeholder can be seen as progressing data work of the 'parameters for use' type, not 'instances of use'.

elements are relational (Slife, 2004). This begins with data-making and continues through all stages of data work and usage.

According to Orlikowski, the field of organisation studies has overlooked how organisations are bound up with *"material forms and spaces through which humans act and interact"* (2007:1435). Therefore, she proposed the concept of sociomateriality. When people interact with each other, mediated through technologies that themselves influence interaction, they are 'constitutively entangled' (Orlikowski, 2007). The social and the material are entangled and inextricably related, where the social shapes the materiality of technology – or data – and materiality is present in every phenomenon considered social (Orlikowski, 2007; Leonardi, 2012).

Whilst the e-Government literature itself has tended to allocate less attention to the data 'artefact' than directly in fields of IS, Organisational Studies, and Science and Technology Studies, there has been a major shift in perspectives that can also be applied to the matter of data within e-Government. In light of increasing levels of – and posited opportunities from – Big Data, including within government entities (Malomo and Sena, 2016), core e-Government topics have been heavily influenced in the past decade. This is no less so at the cusp of AI and mandates to specifically use AI in Public Administration for the same generic benefits of efficiency and effectiveness. In the digital age there is seemingly an endlessness in data-making and calls to capitalise on the data asset.

The concept of sociomateriality is viewed as *"one of the most important ontological trends of the past years"* (Mueller, Renken, and van Den Heuvel, 2016:69; Riemer and Johnston, 2017). American feminist theorist and scholar of the theory of agential realism Karen Barad wrote: *"Language matters. Discourse matters. Culture matters. [..] the only thing that does not seem to matter is matter"* (2003:801). This statement conveys her viewpoint that objects do not have agency, rather people attribute agency to objects when they use them, therefore inviting a shifted focus to consideration of the material (Barad, 2003). A central component of Barad's position is performativity, whereby something is performative when it contributes to the constitution of the reality it describes. In this way, technologies exist in the 'realm of structure' and technology-in-use in the 'realm of action' (Leonardi, 2013). This way of thinking can be applied to spaces where data work happens, where data is an aspect of technology-in-use in the context of digital tools / ICTs that generate vast amounts of data. That said, in the 'old' spaces of pre-digital data use the

conceptualisation is also applicable since the using act/s of data work also entail performativity handing data as an analogue or statistical matter.

Sociomateriality moves the analysis from the development of the material to the use of the material, and in that way can well support a conceptual framework of data use. Technology is not sociomaterial but the practice in which it is embedded is (Orlikowski and Scott, 2008). It could be argued however that data is sociomaterial, as well as its acts of use, thereby meaning even more influence of the relationality, i.e., relational in its making and in its application (uses). As regards data and its use, having access to new and more information changes how people behave, also influencing the tasks they conduct and altering communication within groups, all of which can elicit changes in interaction patterns and work roles (Orlikowski, 1996; Leonardi, 2012). To undertake a deep exploration of data work culture, this conceptual framework regards data work as actions tied-up with in-use purposes and acts. Given the 'character' of the organisation in focus as a part of government, data work action serves (at least two) distinct functions outlined in Section 2.2.2. Some actors have more influence than others in how technology is used (Orlikowski, 1995), which can reinforce existing power structures or conversely disrupt established reference frameworks and organisational arrangements. This aspect has a bearing in addressing the research aim / objectives, and to offer an answer to the sub-RQs on factors that support or limit PSDT within local government data work culture.

Data quality contextualised

In relation to the concept of sociomateriality, this section now briefly considers the issue of data quality. In an essay on the challenge of poor data quality, stemming from a long acquaintance with commercial data management practices, Redman (2013) emphasises the importance of 'fitness for use', which he explains as follows: *"Data are of high-quality if they are fit for use in their uses (by customers) in operations, decision-making, and planning"* (Redman, 2013:18, citing Juran and Godfrey, 1999). As the term suggests, fitness for use as the arbiter of quality is highly context-dependent and subjective, since data will be *"of high quality, in the customer's eyes, if and only if it meets his, her, or its [e.g. a non-human consumer of data] needs"* (Redman, 2013:18).

Redman (2013) argued that data quality must be addressed at the point of data creation (or 'collection'), meaning data should be created correctly the first time rather than patched up in retrospect. In relation to two data work worldviews (Data Publication and Service

Support) described in the next section it seems reasonable to expect that while publishing data might be more rigorous in terms of vetting datasets according to accepted publishing criteria and objective quality markers, supporting services are likely to provide data with greater fitness for use, since in-work needs are given priority. To go further, the sociomateriality and relations are more evident in a service-supporting approach that sees the data work occur in closer ties to the purpose from that work, and as substantive, not preparatory, data work.

The next section further considers the difference between data for publication or service support, which will then be explicitly associated to preparatory or substantive data work.

3.1.2 Preparing for Use, Then Using: Publication or Service Support

Mason and Patil (2015), in their book 'Data Driven: creating a data culture', argue that *"everyone in an organization should have access to as much data as legally possible"* (Mason and Patil, 2015:6), which for them is the democratisation of data. They acknowledge that *"one challenge of democratization is helping people find the right data sets and ensuring that the data is clean"* (ibid) and point to the emerging role of data steward to help address this challenge. The concept of a 'data intermediary' has also gained popularity (Janssen and Singh, 2022; Schrock and Shaffer, 2017; Magalhaes et al., 2013). However, availability of data is not equal to meaningful use of that data (for this point in the context of open data, see Janssen et al, 2012). Additionally, 'brokers' for data decouple the work of data from the data, user/s and uses, aligning to a perspective of data that elevates its detached normative value and acontextual significance.

By highlighting a conceptual distinction between data usage preparation versus actual acts of use, the transactional perspective of data value built from the basis of enabling availability of data, shown to align to a 'data publication' worldview, can be critiqued. In contrast, a more dynamic and responsive worldview of 'data in service support' is presented.

The data worldviews are taken from Parsons and Fox (2013), who emphasised the importance of metaphors in the way that different communities conceptualise the task of good data stewardship. Although Parsons and Fox examined this issue in the context of science research organisations, much of their analysis is equally valid for local authorities. They identified "*five active worldviews on how to most effectively steward and share data*"

(2013:34) and of these, two are most relevant to analysis of local government staff as they access and use data resources within their employer organisation. Their five active worldviews are: Data Publication, Big Iron, Science Support, Map Making, and Linked Data. Here, three of the metaphors are removed from consideration, Big Iron, Map Making, and Linked Data. They are not helpful in the local government worker context since they build more directly from computing science and more technical considerations, such as alignment to engineering culture and 'Big Data' for Big Iron; spatial data sense-making in Map Making; and, Linked Data for sematic web enabled interoperability and data openness in a literal sense via the internet. As elucidated in Chapter Two, the aim is attending to the 'gov' - and less the 'e' - of e-Government as a discipline (Lips and Schuppan, 2009; Homburg, 2018). And also not relegating the data topic to be a technical consideration within electronic ('e') categorisation. Thereby, the technical metaphors are removed in preference for those that better align to PA considerations. Instead, the chapter utilises two metaphors applicable for exploring local government data work culture. Parsons and Fox labelled the first of these Data Publication, whose analogue is a scholarly publication and which *"seeks to define discrete, well-described data sets, ideally with a certain level of quality assurance"* (2013:35). The second is Science Support, *"viewed as an embedded, operational support structure typically associated with a research station or lab"* (ibid). In the context of local authorities, one could relabel this latter worldview as Service Support, substituting 'service delivery units' for 'research stations', following Tetley-Brown and Klein (2021). Whilst service support is not itself research, directly or solely, to understand the details of how service delivery is (or is not) working does require a similar intelligence and analytical effort common to research.

Data for publication

The Data Publication approach has already been widely disseminated across the public sector on the back of open data initiatives, data findability and cataloguing. More specifically, many governmental bodies have adopted data platforms as 'open data portals' for exposing their data to the public. Doing so is viewed as a means of fulfilling good government obligations of accountability and transparency via provision of timely reporting information. Additionally, data resources may catalyse other service providers, taking a 'smart city' view, to support or undertake delivery to meet public needs, alongside general goals of economic stimulation from making data available for innovation.

As a general definition, a data platform[28] is a centrally managed catalogue and repository of datasets published by an organisation (ODI, 2017; Umbrich et al., 2015). A good platform should make it easy for users to discover datasets that are relevant to their needs and, as a result, data platforms typically mandate minimal levels of metadata to accompany each dataset (Assaf et al., 2015) and provide some kind of taxonomy of the topics covered. As publication frameworks, they should make it easy for data producers to upload datasets to a repository where they are (publicly) available. Thereafter the platform ought to make it easy for consumers to preview datasets and either download them manually or access them programmatically. This means that data platforms will also constrain and document the possible formats in which datasets are published, given the technical elements in place.

Information Systems scholars Marjanovic and Cecez-Kecmanovic provided insightful evaluation of the long-running 'MySchool' schools performance data debacle in the Australian public sector, whereby they argued that Open Gov Data Platforms providing open performance data are creating unintended society-wide harmful effects (Marjanovic and Cecez-Kecmanovic, 2020). The scholars proposed a novel theorisation of these as Complex Adaptive Sociomaterial Systems (CASS), to make it possible to explain how and why these platforms create unintended harmful effects. The reduction of complex service provision to sanitised numeric scoring via publication of performance data stripped from contextual nuances is a cautionary tale. The role of the human in the systems, as well as people – broadly - for who the system is created (in the public service context) is an integral component to making sense of the system and for the sought-after benefits (outcomes) to become a possibility.

Data for service support

The Service Support approach is harder than Data Publication to pin down, since it is more dependent on the specific contexts where data is used. It is less linear or causal and more relational, influenced by social acts during use/s. Parsons and Fox (2013:37) characterised this worldview as the *"artisanal, task-specific production"* of data. It is considered a typical scenario in local authorities for operational activities.

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[28] Which need not be 'open', or fully so – it can be a repository where data is available to different stakeholders / data consumers in different ways. North Lanarkshire Council has a public-facing MDM data catalogue showing datasets the council holds and uses without provision of the actual data.

The core attribute of this approach is that data is collected and provided to meet the needs of a specific group of users. Whether there are dedicated staff providing data and systems support will depend heavily on the level of resourcing available. It may be opportunistic in each case, consisting of hyper-local, micro-level data work activities. There is likely to be less importance assigned by the local actors to complying with data standards or to make the data accessible and usable outside the target community (and immediate purpose). Within the service support approach, the extent to which datasets are curated and preserved beyond their immediate use will vary. Unreliable curation could be deemed a potential weakness, following Mason and Patil (2015) and supported by Symons (2016), viewing that more data sources are better, given the innate, normative value in data (whatever data).

A key advantage of the Service Support worldview is the strong link maintained between data producers and data consumers, who may often be the same individual or group. This arrangement is optimal because the close relationship allows for reactions from consumers (or users) to seamlessly reach producers, be implemented, and ultimately enhance data provision in a positive feedback loop. A weakness is that this worldview can reinforce data silos by keeping data within specialist work teams and not allocating time and money to make specific datasets ready for various, appropriate, onwards uses (including presented as fully open data).

The Service Support worldview better serves gaining deeper understanding of the data culture experienced by operational service delivery actors as they advance data work for the intention of improvement (or transformation). Addressing value – potential or realised – via the concept of usefulness and accomplishment of value through realised usefulness and benefits in public service delivery related data work is also pertinent. The concept of 'quality' supports this effort, linking back to Redman (2013), above, on in-use fitness subjectively determined.

3.1.3 Concepts and Components

In this third section the constituent concepts and components of the framework are clarified. This subsection starts with a table of core concepts, presented alongside their relevant components. The intention is to confirm constituent concepts and associated components of the conceptual framework lens following Deleuze and Guattari that *"every concept has components and is defined by them"* (1994:15).

Table 3-1 Concepts and components of the conceptual framework lens

Concept	Key component(s)
Data use	Context; User
Usefulness	Utility; Value[29]
Access	Usage / usage potential

Data use, usefulness and access are the primary concepts applied in the framework. Each of the three concepts consists of acts and purposes in data work at individual, work team and organisational levels since these are the levels that data expectations are experienced. Additionally, 'data use' is the main unit of analysis in the research (more detail in Chapter Four).

Data use in data work culture

The study explores data's role in local government public service delivery and intended transformation. To address this topic, boundaries are set for exploratory research focusing on operational activity in public service/s delivery. The intention is to identify various expectations from data, in use for local government work, and secondly to determine the specific application/s of data associated with these expectations, to classify data use during work.

Expectations from data and the application of data occur during operational activity for public service/s delivery and are understood by looking broadly at data work practices within local government. Together, data-related expectations, application, and the environment of practice constitute a Data Culture. By building out from these elements, the operational application of data is further developed to embody acts and purposes of 'data use' in data work. In pointing to these varied acts and purposes of data use, an understanding of the Data Culture is possible, addressing the main RQ 'what characterises Scottish local government data culture?'.

Usefulness supporting transformation

Transformation in the e-Government literature denotes a complete change in character (Wessel et al., 2021; West, 2004; Cullen 2010; Chadwick and May, 2003), and can be

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[29] Linked to quality, which for data work is the subjective evaluation of utility by the data user in a use context.

understood colloquially across local government as a sought-after improvement.[30] With the transformation of public service delivery as a goal, the occurrence of data use is further enriched by the conceptual association with 'usefulness' and 'utility' (meaning the realisation of usefulness), to support achievement of that goal. Usefulness and utility are determined by the apparent value of use, in the context of a desired result. To better understand data's role in supporting – or conversely limiting – transformation in public service delivery, the concept of usefulness is significant.

As further shown below, there are qualifiers of usefulness (the concept) as a value (its component) occurring in a given context, where a data worker – at whichever level – acts as an interpreter of usefulness. This point is important since the goal from the use will define boundaries of usefulness. Within PSDT if the goal is that data was made or can be pointed to, rather than some other metric of usefulness, that may render hollow the substance of the transformation in relation to the literal public service and / or delivery thereof. Additionally, there are objectively useful aspects such as detached markers of data quality covering completeness, accuracy, and timeliness. On data quality indicators in government see the UK The Government Data Quality Framework (2020).

Access for data use

Data access is another important element in the conceptual framework. The topic was noted in Chapter Two on trends around 'open data', 'open government' and governmental innovation. These align with latter stages in e-Government and digital era governance, alongside ways that 'smart city' approaches call for data sharing to support multi-actor services provision.

Whether fully open, or not – (local) government holds a lot of unopenable data[31] – the scope to access data is a vital precursor to use. Availability of data denotes that data exists or could exist (be gathered or made). However, accessibility of data is subtly distinct and further advanced to data availability. Access invites consideration of means of access. To achieve data access includes issues of permission, where data is theoretically available but not available in a specific instance, either to a person or group or to be applied in a particular use function (perhaps deemed inadmissible), skills and – depending on the data

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[30] Although it is possible to transform for the worse, it is less prevalent as a linguistic association and not local government intention.

[31] ODI spectrum of openness: https://theodi.org/insights/tools/the-data-spectrum/

type and outcome sought – technology. It is worth noting though that technology is not a precursor to data use since analogue data usage has occurred for centuries.

To associate these ideas back to the Publication and Service Support perspectives, the former entails a more literal interpretation of access close to availability (where the data is 'gettable'). The latter is more meaningfully connected to access in a specific service delivery setting, where data is admissible in the named context for proposed usage. In further probing the difference between data being available and accessible, availability glosses over granularity in use but access is directly associated to use, since it invites defining boundaries of access, as 'to' or 'for' what specifically. Ineffectual data flows and lack of interoperability are persistently pointed to as a main issue in deficient data use or a weak data culture in government (Morton et al, 2023). This stance corresponds with a Publication perspective of data availability rather than that of a contextually sensitive Service Support.

Linked to data use itself, access also denotes the process of using (or the potential to use) towards a sought-after result. This is access not only to the data but to the outcome. This requires consideration of what the access achieves, requiring engagement with the purpose of the use, not only the act of use. The significance of insight actionability for PSDT is considered in Part 3.3 below.

Summary

The conceptual framing of data use includes nuances in data work related acts and purposes as versions of use, to enable new insights pertaining to the culture of local government data culture and data's role to support or limit public service delivery transformation. The concepts of data use, usefulness and access are served by the components of utility, categories of use, and determination of value, all undertaken in a use context by a use-enactor – or data worker. The under-consideration (or theorisation) of usage typologies in local government data work is arguably a contributory source for claimed deficiency in data use, not solely data itself nor data-related skills.

Therefore, the conceptual framework positions data use in the centre, supported by second-tier concepts of usefulness and access, and components of utility, value, context, usage, and user/s. The proposed framework widens attention from the wider enabling environment supporting data use (parameters for use), covering data management, governance, broad

data skills corresponding to UK and Scottish Government push for more workers in DDaT job roles (see Part Three in Chapter Two whereby data worker roles are all tied broadly to data 'access' with 'use' conceptualised as part of access), to activities that constitute data use (instances of use). The widened view categorises use types as serving two fundamental functions associated with the concept of 'usefulness'. The chapter describes how these functions connect to instances of use for service support, opposed to a publication, data availability worldview of parameters for use, thereby permitting a rich account of data culture. The core concepts identified further develop the conceptual framing and lens for the research.

By focusing on the fundamental point of data as being what data can do, it is possible to articulate the ways in which data achieves usefulness to offer value via a process of use, which entails a central role for service specialists expecting (and mandated to gain) useful results from data work.

3.2 Data Work Acts

Through a focus on data work in operational public services provision, shortcomings a data availability outlook are apparent, further described as the dominant 'Publication' worldview, set against 'Service Support' in section 3.1.2 above. Applying a lens of data use linked to local government data work within operational activity highlights the significance of data use-enactor/s i.e., public service specialist or work team, and the translative effort of applying data to support service delivery. By looking at data use to support public service delivery work, matters of (potential) transformation can be addressed. Exploring data work through nuanced and varied data uses moves the emphasis from parameters for use associated with publication (the data exists, made available) to instances of use in acts of service support (substantively useful data work). This approach permits the thesis to offer conclusions – after the analysis and discussion of the project's empirical data – about what characterises data culture in Scottish local government.

In the below visual, preparatory elements of data work pre-use are highlighted, termed 'PREPARATORY ACTIVITIES' on the lower right-hand side. In the context of governmental data work these activities cover (literal) availability and scope to use data, via equipment and skills. Moving to the upper left-hand side, and presented as conceptually distinct, are the arguably under-theorised 'SUBSTANTIVE ACTIVITIES'.

Reading the visual bottom to top, left to right increases the active using of data towards the goal of leveraging insights and value that can ultimately apply for PSDT. The focus on operationally aligned acts of data in use for improved public service delivery is termed 'instances of use'.

In the categorisation of 'parameters for' versus 'instances of' data use, the Publication and Service Support worldviews do not align fully with one to the exclusion of the other. However, the Publication perspective matches well to preparatory activities, such as data availability, where data is deemed inherently good and useful. The observed dominant view of data perpetuates a focus on liberating data, tying back to Chapter Two's identified 'blind-spot', not taking a more critical view of the ways the data promise shapes the way work for digital transformation is progressed. In the context of public service delivery and operational activity for services provision – and ideally substantive improvement (as transformation) – the Service Support perspective matches to the instances of use category since these are tangible actions in public service delivery operations. The 'functions', applying to data use and relevant to ways insights are obtained, are elaborated at section 3.2.2 below.

Figure 3-1 Data work towards PSDT

NOTE: only by this stage the data could reasonably be said to have been "leveraged"

Has Public Service Delivery been **transformed?**

Data work as
SUBSTANTIVE
ACTIVITIES
(for either Function)
INSTANCES OF

ACTIONED INSIGHT

Achieving data usefulness and value for PSDT (data-driven decision making and support to Public Service Delivery Transformation)

Is the data insight generated **actionable?**

NOTE: a report is of limited value for PSDT if not progressed to substantive activities for service support

INSIGHT
When data becomes useful

opportunities for future

trends from past

Is the data use for intelligence **purpose?**

F1 F2

DATA USE
Specific data in usage context

Function 2 (F2)
"NEW WAYS" (PSD) looking forwards e.g. forecasting

Is the data sought / required **accessible?**

Function 1 (F1)
"OLD WAYS" backwards looking e.g. reporting

DATA

handling, inc storage, management, availability, cleansing, objective quality markers

collection; creation

Data work as
PREPARATORY
ACTIVITIES
PARAMETERS FOR

SERVICE SUPPORT WORLDVIEW

PUBLICATION WORLDVIEW

3.2.1 Parameters for Use: Data Work as Preparation

This subsection addresses the perspective of supporting data use through preparatory actions, conceptualised as 'parameters for use'. These parameters cover making data available or accessible. The section articulates various categories of parameters for use, citing relevant literature.

For data within governments, predominant administrative concerns in public service are the management and governance of data conceived of as an asset or resource, mechanistically, often with generic, detached determination of data quality, and inborn value (Jones and Tonetti, 2020; Sadowski, 2019). There is less debate about the merits of using data and rather priority is getting the right data to the right places or people. More focus is given to technologies that permit use, plus skills needed, with the latter covering both skills in data-related technologies and as digital or data literacy (more below, section 3.3).

To date, scholars have paid more attention to parameters for use, in a tangible and material sense: where data is, who has it, how to enable the data's (free) flow loosening hinderances to access. This is partly due to the ongoing dominance of the Publication worldview (described above), with pervading NPM values, where public value is accomplished via seamlessness and the joined-up experience of public service/s provision by a member of the public 'client' of the state as a service recipient (Dunleavy et al., 2006; Scholta et al., 2019; Twizeyimana and Andersson, 2019).

Data holds a central role in digital government transformation (Fountain, 2004; Meijer, 2018; Eom and Lee, 2022), but data itself has been subject to less theorising directly in the context of the government setting. Using the conceptual framework constructed, the thesis addresses under-scrutinised acts of data use in the local government setting.

There are many research outputs where data's innate value is assumed. Much consideration of data in (digital) transformation – across government or elsewhere – focuses on the scale of data and what can be gained from its linkage, such as: Big Data (Kshetri, 2014; and in the UK local government setting Malomo and Sena, 2016); data linkage in health, (Aitken et al., 2018); Artificial Intelligence, (Littman et al., 2022; Janssen et al., 2020); governance of data (Abraham et al., 2019; Micheli et al., 2020); and mechanisms to safeguard privacy including topics of cyber-security with permitted users (see GDPR research, e.g., Li et al.,

2019; and on data safe-havens in Scotland, Gao et al., 2022). There is debate on the ethical parameters of data, particularly covering personal and non-consensual data collection, addressed by Micheli et al. (2020) and Varon and Peña (2021). Other researchers cover additional risks arising from Digital Government Transformation (Meijer, 2018; Eom and Lee, 2021). There is plenty to debate or explore in the broader landscape of data opportunities as expanded by the digital or information age. The result is a reduced focus on theorising the concept of data – howsoever defined – in acts of use, although its consideration in conjunction to new applications is plentiful (see Meijer et al., 2021 on algorithmic policing). One notable exception is Van Meter (2020), who did address the substantive point of what data is through her critique and reformulation of the data-information-knowledge-wisdom (DIKW) pyramid in times of vast data levels.

By focusing on data[32] and the substantive work thereof, howsoever regarded by internal organisational data users – council staff in this study – the thesis analyses varied perceptions around handling and the general effort of data work in acts of use within local government, across the Scottish central belt (for map see Chapter 4). Alongside these acts, the purpose/s of use (use as specific or broadly conceived) are highlighted. The thesis is unshackled from a focus on technologies for data use, or opportunities from data (use). Neither does the project begin from an uncritical stance of data as naturally useful for local government transformation (see Tetley-Brown and Klein, 2021). Instead, the thesis places the magnifying glass on acts and purposes of data use in the process of data work.

3.2.2 Instances of Use: Two Functions

Substantive acts of data use are here termed 'instances', aligned to two main local government data work functions. Whilst parameters for use, outlined above, provide support to data work by addressing environmental circumstances in which data work occurs, instances of use are where data work for the intended specific outcomes occurs, see Figure 3-1 above.

Concordant to the local government democratic mandate delivering statutory obligations and following political procedures (as due process), data has two main functions. These are based on scholarship, set out in the preceding chapter, mapping to NPM's necessity of reporting and evaluation, in service to transparency and accountability (Fox, 2007; Hood, 2014; and Ferry et al., 2015 for English local government), as well as being linked to

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[32] Both conceptually (as an artefact in a general way) and specifically (as named datasets or statistics), depending on the respondent accounts.

complexities of responsiveness and trust (Porumbescu, 2015). The second function, intelligence, is also based on NPM's logics and on multiple sources stemming from smart cities scholarship, including promises from ICT vendors incorporated in councils' own strategic outputs, as well as the methodological truism that 'data' forms the basis for knowledge.

Data is used –

(1) to hold local government actors and processes to account: where data is offered as evidence of their effectiveness (success) and efficiency in the provision of public services, or their inadequacy in this regard; note the obligation of transparency is included here

(2) to enable decision-making needed at a range of levels, strategic, policy, down to day-to-day public service delivery and operational activities

These can be presented more simply as –

Function 1: REPORTING

Function 2: INTELLIGENCE

As the first function, data is a means of assessing or evaluating success, and the success is measured by output or outcome indicators, for instance, fewer road traffic accidents, less truancy at school, more uptake of entitlement to free school meals, reduced homelessness, higher quality of living, often termed 'Key Performance Indicators' (KPIs). Quantitative indicators are easier to quantify than qualitative indicator, due to their numeric formulation and perceived clarity.

For the second function, the emphasis is on the usage of data for what often gets termed business or strategic intelligence insights (also referred to by the shorthand 'BI'). For this study, 'intelligence' will suffice since to conflate 'public service' with 'business' (even as a mere denotation of work undertaken officially) risks muddying the waters.

For PSDT, the purpose is to improve public services themselves, encompassing delivery of these in a literal, operational sense. Again, the measure of success can be determined or evaluated using metrics that are deemed appropriate, for instance in relation to the service-recipient's (i.e., the public's) satisfaction, which may be shown via service uptake, or levels of complaints. Quantification is a predominant type of KPI, arguably due to prejudice towards the seemingly objective, as numeric truthfulness and 'trust in numbers' (Porter,

1996; Beer, 2016a). This thesis highlights the quality of insights in public service delivery transformation activities by differentiating between insights themselves, gained from data use, then whether these are actionable and ultimately actioned.

Less attention has been paid to the matter of use of data in processes of public service/s delivery, beyond a focus on data-using skills or locations (e.g., TREs or 'sandboxes') and navigating the legislative requirements around consent and permitted use (GDPR, regulation around use/re-use in new contexts; and more recently new conundrums and ethical parameters to negotiate around the possibilities of synthetic data). The problems from skipping over the detail of data uses have been set out above; in essence, it obscures granularity in data work and holds back an understanding of operational data work culture. In data use, the link to public service provision is unequivocal, covering reasons for use in various public service acts, providing for the public and satisfying needs.

Much is made of the scale of data the public sector holds, including, or perhaps especially, governments. Data super-abundance exists where digital processes increase data trails from interactions between the state and the public, especially where many operational activities occur at the local level. Often smart and data-leveraging initiatives stem from claims of low internal awareness of data 'troves' and their possible value to improve service provision. Council staff's inadequate recognition of data value is indicated by a lack of cataloguing and broad low data maturity, lacking methodical processes for getting at data as a material 'thing' within the organisation, in unsystematic ways like knowing who to ask. This view sees (all) data as innately valuable, just not in the right place.

However, a reason for the data troves' existence may partly owe to residual, potentially unnecessary / un-useful reporting, in relation to goals of PSDT. In a sense, it is partly via the scale of reporting data (whether or not useful for PSDT) that deemed underused data troves come to exist. Other sources of data come from introduction of e.g., sensor technologies or other public administration supporting technologies. Apparent shortcomings in data usage at work in local governments may be due to limits on data's innate value when removed from contexts and processes of use (understood as purposes and acts associated with those purposes). For example, if the purpose of some data was to report on activities undertaken, does that data source inevitably hold potential value for intelligence? As above on the matter of quality, Redman (2013) highlighted that data be made right – for the use purposes – the first time, rather than sought to be given fitness-for-use later. Going further, data is bound up in the process of its creation and there are

legitimate, methodological limits on the scope for re-use. Unintended, problematic consequences can stem from oversimplification of public services to numeric points and statistics as performance data (see Marjanovic and Cecez-Kecmanovic, 2020; also Hartong and Förschler, 2019, for the Australian 'MySchool' performance data example). Whilst the two functions are equally valid, they ought not to be conflated: reporting data is not intelligence until it is used to become such.

Overlooking instances of use diminishes the significance of the ways that data work happens, who uses the data, and how. This bundles together preparation and substantive data work, obscuring the translative, interpretative roles during use. By applying a data use lens and surfacing instances of use, separated out from parameters for use, the formative acts of speaking for data in relation to a public service can be observed and explored. During data work as substantive uses, a local government operational-level data user makes their subjective determination of utility and value by confirming quality in a hyper-local task-specific way, applying (the) data to a use context to achieve – or trying to access – specific value realisation. That value could be to account for government activity or to support decisions about future activity. These are not the same.[33]

The chapter has moved the core, central concept of data use through incremental refinement showing how uses of data are dependent on and shaped by their constituent acts and purposes, thereby closely associated to the users[34] in specific settings of use. Now the chapter moves to the role of Tacit Knowledge (TK), building on the elaborated sociomaterial working practices of data use. Through TK in data work, the process of achieving value and determining quality within data work is highlighted, emphasising as vital data workers' interpretative contribution in various uses.

3.3 Actionable Insights

In this final section of the chapter, the concepts making up the lens are further developed and turned to the matter of actionable and actioned insights within public service delivery transformation.

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[33] Although reporting data can progress to become intelligence, the point is that these serve distinct substantive usage purposes and are conceptually different. This is unclear without drilling down into the granularity of data work through the 'use' lens.

[34] Users in this study are staff, but non-human (automated or AI) users are possible.

The chosen lens enables caution and critique of the extractive view that sees data detachedly to capitalise on as a 'nonrival asset', able to be used (for economic gain) by any number of purposes and use-enactors simultaneously without degradation of the core resource, only limited by practical or ethical scope set (Jones and Tonetti, 2020). The risk is perpetuating data 'assestiation', defined as a view of data (materially) as an asset and commodity, with issues arising from such a perspective (Sadowski, 2019). Claims that data value is locked in data are abundant (see Chapters One, Two and Five). This ignores the necessary work to achieve value from data for expected benefits realisation, through named use/s and the interpretative work in so doing. The risk is a tautological stance – whereby data is good and useful, because data is good and useful – viewing data value as simply able to be 'unlocked' (see Komljenovic, 2022, who addresses this theme in the educational context).

Overall, this section focuses on local government's interpretative communities and translation of data in use/s, particularly service-linked quality of data usefulness and value. The section explains a key dimension pertaining to outcomes from insights from instances of use as intelligence in Function 2 progress to effect change for PSDT. The point is made that 'lower-tier' workers have closer ties to operational work in public services delivery, with a key role in whether – and if so, how – insights from data use ultimately result in transformation as change on-the-ground, where data is leveraged for that intention[35] (see Figure 3-1 above).

3.3.1 Achieving Value

This subsection addresses insights produced from data interpreted and then acted upon. Actionability of insights is offered as an additional conceptual element important in the data work process. Since actions from data use constitute the highest value and definitive usefulness when achieving direct (operational) changes improving public service delivery, this provides the basis for a further data use stage, pertaining to PSDT, in local government data work. Value and public service delivery usefulness come from realisation of Function 2 insights. Identifying where accomplishment of actionable (ACTION-POTENTIAL) and actioned (ACTION-UNDERTAKEN) data-derived insights occur (or not) is core to determining what specific data use supports or limits public service delivery transformation.

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[35] Rather than only reporting to show / communicate what has been done – or not – or making a decision, prior to enacting that decision.

Beneficial outcomes from data use are associated with public service delivery transformation (understood as improvement), not merely 'whatsoever' interaction with data in accomplishment of broad 'do more with data' mandates (see Chapters Two and Five). This highlights that usefulness and value come from the production of not merely insights, as something broadly interesting or relevant, but need production of actionable and ultimately actioned insights (moving upwards through the circular stages – insights and actioned insight – with the 'note' in the green-fill box at the top-left in Figure 3-1). The requirement of a tie, via service delivery specialists, into operational activity is vital for insights to be confirmed as actionable and capable of becoming actioned.[36] The point echoes that of e-Government being what it is and not what it ought to be (see Chapter Two): the same goes for public services activity and the 'fit' of data work therein. The ideal and the real are distinct, and the operational worker has closer ties to the real.

Building on two core Functions of data work as instances of use (section 3.2.2), the following sections consider the need for data interpretation and translation, acknowledging local government as an unavoidably political setting. Whilst not themselves politicians, local government public servants[37] conduct their work delivering public service/s as political actors (in a political environment). This section will address how insights produced from data must be interpreted and then acted upon, and that doing so is a social act.

Data literacy: critical thinking

When thinking about value, the human element (the socio aspect) is of central importance. The next section considers the topic of literacy with data, to connect this to the broader topic of gaining access to value in data work.

Critical thinking is accepted as an important element of data literacy. Critical thinking can be defined as *"purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based"* (Facione, 1990:3). Critical thinking is a skill for data literacy allowing individuals

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[36] Unless the intention is to generate new policy and have that come back around to be implemented, arguably a cumbersome version of data-driven, responsive public service delivery.

[37] Civil servants are employed by 'the Crown' http://civilservant.org.uk/information-definitions.html

to "*identify, define, enumerate, analyse, list and self-correct*" while interacting with data (Snyder and Snyder, 2008:96). This element has been recently highlighted as a core feature of work with data by Loukissas (2019) in his book 'All Data Are Local', calling to attend to data settings rather than data sets, identifying that all data are tied to local knowledge. Critical thinking has also been identified as a vital skill within digitalisation broadly by the both the World Bank[38] and within the European Digital Competencies Framework.[39]

Ever-increasing digitalisation may be described as disrupting *"established reference frameworks"* which include the distinctions between human, machine (technology and digital data) and nature (Floridi, 2015:7). This is apparent in the observable elevation of deemed innate, inherent – normatively determined as objective – value in data. This is denoted by calls for more data, more (skilled) people to handle data (in Digital Data and Technology 'DDaT' roles), and from public sector and government convincing both their staff and the public they serve of benefits (abstractly and broadly) in data work. The concept of data literacy is found to be imprecise and even blurry, with great deal of dissent across both academia and practice about the extent of the concept or who needs to be data literate, and why (Guler, 2019). Arguably methodological aspects, aligned to practice-based application, that provide foundation for credible data work are under emphasised.

Along with the role of Tacit Knowledge[40] (see below), critical thinking in relation to data constitutes a core skillset, since these aspects enable the accomplishment of value and usefulness from – and with – data for a particular purpose. With the evolution of more nuanced outlooks on data (see Pasquale's 'black box society', 2015; Ritchie on 'science fictions', 2020 for example), it is increasingly recognised that data is never fully raw (Gitelman, 2013), and prejudice or bias can be inbuilt (Green, 2021). This highlights that a vital role comes from Tacit Knowledge and critical thinking during data work by data use-enactors to interrogate both the data and the manner of its usage. This aligns to public-serving activities in the Service Support worldview as enabling data work of tangible, realisable value (rather than potential for value, via Publication and sending data 'out', for uses at a remove).

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[38] World Bank 'prosperity data' initiative
https://tcdata360.worldbank.org/indicators/h945a9708?indicator=41400&viz=line_chart&years=2017,2019
[39] European Digital Competences Framework https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework

There is observable persistence in the idea that lack of data availability, access, and free flow is a problem to solve (Janssen et al., 2012). It is posited that weak conceptualisation of acts, purposes, and nuances of use in conjunction to usefulness, utility and value is a significant contributor to deficient data use, not the data itself and not even data-related skills. While technical considerations influence how data is managed by an organisation, it is argued that they are secondary to the assumptions, cultural norms and expertise of the personnel who design and implement data management policies, setting the environment for data use.

The concept of literacy links to access in data use, expanded to include ideas of access to insights from data's use in public service specific contexts. This means that there is capability for insights to be acted upon (see Piening, 2013 on organisational capability). This relies again on the usefulness concept, where there is scope for insights to be actionable and ultimately actioned related to the specific public service. Actionability requires relevance at the micro-level of the business process in an operational sense; abstract insights or determination of value and usefulness at a remove from the operational activities fall short, hence the merit and imperative of engaging at the operational level of work with data, and in pursuit of benefits from (use of) data. Again, this validates attending to alternative types of data work in conjunction with Service Support and Publication worldviews.

3.3.2 Usefulness Through Tacit Knowledge

Now the chapter turns to consider ways that data becomes useful, in specific contexts of use, via interpretative effort of data's users drawing on their accumulated experience and in-work competency.

Tacit knowledge (TK) is the knowledge drawn upon in action, for instance in driving, teaching, operating a machine, or playing a musical instrument, which is difficult to have consciousness of or express in language (Polanyi, 1958, 1966b). Viewing data work as a verb, a 'doing' in action, the concept covers using data. The concept of TK was originally formulated and discussed in 20th-century philosophy. The two philosophers most cited by organisational scholars when discussing this concept are Gilbert Ryle (1949) and Michael Polanyi (1958, 1966b). Some scholars maintain that *"tacit knowledge can be best described as knowledge that has not yet been abstracted from practice"* (Feller et al., 2013:316). However, others disagree, maintaining the opposite: whereby TK cannot be

abstracted as it is an inherent feature of all knowledge (Tsoukas, 2011). The conceptual framing for this thesis shares the latter stance.

In The Tacit Dimension (1966b) and Personal Knowledge (1958), Polanyi focuses on formulating the underlying mechanisms of 'know-how' (the term he used to denote 'Tacit Knowledge' as explored here). Using the concept of 'indwelling', which Polanyi identifies as occurring tacitly through the integration of subsidiary and focal awareness, he maintains that all knowledge is rooted in tacit knowledge (or know-how). In Polanyi's words:

> *while tacit knowledge can be possessed by itself, explicit knowledge must rely on being tacitly understood and applied. Hence all knowledge is either tacit or rooted in tacit knowledge. A wholly explicit knowledge is unthinkable.* (1966a:7)

Hadjimichael and Tsoukas (2019) presented a thorough account of the role of TK in organisations, developing their argument to the context of Artificial Intelligence (which entails a role for abundant data). They posited that the possibility of holding and analysing vast amounts of data does not render TK irrelevant to organisations, since to be skilled entails acquisition of contextual sensitivity; it is not simply a matter of knowing facts, but knowing which facts are relevant to what situation and acting on that knowledge competently (Hadjimichael and Tsoukas, 2019, citing Dreyfus, 2007:248). This is not done on the basis of strict rule following but on the basis of judgement (Ribeiro, 2017; Shotter and Tsoukas, 2014).

Building from this idea, data as a discrete, named item (as it sometimes – although not always – is) can be understood as explicit knowledge, needing to be brought to relevance in action via tacit knowledge. Alongside the sociomaterial conceptualisation,[41] the justification for exploring data worker accounts during acts of (varied) use is developed. In work, when focusing on instances of use the user of data plays a central role. The challenge for non-political actors in a political setting is that there is a context of politics: value judgements and policy preferences are being made and sought to be delivered upon. Accordingly, data use acts need more theorising, especially in a political setting, such that does not seek to minimise the political. This thesis sets out to explore the way necessary value judgements in data work exist by delving into data use practices.

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[41] Sociomaterial conceptualisation of data itself is not discrete: where data is materially fluid and 'made' in its construction and through use acts (including in discussion as acts of interpretation, where people 'see' and know same data differently).

The significance of usefulness is more pronounced and apparent at the local government level in direct linkage to public services delivery. At the closest point of contact with the public, immediate and micro-level value of data to accomplish specific goals is more apparent, be that via named datasets or more abstractly where data work is viewed as a way of working, embodying a clarity of methodology and serving the two main functions (reporting and intelligence). Seeking to do data work or to do one's work with (more and better) data needs application of TK by a user / data use-enactor during a use using action.

Separated out from translating and interpretive effort, data itself, as a source of information, gets championed as a method – or panacea – to achieve public service improvements, and for the government at all levels to be better in serving the public. This is partly due to the vast scale of (digital) data available, with computational advances that generate the data and also to support the analysis (data analytics). However, the context for data use, the ways the usefulness is drawn out, requires interpretative communities that frame the problem, rather than purely extracting the value 'cold' (Frické, 2015).

Gaining value is achievable via both functions in the instances of data use conceptualisation, as reporting and intelligence, towards their realisation as actionable – and actioned – public service delivery relevant insights. Reporting can support decision-making, but that is progression towards the actionability of report. It depends on the goal of the data work: to state what occurred; or, to inform a decision. There is clear commitment at both UK and Scottish Government levels to increase data work, seen in the DDaT job role frameworks (UK Gov policy, plus strategic commitment to reform civil service work) and the Data Transformation 'Personas' Report (Scottish Government, 2021) considered in Chapter Two. The essence of these roles, however, may elevate data work closer to the parameters for data use than substantive instances of data use, and associated actionable insights – spoken for by data users – in public service delivery contexts. Alternatively, whist supporting data work for substantive reasons, this may privilege certain types of workers and skillsets closer to conventional data scientist roles.

3.3.3 Verifiably 'Best' Decisions

This subsection addresses data's role, enacted by a data user, for conversely objective or subjective determination of 'better' government. The topic of what good means is unavoidable in public service, undertaken for the 'Public Good'. Nevertheless, it is often glossed over. The quality of 'good' can be explored using the parameters versus instances

categorisation with its associated functions, and therein the specific purposes, acts, and outcomes from data use. The Publication perspective leaves 'good' undefined and assumes goodness from data's existence and general availability, whereas the Service Support perspective is more closely associated with sought-after outcomes (such as may be deemed 'good'). It is worth noting that transformation itself is colloquially associated with improvement and thereby goodness, as the accomplishment of advancing reform and progress.

As set out above in this chapter, by focusing on data uses, and determining usefulness, the unavoidable topic of subjectivity arises. That topic must be set in relation to pursuit of objectivity. In pursuit of verifiable truth in complex, conflicted political contexts, councils as organisations seek ideally indisputable 'best' public services decisions and actions for delivery. These are deemed possible within the government work context from being 'data-driven' and in the use of evidence-bases for public service decisions. The issue is that in a political organisation, singular 'true-ness' is an improper target. Instead, there are inevitable balancing acts and interpretation of (admissible) data sources. Furthermore, decisions to determine and qualify admissibility must also happen.

On the matter of objectivity and quantifiable truth, Espeland (1997) commented on Porter (1995) to emphasise how distance is crucial to understand the perception of objectivity, where separation and detachedness seems to add credibility to actions. Espeland explained how in decisions made, and actions following those decisions, *"insertion of distance between numbers and their uses"* ultimately lends numbers their authority, as they may exist in a realm of 'fact' and truth. This could be said to match the 'Publication' worldview of opportunities from data described above, which seeks to take the statistical 'facts' of local government work and lay these out, open for evaluation and onwards application.

Green (2021), writing about data science and social justice, drew attention to the more recent recognition of biases in algorithmic usage; he argued there is an increased willingness to face up to the messiness and in-built problems within data science. These problems include opaque processes, algorithmic bias, lack of representativeness in datasets, and many others. For the framework at hand, this view aligns to the nuances between older (traditional) and newer ways to undertake public service delivery work. The thesis maintains sensitivity to the influence of expectations, derived from data's general 'promise' (of improvement and clarity on courses of action). It may be that data is viewed as elevated above political agendas. If data gets presented as raw, factual, and objective,

then actions associated back to its use appear to isolate decisions from the disruption of political context.

Data for serving public good

Data is needed in service support in local government, which requires articulation of the service actors in a translating role for the data. Defining 'good' in government or governance has strong connections to the existence of trust (in a government and associated entities). Accountability and transparency are core to this trust, although as Hood (2014) highlighted, these are not interchangeable. To be accountable does not necessarily require full transparency, since in the realm of politics there are always balancing of interests.

What is required in a democracy is that processes exist permitting those who govern to be held to account by the governed. In research within a local government setting in Ethiopia, Beshi and Kaur added 'responsiveness' to Hood's list (2020); also considered by Porumbescu (2015). This additional term covers effectiveness and efficiency as related to public services, since apposite delivery meeting the public's core needs constitutes the main purpose and broad societal (mandated) expectancy from the public of the government. It can also be said that service provision effectiveness and efficiency associates with good accountability, having and 'measuring up' to responsibility held.

There is a clear role for data in relation to each element: accountability, transparency, and responsiveness. In each instance there is an impression of clarity from data. First, in accountability to show how public monies are allocated, and the success of the spend (which links to parsimony sought from government, which is also part of efficiency); transparency, where details are available about every action undertaken, and a big part of the push for open data / open government; and finally responsiveness, where data can be used to measure the interactions with the public across various 'arms' of the government entity. The e-Government literature and scholarship is heavily focused on seeking the digital transformation of government to streamline services provision, staying true to original channel shift roots, with the addition of more mechanisms for public participation or engagement to satisfy democratic requirements.

A central imperative for government is gaining trust and – relatedly – maintaining legitimacy: trust by the public, other sectors, and other parts of the governmental

organisation, since becoming better is core to e-Government advancement via stages of growth (Layne and Lee, 2001). This has been seen in practice via the open government agenda in the USA and globally across the G8 nations since 2013's Open Data Charter. These elements have significantly influenced government efforts to enable more open data. However, not all data is able to be open data. Governments hold and work with vast swathes of closed data.

This connects to the point about data literacy (above), and the related concept of digital literacy. These two ought not be conflated, and the former – data literacy – requires regard to 'old' facets such as methodological and philosophical considerations. Data literacy in a time of datafication (Van Dijck, 2014) is arguably muddied by digital data themes. Digital data literacy is relevant, supported by robust epistemic foundations, considering how an issue can be understood regardless of it being in the digital realm.

To be accountable means taking responsibility. To be responsible for 'better' service provision needs both actionable and then actioned insights, necessarily informed by service specialists. This aim needs qualitative assessments of receipt (services taken in by the public) not only delivery (services pushed out), which occurs in a relational way. It also requires nuanced evaluation of effective delivery in a government context, where effectiveness is measured across expansive time periods, so (ultimate) intended societal outcome is assessed. These aspects are all associated with the idea of legitimacy (which connects to trust and truthfulness), which matters greatly in governmental settings.

3.4 Conclusion: Data Use in Action

The chapter explained the justification for 'data use' as the thesis' conceptual framework. Section 3.1 presented the concept of sociomateriality, accounting how data and its work are made from relations, which occur through use. Making an account of local government data work culture requires understanding the various ways data is used in acts of use by use-enactors, as the data workers.

The chapter introduced metaphors for data sharing adapted from Parsons and Fox (2013), highlighting 'Publication' and 'Service Support'. These are applicable to help understand work for local government, making data communication as data sharing in both aggregate and 'raw' forms. Dominant ways of data sharing conform to a view of data as an asset,

literally made available in publication, with less emphasis on service-supporting interpretative work of data in uses. This study explores granularity in data work through varied uses, affording greater attention on the inter-relationality between data and in-work motivations or outcomes sought from data, justifying focus on use types.

To conceptualise types of use, the chapter distinguished between preparatory and substantive data work, and denoted quality as linked to use types. This was done by terming data work for preparation as 'parameters for' data use, and work that undertakes the substantive PSDT-linked activities itself as 'instances of' data use. These were explained as aligning to two overarching ways data gets applied in local government work, termed 'Functions', alternatively for (1) reporting and (2) intelligence. Additionally, the topics of data literacy and tacit knowledge have been considered, given their association to the at-work (individual) data worker, as operational public service delivery staff (core unit of observation for the research) in actions of data use.

The main role of the chapter is to present the 'data use' lens of the conceptual framework, supported by 'usefulness' and 'access'. The nuanced term 'access' applies to both data plus any derived insights. For PSDT, insights' actionability is relevant (considered in section 3.3), viewed as a more advanced stage than the availability of data, and more than a report or insight as simply something of interest. Ultimately, instances of use constitute substantive data work with scope to accomplish PSDT.

The thesis sets out to explore if – and if so how and where – data work supports substantive, transformational public service delivery. Against the backdrop of perceived data abundance and pressures to make optimal usage of all resources (including data), the thesis seeks to explore the role of data in (potential, speculated) public service delivery transformation by identifying the expectations of data as the overarching promise from the matter and / or its use, and data work in practice, classifying use types.

Chapter 4: Methodology for Exploring Data Use

The main empirical data generated and utilised for the study are 58 qualitative interviews with 55 employees of local authorities within Scotland. Interviews took place during eight-months between October 2020 and May 2021. That timeframe was during the global COVID-19 pandemic. Consideration of this research backdrop is included in section 4.2.2. Additional research materials were collected to support analysis until summer 2022.

The project methodology is described in the following sections, split into two parts. This chapter explains the onto-epistemology, research design, location selection, sample, and recruitment, then analysis process across the full data corpus. Furthermore, detail is provided on research ethics, alongside the reflexivity and positionality of myself as the researcher.

4.1 Part One – Positioning and Preparation

What follows is a statement of the research strategy, accounting for the project's initial design with subsequent adjustments due to the COVID-19 pandemic, and other considerations.

4.1.1 Reminder of Aims, Objectives, and Research Questions

To clearly set out how the research was conducted, and determine appropriateness of the approach, this chapter starts with a reminder about the thesis aim. The three research questions are repeated.

Presented in more detail in section 4.2.1 on sampling and recruitment, the geography for the research is Scotland's 'central belt' (see map, Figure 4-2).

Aim

The overall aim is to determine what characterises data work culture. The main units of analysis are 'data use', with 'data' and 'data workers' as units of observation. Thereby the research offers comment on 'data work'. The study is an exploration of how calls for local

government be 'data-driven' are experienced during in-work data use for public service delivery transformation.

The exploration is undertaken at individual professional, public service team, and organisational levels. Whilst public service delivery provides parameters for the research, the thesis is not designed to permit comment on whether transformation occurred, instead shining the light on staff's practice-based experiences in data work within their employer organisations. The inclusion of many different services in the research allows a wide view of local government data work and its characteristics but negates possibility to make evaluation of specific services. This approach means the research is wide in its view of data work, then narrows to go deep in conceptualising that work through the lens of use/s.

Research questions

The study identifies characteristics of data work culture, by looking at data use in public service/s delivery transformation in Scottish local government. The research question (RQ), and sub research questions guiding the thesis were set out in Chapter One. To repeat these for clarity -

> **RQ.** What characterises Scottish local government data work culture?
>
> **Sub-RQ. a)** What (i) supports and (ii) limits data use for public service delivery transformation within Scottish local government?
>
> **Sub-RQ. b)** What data use (i) supports and (ii) limits public service delivery transformation within Scottish local government?

The study makes the observed data 'promise' specific by identification of expectations of data (see Chapter Six) experienced during work using data in local government. This promise is investigated in relation to data use working practices, leading to articulation of influencing factors that alternatively support or limit data use for PSDT. Additionally, specific type of data use alternatively supporting or limiting PSDT is also identified.

The study's objectives, set out in Chapter One, enable understanding local government internal data culture by looking into:

- Data handling habits
- Information Use Environments
- Public service delivery processes

- Role for 'Business[42] Intelligence'

Thereby, the research assesses various elements constituting the organisational climate for in-work data practice, therein understanding culture in relation to data and its use for public service delivery and digital transformation efforts.

4.1.2 Ontological and Epistemological Position

To approach the core subject matter, an inductive qualitative research strategy was used. Such a qualitative research strategy is the optimal way to understand how research participants perceive and experience their social world, in the context of their professional work. Seeking to privilege the respondent's own interpretations was imperative to make sense of how those working at local government level view and interpret their day-to-day employment activities, and how they place their immediate professional responsibilities (or tasks) in relation to the wider working environment. However, it is recognised that I as the researcher play an active role in construction of the insights shared. I am not a passive vessel into which research participants pour their opinions, and which I then detachedly analyse (Whyte, 1979).

The ontological standpoint of positivism claims that what can be known is objectively a 'fact' and as an epistemology that one can come to know that 'fact' unhindered by one's own positionality; that one can access 'the truth' of the experience and phenomena without bringing to bear any relative clutter from the researcher's own views or experience. This is not the onto-epistemology of this research project. The approach of this project is relational.

The focus of this study is on understanding inherently personal-professional views of the research participants, alert to the risk that I can skew insights through bias. In practical terms, this meant I carefully reflected upon the manner questions were asked during the semi-structured, often conversational format of the interviews, making specific codes about the question that elicited the response during analysis (more below). In addition, I kept a fieldwork diary to facilitate an ongoing process of reflexivity and positionality. More detail is presented below in Part Two.

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[42] See Chapter Two for consideration of the impact of 'business' terminology in the government setting. Henceforth the thesis simply refers to 'intelligence', whilst recognising that 'business intelligence' (or 'BI') is a common term.

I considered the best way to understand and offer fair a depiction of the phenomenon under analysis i.e., the role of data for staff in Scottish local government public service delivery activities, was to occupy the frame of reference of the participants. However, as a former local government staff member (section 1.5.1 Chapter One), in undertaking the data collection and analysis process it was vital to remain constantly mindful that I may prejudice prior experiences and use these as a frame of reference over the information that I was being given by my research respondents.

During each interview, I was astutely aware of the ways my questions affected the interviewee responses given. On occasion, mention and more detailed reflection of certain pertinent themes was initiated by the interviewee unelicited by me as the interviewer, and those instances are highlighted in the analysis section at 4.2.3. Discussions were dynamic and conversational, weighted towards drawing out the interviewees' perspectives in recognition of the interview as more than a research instrument and itself as an object of sociological enquiry (Silverman, 1973). I note this dynamism to show my reflexivity about how I was an active part in the interview process, and how together with the respondent there was a construction (making) of the empirical data. I was also active in the interpretation of the data corpus, derived from the interviews and surrounding contextual material. Occupying an anti-positivist onto-epistemological stance, I reject the possibility of being a separate observer in relation to any possible distinct, objectively knowable realities for those who have participated in the research project as interviewees.

A core onto-epistemological aspect of this research is conformation to relational ontology as regards interaction with 'data' (socio)matter; in this way, the stance is not substantivist where data would be a discrete thing of significance, detachedly. The thesis supports viewing the sociomateriality concept as marking a significant paradigmatic shift in Information Systems (IS) research, so the onto-epistemology aligns to this core framing. Whilst my research is not wholly within the IS discipline, since e-Government also has a Public Administration (PA) 'root' (see Chapter Two), transactional and linear perspectives abound about gains achievable from digitalisation in the government context. I follow Cecez-Kecmanovic et al. (2014) in taking a sociomaterial perspective for my own data interrelation.

Frequently, across academic and grey literature, reference is made to finding answers (truths) from – as if lying 'in' – data sources. The conceptual framework for the research,

in Chapter Three, contends that accessibility, usefulness, and in-work data use assessed in conjunction with PSDT necessitates accommodation of case-by-case aspirations from data work, stemming from data workers actions to construct use/s from data. The role of data workers as the interpretative community for data use is of significance. Shaping of data is unavoidable, and the thesis rejects the view that data materially exists separately from social acts of making that data. Going further, social acts prevail in uses of data beyond initial data-making, as forms of data use making that entail subjective assessments of usefulness achieved by speaking for (as well as with) data.

Taking a constructivist interpretivist onto-epistemology, I view efforts to research the social world as subjective. In this way, I have produced qualitative research, with meaning from analysis produced with acute awareness of the role of both the interview and interviewee in co-constructing the initial outputs, in the form of the transcripts (more detail on transcription in Part Two).

The qualitative nature of the research is complemented by the addition of quantitative data sources. These derived from a short pre-interview survey and statistical insights pertaining to local government councils, for instance their size. The approach was also strengthened via application of methodological elements from undertaking a case study method (Flyvbjerg, 2011; Yin, 2009), whereby the design permitted drawing on a range of data sources (see Table 4-4). Although the research was not wholly (strictly) a case study, given manner of grouping all respondents and thematic areas together for an overarching, explorative impression. The design also borrowed from other qualitative styles including ethnographic research approaches, using a fieldwork diary, and seeking to immerse myself in the research environments – albeit more digitally than in-person. I also used techniques of narrative history (Hollway and Jefferson, 2000), where interviewees were comfortable to share their career journeys and educational backgrounds through various job roles. A jump-off point for this was the survey question covering length of time in local government and whether respondents had worked in the private sector (see Appendix E: Pre-interview Survey Questions for full survey).

Knowledge was produced via extraction of meaning from multiple realities (Merriam and Tisdell, 2015) by people in data work for PSDT. These multiple realities can coexist (Leavy 2014), justifying the exploratory approach taken, seeking to share a range of perspectives from those who constitute the data work culture. Additionally, this research sees the phenomenon in focus, the way local government internal staff work – or did not

work – with data use to support PSDT, as socially constructed and produced through social interactions with various staff member peers, other professional contacts, and the (local) public. Therefore, the phenomenon was in a constant state of revision (Bryman, 2012). In practical terms, this meant that the exploration is part of an ongoing social occurrence (or broad societal 'event'), navigating changes in work, and the thesis cannot offer definitive final answers. Instead, the thesis offers new knowledge by conceptualising data work, emphasising use and data use type classification, to improve understanding of data work changes in flux and highlight cultural characteristics.

Finally, it is important to highlight again that the project has not sought to determine if PSDT has, by some selected metric/s, factually occurred. Instead, the research focuses on varieties (types) of data use undertaken in the context of a general goal to be data-driven, under global, national, and local government level mandates – and expectancy – to undergo transformation. In this way, the thesis offers new knowledge about data work culture within local government.

4.1.3 Research Strategy and Design

Now, the step-by-step approach and reasoning for the research structure are described. The original research plan evolved due to COVID-19 limitations and after better understanding of on-the-ground transformational and data activities within local government. The latter topic is covered below, and the former (COVID-19 impact and associated research project adjustments) is addressed in a dedicated section in Part Two.

Figure 4-1 Research timeline and activities: three phases

PHASE	2017	2018	2019	2020	2021	2022	2023	2024
ENTRY								
FIELDWORK								
EXIT/WRITE UP								

ENTRY	FIELDWORK	EXIT
Oct. '17 – May '18 [plus maternity leave] Jun. '19 – Mar. '20 (lit rev, project design, Ethics Application) Apr. – Sept. '20 **ACTIVITIES** Literature review, Policy review, UofG Ethics application, Scoping "interviews" (discussions with contacts and other intros facilitated), Preparation of interview protocol + Topic Guide, Recruitment info (Participant Information sheet)	Oct. '20 – May '21 (interviews) Mar. '21 – Sept. '21 (doc collection) Oct '21 - Feb '22 Return to 'field' to go deeper with job descriptions and "data professional" idea; update docs for analysis **ACTIVITIES** Interviews, Document retrieval (policies, strategies, internal non- confidential reports, job descriptions)	Summer 2021 (contact with respondents) Oct. '21 – Oct. '22 for analysis phase **ACTIVITIES** Withdrawal from the field (follow-up 'updating' meetings), sense-making, organisation of materials (empirical data) and analysis, writing as analysis
		WRITE UP
		Autumn '22 – Spring '24 Final report, Thesis submission 2024
RELATED OUTCOMES	presenting ideas: Digital State Conference, Mar 2021; article published 2021; UNU-EGOV 2020- 22	

Changes in the design

Originally the research sought to uncover:

   (i) staff perspectives and perception of data and application (use) in their work

  (ii) infrastructure (physical / technical) for data and information use, re-use, and sharing

 (iii) organisational data-work context, including norms, habits and traditions

During fieldwork preparation I decided tackling (i) and (iii) should be the priority since these fundamental aspects are core to data use culture within local government and the literature review revealed (ii) as well-researched. Also, (ii) was quickly apparent as extremely complex and not feasible in the design, due to my covering a multitude of public service areas (giving breadth, but limiting service area thematic depth, rather choosing 'data work' depth). As further set out below (and in Chapter Five), during the scoping phase it became evident that 'data' was infrequently reliably in named, tangible (material) form to permit ease of mapping its movement. Even where possible to chart, attention to abundant more nebulous data and its handling may be overlooked, privileging that which was easier to 'see' and follow.

Initially, the proposed research sought to determine whether increased data usage, as data-making and application within broad public service task structures, may improve delivery of a public service increased via shared understanding in the specific context of new 'data-driven' or 'smart city' initiatives. The intention was to evaluate how data and information travels in councils, moving vertically and horizontally around the council organisation, to determine the extent new data, or new usage of data, affects prevalent data culture to influence the attainment of PSDT aims. Therefore, the initial research design planned to recruit participants from three distinct groups working as internal local government staff:

Group A: work directly with the new initiative operationally

Group B: to whom Group A report and who work directly with the new initiative at a leadership / managerial / strategic / supervisory level

Group C: do not work directly with new initiative, but progress service area linked activities, with vested interest in the work and data generated or utilised (for example, to obtain intelligence pertaining to the public service area)

The research design reorientated during the early stages of the fieldwork, in October 2020, because it became apparent that staff member employees do not hold roles in such a demarcated manner to permit coherence to proposed Groups A / B / C; there is a great deal

of role fluidity. Selection of councils and service areas based around a 'data-driven' initiative was retained as a qualifying criteria (see Chapter Five Table 5-2 for overview of the selection criteria), although some initiatives were not as specific to service areas as others. As an example, in one location there was a council-wide digital transformation initiative to pursue 'business intelligence' (Location Red) via implementation of new digital infrastructure and processes; in another location, instead there was an operational imperative to respond to official feedback from a national auditing agency about 'better use of data' in relation to the provision of child services (Location Blue).

During the fieldwork and analysis phases, the emphasis shifted away from attempts to map dataset movement in councils, prioritising analytical attention to experiences of data and use/s by staff in Scottish council PSDT working environments. One of the reasons for the decision to stop mapping how data flows was the fact that the councils were further behind in the data management maturity than was initially understood. Also, as the thesis argues, fixation on materiality in dataset resources, whilst a useful undertaking, does not cover the full messy, relationality of data work. Data was found to be much more fluid and, in some ways, more informal than expected during the preliminary planning stages for the research project.

Designing the research

Further detail is now provided about how this research was produced, referring to my study's philosophical underpinnings as a qualitative project. Connecting the practical elements of the research project to the onto-epistemology, described above, allows the reader to see the appropriateness of research strategy and design decisions. In making account of the process, alignment is emphasised with the notion that *"qualitative research design must combine characteristics of a phenomenon ... with rigor of scientific research"*, as articulated by Cleary, Horsfall, and Hayter (2014:273).

The research views Scottish local government 'data work' singularly, albeit across multiple locations. This approach is justified by the goal of exploring a widespread, under-researched phenomenon, of data use as part of the data work culture and local government actions to achieve PSDT. The purpose is holistic inquiry investigating a contemporary phenomenon within its natural setting. By borrowing methodological elements from 'case study' qualitative methodology (Yin, 2009), it is possible to seek then draw upon multiple sources of information needed to convey an in-depth picture of the phenomenon being studied. The research is 'instrumental' in as much as it aims to provide a general

understanding of the phenomenon via the use of the case, and 'multiple' because several locations (and initiatives therein), with varied attributes, are included in the study. However, it is also 'holistic' because the purpose is to consider the themes within the case study across the various locations and initiatives, not to compare or contrast the locations as an overarching output.

Yin (2003) suggested that the case study format can help uncover the contextual conditions the researcher believes to be relevant to the phenomenon being studied. Miles and Huberman (1994:25) explored the challenge of determining the units of analysis for a case study, whereby the case itself is a unit of analysis. For the purposes of this project, Scottish local government itself is the target of the study and the research offers comment on data work. The primary unit of analysis is 'data use', with employees (data workers) and data as units of observation.

An additional document retrieval and analysis stage was inserted latterly due to surfacing the 'data professional' concept as of pivotal significance in ways that data was used. Doing so was possible due to the flexibility in the design, retaining the focus on nuances of data use but able to take the conceptualisation further as my thinking about the object of study evolved.

The research design did not seek to compare or contrast councils, but to explore the data work culture phenomenon widely. This was both broad and narrow: broad councils and services; narrow on 'data' and its use/s. I retained openness on definitions of data so that respondents could offer their views freely and thereby I offer analytical comment on the prevalent data work culture. Also, I used the secondary location (grouped) dataset to sense-check findings from primary locations.

In-depth qualitative interviews

The research design used semi-structured interviews for flexibility and space for participants to answer on their own terms and direct the discussions while providing a structure, via the list of themes, to facilitate analytical evaluation across interviews. This study examined meanings staff attributed to their data work practices and experiences seeking to go beyond surface description into latent meanings and generating meaning inductively (Mayring, 2004; Schreier, 2012). However, the treatment of the accounts is

sensitive to *"how [a] researcher is always only giving access to some aspect of that lived experience or organizational context"* (Rapley 2014:57).

For the research, interviews were used to gain access to meanings ascribed by staff to their data work, and the ways they made sense of their experiences and feelings towards their public services work, through data and digitalisation, during the activities of their profession. Qualitative interviewing enables elicitation of participants' own understandings and perceptions of the phenomena in focus, ways of working with data for PSDT, discovering who does what, why and how. In-depth interviews are *"conversations with a purpose"* (Burgess, 1984:102) holding space for *"possibility of surprise"* (Firebaugh; 2008). By choosing to utilise qualitative interviews, I sought to understand the points of view held by the subjects *"to unfold the meanings of their experiences"* (Kvale, 1996:1).

Since the research derives from a constructivist stance (Silverman, 1997; 2001), the view is of socially constructed reality (Berger and Luckman, 1966). This onto-epistemological stance is consistent with the conceptual framing for the research, positing and exploring how data work is influenced by practices of data use, where data both comes to be and is thereafter handled (in uses) relationally. Reflexivity and positionality are integral, as Baxter and Eyles described: *"allowing a conscious deliberation of what we do, how we interpret and how we relate to subjects"* (1997:505); Appendix F: Interview Guide shows the Interview Guide.

4.1.4 Location Selection

Locations were selected on the basis that these would give access to data work practices by staff tasked to advance goals of PSDT. Preparation to enter the field entailed time to identify appropriate initiatives to serve as the starting point for the interviews and a framework to understand the function of data use therein.

In selecting appropriate locations from which to recruit interviewees, I sought a forerunner initiative within the council purporting to be data-driven or 'smart'. Therefore, an explicit connection to the council's digital transformation or digitalisation agenda was expected. Whilst a limited number (two or three) of projects qualified each selected place as an admissible location for the research project, during the interviews the respondents all spoke about many more than these, and the research design encouraged shared accounts to go in

directions the respondents precipitated, so long as interviews stayed on topic (i.e., data use, including data's changing role in transformation efforts).

I decided it was preferable to select a couple of comparably sized councils, for analysis of the empirical data and to obfuscate source councils. Seeking to offer some anonymity was deemed important to encourage the research participants to speak openly and frankly about their professional experiences and feel able to share critical or negative perspectives. Also, it was considered prudent to select councils that used a range of funding sources, although details of this took some time to determine during the sketch phase, where the initial data-driven or smart city initiative was placed within its specific location in the organisation (i.e., in X or Y division within the council subjected to whichever reporting structures, e.g., to a particular board, committee, senior manager, steering group, or combination of these).

The local government locations chosen for the research, an indication of size and the corresponding number of interviews are set out in the table below:

Table 4-1 Named research location councils and number of interviews

Council	Size (large / medium / small)	Number of interviewees
Glasgow City Council	Large	16
City of Edinburgh Council	Large	14
North Lanarkshire Council	Large to Medium	11
Dundee City Council	Medium	7
Perth and Kinross Council	Medium to Small	4
Stirling Council	Small	3
TOTAL	*6*	*55*

The map below shows the geography of mainland Scotland, located in north Britain. The location of the three Primary locations (Glasgow, North Lanarkshire, and Edinburgh) are across the 'central belt' in the south, shown in darker green shade, and marked with a red border. The three Secondary locations (Stirling, Perth and Kinross, and Dundee) are shown to the north in lighter green shade, marked with a blue border.

Figure 4-2 Map of Scotland showing research locations and number of interviews
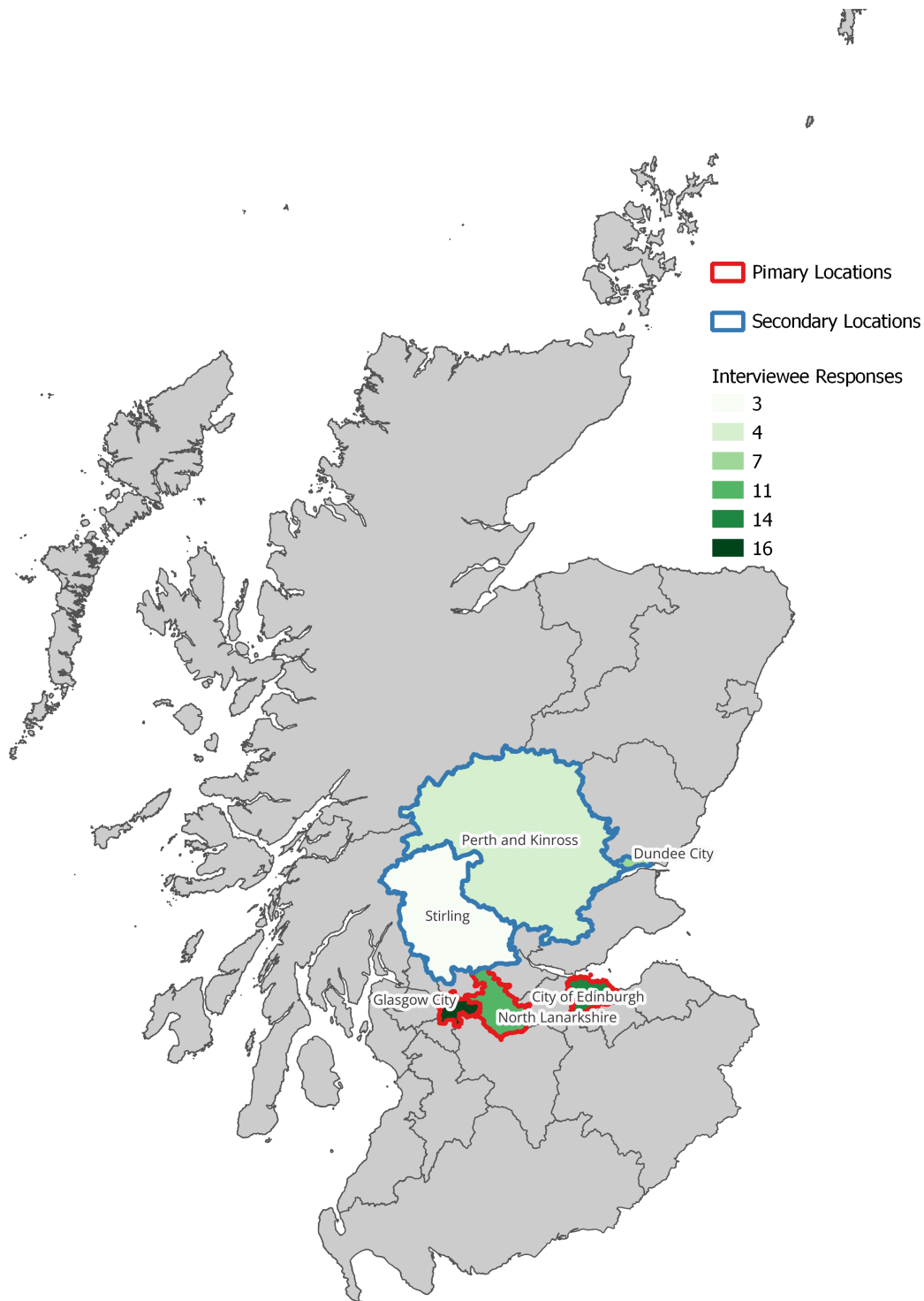
4.2 Part Two – Process and Practicalities

The second part of this chapter sets out the research process and practicalities during the empirical phase, detailing how participants were involved in the study. This part also addresses the impact from COVID-19 and lays out how ethical issues were considered and mitigated.

4.2.1 Sample and Recruitment

Sample

Rapley (2014) explained how sampling really matters for qualitative research since often claims made by qualitative researchers are based on smaller populations (than quantitative projects). Also, the nature of qualitative research means fewer interactions, situations or spaces are included. Therefore, decisions around sample have huge importance enabling reliability and validity for the research. The research population must be chosen for good analytical reasons. As Rapley put it:

> *"Above all, sampling should never be the product of ad hoc decisions or left solely to chance. It needs to be thoughtful and rigorous."* (2014:49)

A small number of factors, individual to distinct research projects, influence whether a sample size is sufficient (Mthuli, Ruffin and Singh, 2022). Smaller sample sizes are generally regarded as appropriate for interviews that explore complex, subjective experiences (Crouch and McKenzie, 2006). Here, my target was between ten and 15 participants from each (primary) location, considering ten a sensible minimum for a 'case'.

A purposive sampling strategy was utilised, identifying participants with characteristics of interest in relation to processes studied (Denzin and Lincoln, 1994). That meant my sampling focused on sourcing individuals doing data work within an initiative seeking to leverage data for PSDT. During policy and strategic documentation review, it was clear all Scottish local authorities seek to undergo transformation via ICT and associated data, since doing so is a national (U.K. and Scottish) government mandate. Furthermore, participants must interact with operational public services, whether at the level of delivery directly or in a managerial (oversight) manner.

Table 4-2 below shows how I applied the issues highlighted by Rapley (2014) to guide sampling to the data work phenomenon under examination.

Table 4-2 Sample guide, applied to data work culture phenomenon

Sampling subject	Social, relational, and conceptual units	Data work culture topic
Actions	specific acts, processes, behaviours, intentions and motivations	DATA USES & DATA USERS / WORKERS
Interactions	activities, formats, consequences and outcomes.	DATA USES
Identities	roles, types, categories	DATA USERS / WORKERS
Events	situations, rituals, ceremonies, temporal orders or trajectories	DATA USES
Settings and spaces	spatial (or conceptual) locations, organisations, milieu	DATA USES
Objects	devices, artefacts, electronic and paper texts	DATA

Developed from Rapley (2014:57)

There was a scoping period for the study, entailing desk research and informal contact with key informants, in early 2020. From this I developed an overview of possible locations and data work initiatives that met the sampling criteria. This long-list of both initiatives and staff seeking to draw value from data in PSDT assisted in the selection of the locations (primary and secondary). Ultimately there was relaxation of originally planned rigidity to 'cases' as set initiatives where I would follow the data.

After naming locations, I obtained ethical approval from the University of Glasgow and fieldwork commenced (see Part One Figure 4-1 overview of process). Prior to going on record, I undertook preliminary discussions with contacts based at chosen locations (or having previously been based there; some contacts progressed to new, different organisational roles in the Scottish public sector). Doing so helped my understanding of key documentation and work-team structure, such as digital boards or committees, commencing gathering documentation to review. During this time, I considered whether to draw in politicians for research interviews or demarcate the research by only interviewing equivalent 'civil servant'[43] employees. After unsuccessful attempts to arrange contact with a pertinent politician tasked with the mandate for 'digital' at Location Yellow, and following difficult publicity for Location Blue about one of the selected service areas, I deemed it prudent (and expedient) to remove political actors from scope. I view this as a both a limitation of my research and a future opportunity to explore (see Chapter Nine).

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[43] Civil servants are those employed by the Crown. Local government staff in the UK are public servants but not civil servants.

Recruitment

As noted, I deemed ten to be a decent target number of interviewees for each primary location. The study originally intended to recruit three different cohort groups and to follow 'the' data from novel digital transformation and data-driven initiatives (see section 4.1.3), but this was not possible due to both the early stage of initiatives plus the paucity of 'data materiality',[44] since named and dependable datasets were not prevalent at the council organisations. Ultimately, and of significance for the original project conceptualisation, local governments' 'data' (as sources, datasets, and such) were not as discrete as I anticipated. The immateriality of data found during the research influenced the development of the conceptual framework of 'data use' as a viable means to understand data work culture, as action and relations (see Chapter Three).

During recruitment key informants based in each location, and the Scottish Government, were used. This allowed for identification of potential data-driven or smart city initiatives and staff to approach about participation in the study. This effort also supported collection of secondary data sources, allowing (basic) preliminary organisational mapping within the council locations for each data-driven initiative being researched. Where informants were based within a selected council location, they were also invited to participate, and all did so.

Gatekeepers often influence participant selection (Bulmer, 1988). I experienced this on occasion when seeking to apply a 'snowball' technique (Noy, 2008). One time during an interview, a senior, male manager referred to a junior, female colleague as being a capable and central data user within his work team. At closure of the interview, I queried the possibility of obtaining her name so I could approach her about an interview. I was told that since she was young, she would not be comfortable since she would not know what she was allowed to say to an external contact (researcher). This response struck me as controlling and patronising, but I accepted and moved on. Gatekeeping of this type is especially evident when working with highly hierarchical organisations such as (local) government entities. In practical terms, when using the snowballing technique, I sent a general information sheet to potential respondents; also used in the earlier scoping phases in summer 2020 (see Appendix C: General Information About the Study).

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[44] Where materiality means the tangibility of data; named datasets linked to PSDT activities.

As regards time commitment asked from participants and imposition, I gave this matter careful thought, so participation did not become a burden or constitute an intrusion. This was managed by aiming to keep interview length to 45 minutes, with five minutes to cover an 'ice breaking' introduction and a wrap up to end the discussion (including a reflective question about the interview process). The first five minutes were also used to go through the Participant Information Sheet and to confirm respondent understanding about their involvement and my use of their data. Opportunity was given to address any queries, covering the origins of the research, myself as the researcher, the process of the interview and the following stages.

The vast majority of the 58 interviews (all bar five), were scheduled at ten minutes past the hour of 10:00, 12:00, or 15:00, so it would be obvious to end the interview on the hour without running too much over the intended 45 minutes. There were a few people who did continue the discussion by up to 15 minutes longer. All interviews were completed within one hour and 15 minutes maximum. Where a participant was used to help recruit interviewees or for the purposes of the business process mapping part of the research process, I was aware that assisting me was additional to their normal work. Therefore, all communications were kept succinct. For emails, I used templates written in advance drawing on my local government experience to structure emails concisely. I also personalised contact each time to help convey my gratitude. Discretion and tact were utilised to keep as much anonymity as possible, although in some instances it was knowable to certain participants that others had been invited and had accepted or declined an official research interview.

The interview guide

Interviews were semi-structured and conducted following a series of broad topics from my interview guide (see Appendix F: Interview Guide). I used cards and large paper copies as supporting materials. I produced a spider-diagram of topics that I was able to refer to during the interview, aided by having the camera off and so reference to materials did not indicate distraction from listening to respondents' accounts. The spider-diagram tool helped me retain focus when interview topics covered were expansive. The interview guide was designed to leave adequate space and flexibility for participants to answer questions on their own terms and for me to explore individual experiences and pursue the topics that participants raised (Edwards and Holland, 2013).

The main themes covered in the interview guide included:

- Data
- Data work
- Data workers
- Data work as a profession in local government
- Data Use/s
- Data Usefulness
- Data Availability and Accessibility
- Transformation
- Digital transformation

The interview guide was designed with open ended questions and probes focusing on individual experiences and perceptions of data work. For example, probes included:

- Can you give me an example of what you mean?
- Please tell me more about that.
- What you say is important.
- Can you say more?
- How does your experience before that time compare to your experience now?
- Tell me more about that experience (or that time)?
- If you could change anything about that experience, what would it be?

Use of motivational probes or 'conversation continuers' enabled me to gain more detail by inviting elaboration and provide more clarity about an issue ultimately helping me more fully understand some process.

Overall, the interviews went very well. There was positive feedback from the participants when I invited their final reflections on the experience at the closure of the interviews. Also, the ongoing interest – via response to updating emails and invitation for follow-up contact – suggests that their experience was a good one and highlights the importance of the topic. From my side, I obtained extremely detailed, rich data from which there were a vast array of relevant insights on the data work, data uses and digital transformation topic.

4.2.2 COVID-19 Context

For this study, I had the benefit of exploring how local government staff view their own work in relation to data use and the context of digital transformation by talking to them during their work time. Had the study progressed without the pandemic, I would have attended interviews in person, where interviewees took a break from their work, evident to their office colleagues, to engage in the research. Work-from-home mandates meant that worktime becomes less observed by colleagues.

Fine and Abramson claimed of COVID-19's impact on ethnography that:

> *"to say the physical and digital are interchangeable or produce similar analyses is a methodologically indefensible false equivalence."* (2020:4)

Whilst to conflate digital and physical is problematic, it is necessary to consider the subject matter. Using teleconferencing tools was not in my original research design: as noted, I planned to visit each of the locations to conduct interviews in person. I certainly recognise that some data sources were lost. For example, I wanted to interview respondents in their places of work to be able to observe their working environment in offices, or depots, drawing on ethnographic techniques. However, there were many positives of the fully digital approach. I believe it was much easier to recruit because staff were not concerned about being seen to have the time to talk to a researcher as opposed to just getting on with their work. If in person, colleagues and managers would see them going to meet me in a café or an invariably glass-walled meeting room if the interview arrangements had not been altered by COVID-19 restrictions.

Unsurprisingly given the period, often COVID-19 came up as a topic, linked to the use of ICTs across local government, or the use of data and how it can be stored, accessed, or shared in the pandemic context. However, broadly, respondents talked about their day-to-day work 'as normal', even in an obviously changed (unusual) situation. I do not claim that I would have created the same data were it not for the pandemic. Regardless, I believe I obtained a strong data corpus. Although, as Fine and Abramson (2020) asserted, the physical and digital are not interchangeable, however in the case of my field work there was minimal disruption methodologically.

During the interviews, the first five or so minutes was spent with the camera on, to build rapport, and confirm the participant understood the consent process and had the chance to ask any questions before I began the official interview (and the recording). Part of my

reasoning to suggest the camera was off was to offer the respondents a break from screen-fatigue, as I understood there are many team meetings with cameras throughout the workday.

I would not replicate the decision to have the camera off during teleconferencing interviews. Partly, working styles have evolved post-COVID with people more comfortable using teleconferencing. However, back in 2020 at the start of the interviewing process, I also had three telephone interviews: my thought-process was to replicate the telephone experience for the computer-mediated interview (Block and Erskine, 2012). I had thought that not being observed by the interviewer, especially during uncertain times of the pandemic, in a second lock-down across the UK when I began my interviews in October 2020, would help put the interviewee at ease. Also, I was concerned about connectivity issues, whereby the camera might take up additional bandwidth from home internet and I was keen to have a smooth interview, and associated recording.

4.2.3 Empirical Data Sources and Analysis

In research, the most vital component in relation to data type or mode of collection is the quality of the data, whereby *"Rich and complex data on a given topic are the crown jewels of qualitative research"* (Terry et al., 2012:22). This whole thesis commits itself to deep exploration of data, and thoroughly ascribes to this adage. The sought after 'thick description' is provided through a descriptive and detailed account of the research settings and context (Geertz, 1973).

Sources

My research design required gathering investigative material from several empirical data-sources. I was consistent and methodical about drawing these together from all locations, although not all locations had the same types of policies or strategies (for instance, 'open data policy' versus 'data policy', or 'information governance policy'). The ambition was obtaining similar sources of empirical data from each of the council locations and 'smart' or 'data-driven' initiatives. In practical terms, this entailed seeking out data policies and information management documentation from all locations and reviewing overarching digital transformation, digitalisation, or 'smart' public-facing outputs.

Additionally, job descriptions were obtained where offered by interviewees, totalling <10. The job descriptions covered both those interviewed, and in two instances job descriptions for other data-work related roles. To extend this data-source, I searched for data, digital transformation, and smart jobs on MyJobScotland, conducting a first-pass thematic analysis of 15 job descriptions from council locations included in the research. I did this in summer 2022 following clarity about the centrality of data professionals and significance of career history in understanding data work culture. This served as an analytical support for handling the main data corpus, further elaborated below.

Table 4-3 Sourcing job descriptions

Respondent	Action / opportunity	Date
W-2	*Could ask for job description for previous role and could ask for another interview in new role*	
Q-2	*Could ask for job description for previous role* **Conducted additional interview**	15/4/21 25/5/21 14/6/21
I-2	*Could request job description?*	
Dd-2	*Could request job description?*	
Aa-2	**Two job specs shared**	
U-3	Provided email update **Received feedback via reply**	2/7/21 5/7/21
T-3	Job spec shared **Feedback session provided**	30/4/21 15/6/21
S-3	Provided email update **Feedback session provided**	30/4/21 15/6/21
O-3	*May be open to second interview?* Provided email update **Job spec files x3 shared** **Informal follow-up undertaken**	27/7/21

The full range of PhD data sources are detailed below. Together these constitute the full data corpus for the study.

Table 4-4 Empirical data sources

TYPE OF DATA SOURCE	OBTAINED VIA
PRIMARY	
Qualitative	Fifty-eight interviews

Quantitative	Fifty-five responses (same number as interviewees) completed Pre-interview Survey
SECONDARY	
Quantitative	Official statistics: locations' population size and demographics, budgets, local government measurements (employee numbers, external ICT procurement) (see Chapter Five)
Unstructured Administrative (textual)	
Council Strategy and Policy Documents – data and digital transformation	(City / Region) Council Plans, Open Data Policy, Information Governance Policy, Security (GDPR)
Council Strategy and Policy Documents – thematic service area	Housing Poverty Care Services Education Transport
National Government Strategy and Policy Documents (10+ YEARS 2011 - 2021)	Scottish Government (2011) 'Scotland's Digital Future - A Strategy for Scotland' Scottish Government (2012) 'Scotland's Digital Future: Delivery of Public Services' UK Government (2012) 'Civil Service Reform Plan' UK Government (2012) 'UK Government Digital Strategy' Scottish Government (2015) 'Open Data Policy' Scottish Government (2017) 'Realising Scotland's Full Potential in a Digital World 2017' Scottish Government (2017) 'Scotland's Digital Strategy - Evidence Discussion Paper' UK Government (2020) 'National Data Strategy' [Policy paper] Scottish Government (2021) 'Scotland's Digital Strategy'
Government Committee Reports	Fox; M.L. (2010) 'Martha Lane Fox Review – Directgov 2010 And Beyond: Revolution Not Evolution' Scottish Government (2011) 'Christie Commission Future Delivery of Public Services' NAO 'Challenges of Using Data in Government' (2019)
Council Committee Reports	'8th City' Programme … (newsletters) Internal initiative-linked programme / project reports shared

• data and digital transformation • thematic service area	Housing Poverty Care Services Education Transport
Job Descriptions	Via Interviewees; keyword search in MyJobScotland
Additional Unstructured (textual)	
Thematically relevant Media Articles, including promotional outputs from Locations	Various, details in Chapter Five Via outlets such as Digital Office of Scottish Local Government, and news site 'Holyrood'[45]

The initial period set for gathering relevant digital transformation and data documentation, as unstructured textual PhD data sources outlined above, was ten years from 2011 – 2021/22, starting from 'UK Government Digital Strategy 2012' and 'Scotland's Digital Future: Delivery of Public Services 2012'. The bulk of PhD fieldwork was carried out between October 2020 and May 2021, with the qualitative interviews taking place during that time and many additional sources of PhD data gathered via suggestion by interviewees. Document retrieval mainly occurred between January and June 2020, although bolstered during interviews by recommended items.

In the scoping phase, prior to the scheduling of the research interviews, preliminary content analysis (Stemler, 2000) was undertaken of pertinent strategic and policy documents. The documentation in focus concerned digital transformation and data's role to support public service delivery, produced by the Scottish Government, the U.K. Government, Nesta, alongside council locations themselves. This process supported development of the interview guide and enabled myself as the researcher to strengthen my awareness of the (vast) digital transformation landscape.

Data analysis

The main method of analysis was Reflexive Thematic Analysis (RTA), following the six-stage process:

1. Review data (immersion)

2. Coding

3. Themes

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[45] *"Scotland's fortnightly political and current affairs magazine"* https://www.holyrood.com

4. Reviewing themes

5. Naming themes

6. Report

Undertaking methodical process of RTA has many benefits, particularly for new researchers, including flexibility in use to ascertain similarities and differences within a dataset, to help *"summarise key features of a large body of data"* and *"generate unanticipated insights"* (Braun and Clarke, 2006:97). Additionally, RTA is considered a useful toolkit for researchers that ultimately seek to communicate their work outside of academic communities (Braun, Clarke and Weate, 2016). Having made a sincere commitment to provide meaningful feedback to the participants, both at the personal and organisational (i.e., council location) level, this seemed pertinent. Following the six stages, I developed my codes, themes, and refined concepts iteratively to accomplish the analysis and offer interpretation of the results.

Geertz used Weber to explain how people in a social world are *"an animal suspended in webs of significance he himself has spun"*, going on to define 'culture' as the webs and that analysis thereof *"is not an experimental science in search of law but an interpretive one in search of meaning"* (Geertz 1973:5). Following this, analysis requires organising to determine what the structures – the webs – signify. In RTA this may be undertaken in a 'coding' process. Geertz cautioned that the effort is not like a 'cipher clerk' clarifying answers but rather akin to a 'literary critic' with a role to determine the social ground as webs woven, and their importance (Geertz, 1973:9).

To mitigate bias risk in my inductive analysis, I triangulated the PhD data wherever possible by asking colleagues (PhD supervisors and e-Government researchers) to consider the interpretation made in my study. This served as a means of minimising risk of my unconscious manipulation of my empirical data to better fit with the picture that may be coming together from the multitude of case study data sources. Thereby, I followed the steps in Reflexive Thematic Analysis (Braun and Clark, 2006; 2017) of the interview content establishing meaning within the empirical data beyond 'manifest' towards the 'latent' meaning (Cresswell, 1994) and made effort to sense-check my interpretation.

Transcription

Keeping the six stages of RTA in mind, data review was accomplished during the empirical phase in conducting interviews by keeping a fieldwork diary to describe my data-making. Thereafter, I immersed in my data during preparation for analysis. For this study, 58 transcripts were prepared and subject to analysis, both during the transcription task as data immersion, and thereafter searching for patterns and themes to address the research aim. Kowal and O'Connell (2014) explained how a transcript results from activity transcribing, which I undertook with some assistance from technological tools. Chafe (1995:61) stated: *"One cannot fully understand data unless one has been in on it from the beginning."* Whilst in some studies transcription work occurs by those not involved in the research directly, for my project I did all my transcription, in full (but not anonymised). I used 'Otter.ai' software to assist, but the quality of the transcript was often poor from the automated product, perhaps due to the Scottish accents, thereby necessitating comprehensive effort to listen to my recordings and correct the transcript prose.

Coding

In stage two, I began the process of initial coding for data classification into discrete categories and labelling. During RTA stages two to four, I listened to recordings whilst I marked-up physical copies of the transcripts with a pencil alongside a colour system to highlight prominent topics (such as 'data as truth / answers', 'data as named datasets', 'data in varied forms' e.g., spreadsheets or local radio commentary). Whilst seeking to identify patterns, similarities, and differences that I could go on to further interrogate and seek to explain, I undertook an overall positive/negative/neutral/conflicted classification (see Table 4-5 below). This was an important analytical act because it helped me recognise the innate contradictions within transcripts and between them. This led me to recognise paradox and contradiction in my results, to find ways of communicating this through theme definition and write-up. Not disguising the messiness and ambiguity was important since this was a key characteristic of the data work culture.

Table 4-5 Excerpt of coding work

Example	Categories of data-in-use	Notes	+ve or -ve
Traffic modelling "in 20 years' time, 100 cars will turn right at	Political, in this case inaccurate* as disingenuous use of modelling capability	Lack of skills – perhaps by person making claim; but perhaps intentional in political agenda	-ve

this junction" **Pp-4**	*Factual accuracy not aim if it served political purpose of time, as agenda-setting / comms.	- in public understanding limitations of the tech / software-derived insights	
Multiple examples, since most data use is for reporting after the fact	Administrative – backwards reporting	**Uu-4** meeting SusDev targets cannot be known for 1 year+ after deadline. Location Red problems with repeat failures in service delivery in context of housing maintenance, change in reporting process highlighted improvements (not missing process targets)	-ve (not transformative), maybe neutral
Poverty alleviation	Administrative – forecasting; strategic / policy intention	Beyond one council area's sole responsibility (politically less controversial). Effective group working, plenty of buy-in and data sharing	+ve
Roads and Transport **A-4**, **Ss-4**	Explorative; vague intentions removed from service area. Original data(set) makers highlighted concern / frustration at misuse of data (data re-users not respecting parameters of data creation)	Lack of data skills, even in data use experts; lack of metadata	-ve
Streamlining reporting in adult care services, **L-3**	Administrative	Statutory duties of care and associated responsibilities to reach a certain standard, and evidence non-neglect esp. if any accidents / issues. Lots to gain with better reporting.	+ve
Grass cutting efficiencies via **K-4**	Service delivery improvement	Resisted. Not progressed with the work team concerned, so weak buy-in to the 'solutions' for improved service delivery identified	-ve
Gulley Maintenance analysis via a service embedded data scientist **Cc-4**	Service delivery improvement	Need to find monetary savings, project set up with service area buy-in - improvements actioned. **Cc-4** specifically NOT part of corporate data resource in that location.	+ve

Motivated in health & social care analysis, not permitted **D-3**	Explorative; focused	Not permitted, out of role scope due to restructure and funding constraints	-ve
U-3, **B-3**	Explorative; focused related to service area but vague in terms of what was sought (see 'professional curiosity' idea)	Scope to be creative, self-granted permission linked to service area (Education). Seniority of **U-3** may be relevant, noting accounts of colleagues dismissing **U-3**'s "luxury" data use and surprise **U-3** had the time for such work	+ve
GIRFEC and siblings-in-care example from **S-3**	Explorative; focused related service area but vague in terms of what was sought (again 'professional curiosity' idea)	Changes to central reporting mechanisms from a database / system upgrade thwarting **S-3**'s previous work. Also, in Siblings example, database did not permit collection of sought datapoints - analysis not possible.	-ve

During the coding and theme-creation process, I searched for specific data types and use/s. I noted few accounts of actionable service delivery improvements beyond administratively in preparatory ways. Put another way, applying terminology introduced in Chapter Three, many in-work activities concerned 'parameters for' more substantive 'instances of' data use, rather than substantive examples of data uses in work.

Theme-making

The RTA process entails grouping quotations extracted from the PhD data corpus, such as interview transcripts, into appropriate themed categories and thereby allowing for a deep analysis of that empirical data. The theme categories are identified via codes constituting the *"building blocks for themes"* (Braun and Clarke, 2017:297) to help convey patterns of meaning. Through the analysis process, key recurring themes were identified. The earlier literature review stage of the project had surfaced elements I kept in mind, although the analysis process was inductive, led by the data itself. In conjunction with RTA from interviews, I also analysed multiple documents to build up my understanding. Through this effort, I observed turns of phrase that echoed that from other materials (such as the terms *"one source of the truth"* and being *"data-driven"*). More detail on theme-making follows below.

Sense-making

From manual coding, I produced themes for each transcript and tabulated these using Microsoft Excel to enable comparison. Emergent themes were then grouped into 13 broad, simplified categories used for analysis. Conceptually, these align to substantive data work and are as follows:

Table 4-6 Data use themes

	DATA USE THEME
1	MATERIALITY AND MATTER
2	TANGIBILITY
3	USEFULNESS
4	VALUE
5	ADMISSIBILITY
6	OBJECTIVITY
7	SUBJECTIVITY
8	CREDIBILITY
9	OPPORTUNISM
10	FORMALITY
11	INFORMALITY
12	PERMISSION
13	CREATIVITY

Table 4-7 Data use themes: further refinement

	DATA USE THEME	Refined theme
1	MATERIALITY AND MATTER	Substance of (the) data (S)
2	TANGIBILITY	S and Purpose of data use outcomes (P)
3	USEFULNESS	P … and S? **link to VALUE
4	VALUE	P and (Data) User perspective, individual, team, or system (U) [VAGUE]; and Detached assessment / evaluation (D)
5	ADMISSIBILITY	P and U
6	OBJECTIVITY	D **link to VALUE, unsullied by subjectivity and thereby overtly 'free from bias' is preferred
7	SUBJECTIVITY	**link to TANGIBILITY (i.e., the subjective is less tangible) and to USEFULNESS and VALUE. Analysis and derivation of answers should be objective?

8	CREDIBILITY	P, U and D **link to OBJECTIVITY (vs SUBEJCTIVITY) and ADMISSIBILITY
9	OPPORTUNISM	P and Agency of data user actors (A)
10	FORMALITY	S, D, P … tie to //EXPECTATIONS// (from data use)
11	INFORMALITY	P **link to OPPORTUNISM plus imagined – but not apparent from my findings - inverse link to ADMISSIBILITY and CREDIBILITY, also VALUE and USEFULNESS
12	PERMISSION	P and A
13	CREATIVITY	P and A

Thereafter, I spent some time in analysis through writing to crystalise the ideas and bring them 'down' from abstraction. During this period (2022), I wrote, as prose and in conceptual associations as shown above, about the grouped codes and emergent themes, and ways they interconnected. For example, some were opposite (6+7; 10+11), conceptually associated (1+2; 12+8; 3+4 alongside 5+8); and others were practically associated (13+9). I also explored grouping themes into categories of data work as a tool, skill, and answer, to make sense of the motivations from data use at varied levels (individual, work-team and organisational). This stage was critical for naming the six expectations of data (Chapter Six).

Table 4-8 Exploring 'types' within data work

Types of data	Object (and objective)	Tool	Answer "*One source of the truth*"	Raw and pure; inherent value locked in, ready to leverage, mine, draw out ("*unlocked*")	Extracting solutions, then seeking application contexts
Types of data user	Professional – local gov civil servant	Data Scientist	Protector of data as a category of user? Akin to data guardian	Data custodian, data owner, data controller, data intermediary	Old ways user vs New ways user Does data demonstrate reduced role of venerated (specific / particular service delivery specialist) professional …?
Types of data use	Service delivery functions (operational)	Service delivery (strategic)	Reporting on activities (operational and plans / strategies) – proactive?	Justifications and defence of activities – reactive? Political?	For debate / discussion / political decision-making

One other analytical technique was conducting keyword searches in both the digital versions of the transcripts and my own interview notes. Keywords were set to match emergent themes, for instance, as shown below in Table 4-9.

Table 4-9 Analysis excerpt: matching keywords to themes

Theme	Keywords
Substance of (the) data	Source/s of truth
Purpose of data use outcomes	Forecasting / predictive. What went wrong; how to fix
(Data) User perspective	Change; improvement; better
Evaluation of (un)usefulness	Worked well. "*Firefighting*"; backwards-looking; reactive
Agency of data use actors	Finding answers; solutions

Once I decided the themes, I returned to the transcripts to ground my data analysis in each interview again, as well as a way of cross-referencing my interpretation. This is what Mason (2002) described as a 'reflexive' reading of the data, highlighting researchers' *"role and perspective in the process of generation and interpretation of data"* (2002:149).

4.2.4 Ethical Issues

Ongoing practical and ethical concerns were discussed with my supervisors throughout. This was particularly notable when seeking approval for the empirical phase exactly when COVID-19 started (March 2020), necessitating changes to my research design. Fortuitously, since I had not yet obtained ethical approval, there was minimal disruption beyond reimagining the interview process from in-person to online and accommodating possible additional pressures for the participants.

During the study, I was mindful of the distinction between 'procedural ethics' (official ethical approval) and 'ethics in practice', which Guillemin and Gilliam (2004) described as *"everyday ethical issues that arise in the doing of research"* (2004:263). In practical terms, this means constant critical reflection on ethical considerations and how I react to these that arose during fieldwork – and beyond. One example of this was when an interviewee asked me to input into their own work process, an audit, whereby I was to confirm public engagement by the individual. I did so, after reflecting and recognising that this was an appropriate contribution I could make to express gratitude for this time in my own study.

Potential participant harm related to anonymity (Bryman, 2012) was a challenge given the socio-political landscape of the study: Scotland is a small country and in looking at novel digital transformation initiatives, it is realistic those involved could be identified by others with knowledge of this area of study. Accordingly, in seeking to provide confidentiality to those who were interviewed I presented the findings without specifying comments from named council locations (hence colour coding) and with obfuscated initiatives. This works because the exploration is multiple and holistic, not comparative. On this matter, Guenther (2009) offers guidance to limit the risk for participants through separation between respondent comments and identifying characteristics or affiliations. The topic and the population involved limited the impact of this so participants were informed of limits to confidentiality that could be offered. Care was taken to disguise individuals, including by (at times) switching gender so hopefully that even if suspected, the exact participant cannot be known definitively.

Also, in respect to the participants and to ensure scientific rigour, throughout design of the interview guide, the research fieldwork, and the analysis phase, I was mindful to be reflexive to minimise the effects of the imposition of my own perceptions and pre-conceived understandings onto the interviewees. In practical terms this was aided by my fieldwork diary and an analytical (and write-up) phase ritual reminding me about reflexivity. Teaching Qualitative Methods during my doctoral studies between 2020 – 2024 also helped me to be mindful about the ways scientific rigour can be undermined by paltry reflexivity, not being sincere about ones influence on data interpretation. Working with 'data' as a topic also kept me constantly alert to data limits and the sense or truth we seek to interpret from it. By being reflexive throughout, a central element in good qualitative research (Mason, 2002:7), I negotiated ethical dilemmas during fieldwork and the analysis process.

Informed consent of interviewees was obtained, and an information sheet (see Appendix D: Plain Language Statement – Invitation to Interview) was disseminated in advance of confirmation of consent (provided with a signature on a form). Every interview began with an opportunity to ask questions, a reminder of my intention, and the offer to opt out. After every interview, within two days I wrote to the participants to thank them for their time and note I would be in touch in the future. Efforts to 'touch base' during a post-interview follow-up discussion demonstrate my respondent after-care, and researcher integrity. For the full sample I offered follow-up conversations, which seven participants took up, as I

was seeking to retain a communication channel to interested participants to share any early insights. These were requested by the participants. The topic of the study was of interest, and I was mindful of the ways that my research could have implications for improving in-work data use activities through digital transformation. Through the write-up during 2023-24 I was made aware however that a comprehensive 'practitioners toolkit' is a separate output to the doctoral thesis. I intend to produce this in the future.

Finally, in order to be a responsible researcher, I have committed to disseminate my results in a manner that is appropriate for the participants. To produce dedicated policy-linked practitioner guidance is a first priority after the completion of the doctorate. I have already provided follow-up sessions to participants upon their request – after my offer at the closure of the interview – and stayed in regular contact until 2022, sharing research-related activities (such as flagging a new Scottish Government programme, 'Unlocking the Value of Data'). I plan to update the participants again in 2024 when I have submitted the final thesis for examination and remain committed to the production of a practical output, such as a toolkit.

4.3 Conclusion: Making Data to Understand Data Work

The research was designed to explore the complexity of data use and increase understanding of data work culture. The overarching purpose of the thesis project is to explore the status quo of data use in relation to digital transformation aims, within local government in Scotland.

This chapter described the methodological underpinnings of the study design and research methods chosen to account for data work culture. Criteria for selecting the locations and rationale was provided, giving broad overview of the sample. Chapter Five provides more contextual detail on the locations, initiatives, and interviewees.

Research and analysis processes at the preparatory and practical stages were also detailed, alongside ethical considerations that arose throughout the research. Attention was paid to providing a suitable level of anonymity for participants given the small size of Scotland and the closeness of the digital transformation and / or smart community. Reflexivity was another critical component key to avoid pitfalls like believing I could give voice to the respondents, mindful of my own bias and prejudices related to experience in the subject.

The strength of the proposed approach lies in prioritisation of the practice-based experiences of data work staff, drawn from an appropriately wide pool, as opposed to only those who conform to narrow definitions of data worker. This enables the study to better interrogate the data work culture phenomena, as a process underway. Overall, the rigour in the design and care taken in setting the research scope has enabled close exploration of data use, a significant topic which has not been addressed in this way to date.

Chapter 5: Research Context

This chapter describes the places, projects, and people central to the study. The intention is to contextualise the practice-based examples of data use presented in the subsequent two findings chapters. This chapter also presents some of the background data (in section 5.3) in Table 5-4, showing the thematic service areas for each research location. The main findings chapters, following this contextual chapter, present the analysis of empirical data from the research to identify the overarching "promise" of data in local government (Chapter Six), laying out how these articulated expectations from data work are influencing and changing local government public service delivery activities through two illustrative personas (Chapter Seven).

Consistent with the UK structure of local government, local unitary authorities in Scotland have the mandate to deliver public services to residents, businesses, and visitors of the geographic area the council represents. Services range from the provision of infrastructure or amenities constituting physical environmental services, such as roads, traffic, lighting, or waste, to social arrangements, like education, democratic services (e.g., facilitating elections), social care (including adult and children's services), or parks and recreational facilities. Some services directly address legislative requirements, others do not, but all align to overall strategic plans for the geographic locality in terms of political commitments and the mandate upon which the councillors were elected as political representatives of the people.

First, this chapter lays out the broad national level backdrop, detailing why Scotland was selected for the research. Then, the chapter covers how locations and respondents were chosen. The methodological aspects were covered in Chapter Four, so this chapter provides descriptive, factual details. Section 5.2 provides an overview of the six locations, with further explanation of the split between primary and secondary locations. Section 5.3 seeks to disguise the locations to offer some veiling of the named councils.

The 'data' topic is central for the study as it sets out to explore data work culture: this is covered via explicit or non-specific stated role/s for data in each location. As described in Chapter Three, these align to reporting and to intelligence functions – although not often in a direct way since the demarcated categorisation is not usual. Thematic service areas featured in the study are clarified below, following from the initial scoping to identify

projects that met the qualifying criteria (see Table 5-2). Information is given about data's role(s) in strategic or policy terms, as well as related to specific projects (where applicable). Providing this detail aids understanding of the data use context for subsequent chapters.

5.1 Places and Projects

This first section of the chapter provides details about the rationale for basing the research in Scotland, and the specific councils therein. It describes the criteria for choosing locations, as well as activities and local government staff working with these from which the study created the empirical data for the project.

5.1.1 Why Scotland?

Public service delivery transformation (PSDT) is a strategic goal for the Scottish government (Chapters One and Two). This goal is bolstered by multiple global-level claims about transformative possibilities from digital technologies and data, a subject given abundant attention over the past decade. At the highest levels, digital government transformation means improving public services for the public, including ways of delivering these that beyond 'old' pre-digital methods, since the provision of essential services is a core function of government. Often additional services are provided where these align to a council's vision and political mandate.

A key dimension in the Scottish public services landscape is the Christie Commission, which published its findings about the future delivery of public services in Scotland in 2011. Even more than a decade on from the research and final output – with the findings and recommendations accepted in full by the Scottish Government – the motivations remain relevant. Arguably there is even greater pressure on local governments that bear responsibility for provision of public services. Core challenges highlighted at the time include strains on public budgets; rising inequality alongside impacts from past welfare reform; an ageing population placing greater demand on public services; worsening climate change; and complex economic realities. These problems remain present, and it is now possible to add prolonged austerity policies, impacts from Brexit and the COVID-19 pandemic to the list.

In their review of the Report ten years on in 2021, Glasgow University's own (discontinued) Policy Scotland 'think tank' posited that *"the shape of the modern economy provides opportunities to be more effective and to improve quality in how public services are delivered"*.[46] During a panel dedicated to reflections about the Christie Commission Report and its relevance today, contributors recognised that digital tools and data could afford opportunities for the transformation in public service delivery required. As explored throughout this study, there are myriad expectancies of digitalisation and opportunities from data. There is also a recognition of the need to focus on the local level and to increase community empowerment, including potentially in data governance or ownership arrangements.

5.1.2 Places: Research Locations

The places for the research, as both physical locations and organisational entities, are all councils in Scotland. The selected places are all located in what is known as 'the central belt' (see map Figure 4-2, Chapter Four). Scottish local government has been made up of 32 local authorities since The Local Government etc. (Scotland) Act 1994 came into force, in 1996.

Primary and secondary locations

In total, six places were chosen as locations for the research: three are considered separately as the primary locations, the other three are grouped together as secondary locations (Table 4-1, Chapter Four). Each place - Dundee, Edinburgh, Glasgow, North Lanarkshire, Stirling and Perthshire - constitutes a physical location where residents are governed and served by the council as a governmental entity, providing a range of public services. The councils are also the organisational locations where the specific projects or general initiatives in focus are based, as well as the employer of the respondents as human subjects of the research.

All three primary locations - Edinburgh, Glasgow and North Lanarkshire - have organisationally centralised data work individuals, or full teams, categorised as being a 'corporate data' approach to data work; this is further described in section 5.1.3 below. In the secondary locations, smaller councils still constituting (Dundee) or containing a city,

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[46] Policy Scotland blog about the Christie Commission https://policyscotland.gla.ac.uk/the-christie-commission-10-years-reflections-on-progress/

the capacity in predominantly financial and human resource form is less, so the data use changes at what is termed a corporate level are not observed at the scale of the primary locations. There is nevertheless an aspiration to 'follow' the larger councils' approach in this manner.

Accounts from each council cover at least two separate service delivery areas, detailed in section 5.3.5, as well as the centralised 'corporate data' function. The latter function was primarily made up of staff based within centralised ICT teams for the secondary locations, but for the primary locations only one respondent was based in an ICT team. As regards projects and initiatives, quantification in precise numeric terms is hard since many of the public service activities were not clearly defined. In sections 5.2 and 5.3 there is additional contextual detail about the data use public service delivery activities in focus. Furthermore, throughout the findings chapters, articulation of themes and defining features of projects and initiatives are given when describing data use working practices.

5.1.3 Projects, Initiatives – and Just Plain 'Work'

The research was designed around specific named 'smart' or data use initiatives, identification of such was an important stage before commencing contact with the participants. Various projects or initiatives were identified, assessed, and sifted, where they were showcased as part of the local authority's wider smart and data-driven digital transformation effort. In 'diving down' during the empirical phase, some activities described by respondents were not overtly promoted at the organisation level, beyond conforming to a general edict to do more with data when delivering public services. Where accounts told of less discrete or tangible data use instances (not pertaining to projects or initiatives but amounting to data use via work practices), these were also analysed and are part of the research findings.

Centralised, service-agnostic data teams

During organisation of the full data corpus for this study, respondents were grouped according to whether they were based in a service-agnostic corporate data team or worked in operational service delivery aligned to a public service area. The 'corporate' turn of phrase came from respondents themselves, who referred to centralised data and performance oversight teams this way, related to the fact they were often located in that department of the councils (often councils have a corporate, business department where the

chief executive is based, distinct to, for example, physical infrastructure, health and social care, or education – specialist public service – departments).

Table 5-1 Scoping initiatives to choose research locations

	CITY	PROJECT/S
1	Scottish Cities Alliance	Various in Data Cluster for 8th City Programme.
2	Digital Office	Various across Scotland; COVID-19 Data Taskforce activity; Digital Strategy Refresh.
3	8th City PMO (Glasgow, for SCA's seven cities)	Various 8th City; Various in Neighbourhoods and Sustainability division (note complexities in funding and reporting structures for post)
4	Dundee	ERDF funded 8th City activity: Public Safety; Mobility in Living Lab (MiLL); Transport and parking; Economic Development and regeneration
5	Glasgow	Intelligent Street Lighting; Smart Waste / Recycling; various sustainability initiatives (air quality, transport, CO2 reduction targets); Child Services; Economic Development; 'Strategic Intelligence Technology (SIT) Team' and 'Centre for Civic Innovation'; Leaders Office
6	North Lanarkshire Council	Master Data Management; Platform design; Various linked to Business Intelligence Hub
7	Perth and Kinross	Public Safety; Smart Waste; Mobile Working and Scheduling; Open Data; Various (in PKC IT Team)
8	Edinburgh (region)	Various on 'DDI' and Region Deal. Child Services / Social Work; Education; ERDF funded 'Open Data'; Chief Digital Officer projects; Tourism
9	Stirling	Open Data; Sustainability; Chief Executive office projects; Data architecture

Table 5-2 below sets out criteria for identifying suitable work activities to qualify the place as an appropriate location. Activities had to relate to efforts to use data in new ways, to advance the local authority's digital transformation (via data use and being 'smart' and / or 'data-driven'). These could be named projects (or programmes) such as GCC's net-zero and low emissions zone transportation planning, Future City Glasgow, then 8th City – more detail below – funded activities, including intelligent street lighting among numerable others. They could also be initiatives, such as the 'data workers' internal audit in CEC, or GCC's Centre for Civic Innovation, or CEC's calls to better leverage data assets as obtained during operational work for child services, and the Business Intelligence Hub in NLC, which are more akin to new day-to-day practices within local government work. There had to be an overt role for data but supporting (digital) transformation could be implicit.

Table 5-2 Criteria table

1	2	3
LOCATION	**INITIATIVE**	**RESPONDENT**
Constitutes	*Based within*	*Employed by*
Scottish unitary authority (aka council or 'local government')		
Has public-facing strategy and policy commitments that…	***With an overt statement that…***	***Working in a setting that…***
…purport to use data in 'new way', linked to smart or data-driven or digital transformation ambitions		
Has…		
a corporate data function	public service delivery in operational sense directly, OR based out of "corporate data" team	role in data use for public service delivery in operational sense, OR in corporate data

5.2 Location Details

Now contextual information is provided for each of the six councils featured in the research. The purpose is to set the scene and lay necessary foundations, helping practice-based data use accounts by respondents to be understood when presented in the following chapters.

5.2.1 North Lanarkshire

North Lanarkshire Council (NLC) is the fourth largest Scottish local authority, located between Edinburgh and Glasgow, closer to (and bordering with) the latter, to the north-east. Using statistical data from National Records of Scotland (2021), the council serves a resident population of 341,400 people.[47]

North Lanarkshire's first Digital Vision (2017) stated that the council aims to *"innovate[s] with a deeper toolbox for problem solving … using data analytics, predictive algorithms to identify, analyse and anticipate problems"* (NLC, 2017:3). Also, the intention is that *"staff focus on higher value analytics not routine admin"* (NLC, 2017:3), which is further

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[47] https://www.nrscotland.gov.uk/files//statistics/council-area-data-sheets/north-lanarkshire-council-profile.html 30 June 2021

explained as entailing full digitisation of the back office, with Robotic Process Automation intended to become a common feature at the council.

NLC is unique across Scottish councils in the comprehensiveness of its information available online, extending beyond a small number of approved open datasets. Instead of reliance on an open data portal to showcase available resources, there is a full statement of 1,035 information assets[48] in a tabular view that indicates e.g., 'Service', 'Business unit', 'Owner Job Role', 'Availability for re-use', and whether they constitute personal data, among other tags. This is an example of strong, transparent showcasing of data and the provision of such detailed metadata is noteworthy.

In terms of digitalisation efforts within the locality, DigitalNL is the council's Transformation Programme and has three key aspirations: the digitisation of council services; upskilling our staff and residents; and stimulating economic growth. SmartNL, later renamed 'Digital Infrastructure', is the twin-tracked transformation programme to DigitalNL. The intention is to develop the connectivity and other infrastructure offerings that stimulate inclusive economic growth and attract external investment in digital skills for the locality.

The council has a dedicated committee with a remit for digital transformation, constituted by 25 elected members tasked with scrutinising delivery of the digital programme, DigitalNL. The council also has a digital delivery board providing overall strategic control for the programme and a corporate working group that ensures new products or technologies align with DigitalNL aims, seeking reuse of any existing solutions and integration with the council's digital platform.

NLC is introducing a BI Hub, staffed by several people with partial responsibility alongside other duties from their day-to-day job roles. By seeking a move from hindsight to foresight reporting, even if not reaching that 'predictive' or fully anticipatory level, the Hub aspires to advance current practices which remain very paper based.

Furthermore, there is a stated priority of a 'digital first' approach to all customer queries, with an intended flow of data between the customer and the Hub. As a note, channel

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[48] NLC's public-facing information asset register (part of their MDM)
   https://www.northlanarkshire.gov.uk/your-council/managing-information/information-asset-register

shifting to prioritise digital mechanisms is a commitment shared by all six councils, and constitutes a core tenet in e-Government, utilising benefit from the internet for meeting public needs.

ICT partners

NLC has been working with several private sector providers for fundamental ICT support and digitalisation experimentation. One entity is Verint on options for a single, golden record of every citizen as an enabling foundation for digital service delivery. Another is Agilisys who in 2019 were awarded a contract up to £12 million in value liked to DigitalNL (the NLC digital transformation programme) to migrate NLC's legacy systems to the cloud, deploy collaborative workforce productivity tools, and implement a Microsoft Dynamics Platform for enabling access of council services for citizens, staff, and businesses. The contract was set for two years with a six-month extension, so has now elapsed. Yet another is Civica, in relation to the NLC council tax system. Additionally, there is Commsworld who in February 2022 agreed a 15-year framework agreement for Digital Connectivity Services with North Lanarkshire for fibre connection.[49] This latter company is also providing connectivity services to Glasgow and Edinburgh.

5.2.2 Edinburgh

City of Edinburgh Council (CEC) is the second largest local authority in Scotland, and the city is the Scottish capital. The council serves a population of 526,470[50] who live in the city itself, although in the wider region grouped for the recent (major) 'Edinburgh and South-East Scotland City Region Deal',[51] comprising five additional member authorities (East Lothian, Fife, Midlothian, Scottish Borders, and West Lothian Councils), the population is approximately 1.4 million people, at more than a quarter of the Scotland's full population.

In October 2020, CEC's Policy and Sustainability Committee approved the Digital and Smart City Strategy, covering the period 2020 – 2023. This strategy describes how CEC

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[49] https://www.commsworld.com/insights/press-releases/2022/february/commsworld-secures-15-year-contract-to-transform-north-lanarkshire-council-s-digital-infrastructure/

[50] https://www.nrscotland.gov.uk/files//statistics/council-area-data-sheets/city-of-edinburgh-council-profile.html 30 June 2021

[51] The Edinburgh and South-East Scotland City Region Deal: https://static1.squarespace.com/static/55c87967e4b05aa55020f656/t/5c263201898583ec74c01146/1546007049724/ESESCR+Deal+Document+6+August+2018+signed.pdf

will approach sustainable development, applying technology supportively as the council seeks to become a smart city.

After being a pioneer at local government level in Scotland on the topic of open data, by enacting the country of Scotland's first council-wide Open Data Policy (CEC, 2014) intended to catalyse efforts to deliver accessible, freely available data, CEC subsequently appeared cautious on the matter of 'smart' activities. The local authority declined to participate in any co-funded smart city initiatives in collaboration with the other cities for the Scottish Cities Alliance (SCA) co-ordinated by the European Regional Development Fund's (ERDF) '8th City Programme' during the first tranche of projects in phase one. The council did maintain engagement as a partner in the funded[52] 'data cluster' project that sat central to the structure of projects, given that output indicators of success from all ERDF funded project initiatives within this Strategic Intervention included measurement in total number of datasets opened for innovation. Subsequently, during latter stages of phase one and in phase two of the 8th City Programme, with its increased funding allocation from ERDF,[53] CEC progressed a smart waste project (closed in 2020) and additional projects covering 'intelligent infrastructure', 'public safety' and 'driving operational efficiency'.

Another notable development, the 'Data Driven Innovation' (DDI) initiative funded by the aforementioned Edinburgh and South East Scotland City Region Deal, delivered in partnership from University of Edinburgh and Heriot Watt, is *"an innovation network helping organisations tackle challenges for industry and society by doing data right to support Edinburgh in its ambition to become the data capital of Europe"* (DDI webpages, n.d.).

The council has been undergoing internal re-organisation to restructure services and support teams, which include voluntary redundancies, and is pursuing a centralised corporate data function within 'Data, Performance and Business Planning', which is located organisationally in the Strategy and Communications unit.

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[52] Facilitated using 'City Investment Fund' monies from the Scottish Government, granted to the cities in conjunction to their SCA work, meaning that cities did not need to put up any match funds

[53] Due to Brexit and the imperative to get funding allocated to strategic interventions that were already set up and delivering on their mandates.

ICT partner

In 2020, the Council extended an outsourcing deal with CGI (Consultants to Government and Industries) by six years, constituting an additional £102m on top of the £186m initial contract when signed in 2015. The company is a Canadian multinational information technology consulting and software development business. The contract will last until 2029. From a press release, CGI is said to be tasked with updating the council's IT systems and supporting its channel shift programme to introduce integrated digital services[54] across the local authority (CEC, 2020 press release).

More contextual detail is available about CEC in a data visualisation brochure published in 2022 by the internal Data Team themselves.[55]

5.2.3 Glasgow

Glasgow City Council (GCC) is the largest Scottish local authority. The residential population in the area is 635,130,[56] using statistical data from 2021. The metropolitan area was reduced from prior regional council classification as 'Strathclyde' by Local Government etc. (Scotland) Act 1994, making the change from nine regions to 32 local government authorities (also true for Edinburgh which was 'Lothian'; but the land area and urban centres of North Lanarkshire were part of Strathclyde). At that time in the mid-1990s, just before the re-drawing of the governmental lines, the region was home to almost 2.3 million residents (around half of the population of Scotland).[57]

Similarly to Edinburgh and its geographic surrounds, Glasgow has a wider region deal – the 'Glasgow City Region City Deal'. Beside GCC there are seven additional partners, including NLC and councils for East Dunbartonshire, East Renfrewshire, Inverclyde Council, Renfrewshire, South Lanarkshire Council and West Dunbartonshire.

The presence of a smart vision from GCC for the city has been in evidence for over a decade, related to its role as the first British city to become part of the IBM Smarter Cities

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[54] It appears to be cross-theme (with multi service delivery areas linked up), with a focus on ease of access for the individual member of public (or company) using them / being served.

[55] https://www.edinburgh.gov.uk/downloads/file/30669/edinburgh-by-numbers-2022

[56] https://www.nrscotland.gov.uk/files//statistics/council-area-data-sheets/glasgow-city-council-profile.html 30 June 2021

[57] Whitaker's Concise Almanack 1995. London: J Whitaker & Sons Ltd. 1994. pp. 570–571. ISBN 978-0-85021-247-1.

Challenge Initiative in 2011,[58] and thereafter entry into (and winning) the UK government funded 'Smart Cities Demonstrator' competition. After completion of the Future City Glasgow (FCG) Programme in 2015, GCC sought to mainstream data and digitalisation techniques into substantive activity in day-to-day service delivery beyond the FCG pilot projects. Around the same time, the council became lead partner on behalf of the (then) seven Scottish cities under the auspices of the Scottish Cities Alliance, serving a Programme Management Office function for the ERDF '8th City Programme'. Via this role, GCC continued a proactive commitment supporting the trajectory of 'smartness' in the Scottish context.

External ICT partner

During the FCG period, GCC provided its own ICT functionality in a 51% to 49% split with SERCO,[59] in an entity called 'ACCESS'. Since 2017, the Council – like Edinburgh – has been in partnership with CGI with a seven-year outsourcing contract. The intention is providing *"transformational IT services to enable the introduction of integrated digital services for the Glasgow area"* (GCC, 2017 press release). Audit Scotland stated that GCC established their Strategic Innovation and Technology (SIT) team to get the most out of the contract with its business partner (Audit Scotland 2021:23), and some respondents from GCC hold roles linking directly to CGI. There are other reasons apparent for the introduction of the new team, but effective interfacing with CGI may be a significant justification and motivation.

Strategic use of data across the council is a central focus of the 'Business Intelligence (BI) Strategy' output (GCC, 2019) from the aforementioned SIT Team. Often overt focus in local government digital transformation described in documentation and public-facing statements (e.g., by politicians, or local government spokespersons) is on the users as residents, those who access public services. However, the GCC BI Strategy acknowledges the role of staff as users of technology and data in work to deliver services, in recognition of their contribution. The strategy clearly emphasises 'BI roles' but provides minimal substantive detail on who hold these roles.

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[58] Scotsman newspaper IBM funding reporting https://www.scotsman.com/business/glasgow-wins-ibm-funding-support-1682029

[59] Serco Group Plc ['**Ser**vice **Co**rporation'] *"...a leading provider of public services: Serco is a FTSE 250 company managing over 500 contracts worldwide. Employing over 50,000 people, we operate internationally across four geographies: UK & Europe, North America, Asia Pacific and the Middle East and across five sectors: Defence, Justice & Immigration, Transport, Health and Citizen Services."* https://www.serco.com/

Furthermore, a fairly new Centre for Civic Innovation exists, based out of The Tontine in Merchant City, where specialist staff carry out service design work to facilitate more innovative approaches in understanding – and meeting – the public's needs. GCC is working with the centre to increase the skills of its digital team in service design so that this can be used more widely in transformation projects (Audit Scotland, 2021:16).

Now we turn to consider the councils that were grouped together as secondary locations.

5.2.4 Dundee

Dundee City Council (DCC) is a locality in the east of Scotland with a population of 147,720[60]. The city's administration has been actively engaged in centralised 8th City Programme smart cities opportunities since 2015. When the 'Data Manager' post was created associated to the '8th City' suite of smart projects using Scottish Government funds, DCC hosted this role on behalf of all participating cities. The Data Manager led the central 'data cluster' work, developed to ensure that data capacity remained the focus for the full programme, given that the success factor for the overall programme and all projects therein was counted in number of datasets opened (alongside number of innovative services created).

In tangible project terms, DCC has multiple activities seeking to apply data use in new ways. Currently in force are several strategic and policy diktats that contain reference to data in direct or indirect ways. For instance, DCC's overall Council Plan 2017-2022 namechecks their Digital Strategy (Dundee City Council, n.d) as a core part of how the council plans to deliver the outcomes for the city and its people. The following is set out by Dundee in 'Changing for the Future' (Dundee City Council, 2018): the imperative of putting citizens at the heart of services; ensuring central role for local democracy; methods of service delivery focussed on prevention of avoidable costs, shaped by local needs, and aligned to local markets; and all activities supporting regional working, with collaborative methods of delivering services. Digitalisation and leveraging available data are viewed as important mechanisms, as well as opening up data in connection to commitments made both for the '8th City' and more generally in alignment to open government.

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[60] https://www.nrscotland.gov.uk/files/statistics/council-area-data-sheets/dundee-city-council-profile.html

Additionally, in the document 'C2022: The City Council – Changing for the Future', DCC asserts "*We are digitally skilled but on a journey to being a smart and connected digital city*" (2018:4). DCC has embraced the opportunities from branding itself as smart and sought to link this concept to its recent achievements in the context of design, such as by becoming UNESCO City of Design in 2014 – the only one in the UK – and being the site for the V&A Dundee, a design museum, opened in 2018.

5.2.5 Perth and Kinross

Perth and Kinross Council (PKC), like DCC above and Stirling below, is a smaller local government authority with a population of 153,810[61]. It is located in the northern part of the central belt, covering a large land area. PKC made an early alignment with the Scottish Government agenda on smartness and digital transformation. As a smaller local authority, PKC recognised the advantages in aligning to the 'smart' nomenclature, especially where there is scope to attract funding. PKC was the first council in Scotland to create a post of Smart City Officer (circa 2015), a permanent (rather than temporary or fixed-term) role, conveying strategic commitment to the agenda. In geographic terms, the locality has experienced tensions from the terminology of 'smart city' given it covers a large rural hinterland alongside containing an official city urban centre. Indeed, the ineligibility of the outer areas for the locality to access the '8th City Programme' ERDF monies caused friction politically, since the rigidity of spend having to be allocated in the city of Perth itself to the exclusion of the wider area was hard to justify. Smart approaches and being 'data-driven' can apply to public services provision widely, not just for those based in the city or assets therein. A key attribute of the PKC population is that it is aging, and there is estimated to be 15,053 more people aged 65+ years than under 15. This increases impact on demand for services across the Council, particularly regarding social care.

One of the initial projects of major interest for this study was 'Mobile Working and Scheduling' (see all initial public services as thematic areas in Table 5-3, section 5.3.5 below), which in 2019 was being promoted as a success story by PKC, having greatly improved the delivery of physical infrastructure maintenance work. In the end it was not possible to recruit these operational staff to the project since going out in-person was precluded due to the pandemic, and these staff were not desk-based to permit online interviews; also, PKC was ultimately a secondary location in the research design.

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[61] https://www.nrscotland.gov.uk/files/statistics/council-area-data-sheets/perth-and-kinross-council-profile.html

Seeing the potential from data use, and in alignment to open government principles, PKC has been driving forward several initiatives associated with Open Data, some of which are part of the 8th City Programme. For instance, the 'data cluster' project sitting at the heart of the suite of ERDF-funded smart activities, and the development of open data portals with a shared 'brand' identity (the SCA inspired bespoke '8th City' identity, used across the various projects) for several of the cities involved.

PKC's 'Perth Open Data Phase 2' 8th City ERDF-funded project sought to interact with stakeholders by creating chances for participation. This involved facilitating a Data and Analytics Steering Group and a wider Advisory group with representatives from each service across the council; and Engagement with a Digital Board, chaired by a Chief Digital Officer, and involving PKC services as part of wider work to steer the council's digital and data strategy.

Some of these ambitions highlighted as partly funded through the ERDF monies are similar to work that the larger councils have been progressing already, with their increased capacity as larger organisations.

5.2.6 Stirling

The city of Stirling is a city in central Scotland, located almost equidistant from Glasgow to the southeast (by 26 miles) and of Edinburgh to the south-west (37 miles). The city gets referred to as being the 'heart' of Scotland and has a population of approximately 93,470[62]. Stirling Council (SC) has had high levels of participation in the 8th City Programme as well as the Digital Office for Scottish Local Government's 'squads', where local government staff are called upon to collaborate across localities and council organisations to progress the ambition of all Scottish councils becoming digital businesses. SC has also been well engaged in the aforementioned 8th City data cluster activities, including on the topic of developing data standards and improving metadata.

There are signs of extensive open data ambition and activities, however, in a closure report shared for this study, it seems the council was over-ambitious and under-estimated the scale of the challenge in shifting to a more engrained data use culture. In a project

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[62] https://www.nrscotland.gov.uk/files/statistics/council-area-data-sheets/stirling-council-profile.html

initiation document for SC, the first phases of their partially ERDF funded project should have delivered the benefit of "*A package of training, guides and tools enabling robust data analysis within Stirling Council and for use by both our partner organisations and the wider community. This extends to extracting data from a new platform, data analysis, and the process of creating visualisations and applications using the data to ensure accessibility regardless of technical ability*" (Stirling Council, 2020). This is a vast endeavour, delivery of which – with realisation of associated benefits – would only be achievable if the datasets published are resilient and of a sufficiently high quality, entailing usefulness for public service delivery. In addition, not all data can be open data requiring good management of closed (secure) data resources.

Whilst there have been complexities, strides have also been made since the appointment of a lead staff member (circa 2018), and there has been open data set development and publishing; support in common data sets; data standards and vocabularies; involvement in the Data Commons in Scotland (a University of Stirling project); and Transition to Net Zero – Carbon Scenario Planning Tool (with Edinburgh Climate Change Institute, University of Edinburgh). It is notable that the dedicated 'smart' and data use staffing were not on a permanent footing however, as was the case in PKC some years prior.

Additionally, all the above councils (along with the other 26) subscribe to and conform with national-level ambitions of being open governments, and since 2016 have been part of the global community committed to promoting transparency, empowering citizens, fighting corruption, and harnessing new technologies to strengthen governance (see Open Government Partnership[63] and Scottish Government webpages[64]).

5.3 Further Context

The following section introduces the people and further attends to work practices the study features in the primary locations (only). In this section, locations are not stated explicitly since the small numbers of respondents involved for limited, named thematic areas increases the likelihood of identification: obfuscation aids the preservation of participant confidentiality.

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[63] Global Open Government Partnership (OGP) webpages https://www.opengovpartnership.org
[64] Scottish Government webpages on OGP involvement and commitments
https://www.gov.scot/policies/improving-public-services/open-government-partnership/

To offer respondents greater likelihood of anonymity and protect their identities, the six locations are assigned a colour code for the remainder of the thesis: yellow, red and blue, (plus green for the grouped secondary locations). The research does not offer specific insight or comment on the status quo of data use for PSDT in named locations; rather, the insights derive from obfuscated councils and are grouped to enable the study to address its overall aim of identifying what characterises data work culture in Scottish local government. Future research could explore councils and even work teams or departments at a greater level of granularity, with the micro focus that this project starts to apply through attention on data practices in operational activities (not solely at the policy level).

5.3.1 Data Using Staff

Every Scottish council aspires to have a flexible, skilled, and motivated workforce and to be responsive to the public, shaping services around needs, and focusing constrained resources where they are most necessary. The goal is to work closely with partners, including local communities, delivering the outcomes as set out in councils' City (or Locality) Plans, for the benefit of all citizens (on enabling collaboration, see Chapter Two for digital era governance and smart cities approaches, where the council plays a co-ordinating role across multiple partners).

Precisely what constitutes a suitably skilled workforce is less evident, but in the context of digitalisation it includes staff abilities to work with digital technologies and data, stated by all local governments. This is highlighted in the drive towards enabling a data economy, and in Digital Data and Technology / 'DDaT' roles to up- and re-skill the workforce (such as in the civil service). Furthermore, it is a specific aim of the Digital Office of Scottish Local Government, as set up by Scottish Branch of the Society of Local Authority Chief Executives and Senior Managers / 'SOLACE', to support all councils to become digital businesses, entailing increasing skills for data work (Audit Scotland, 2021). The thesis argues against work in service to data, rather than – as it ought to be for PSDT – the other way around where data exists and is drawn upon, used, in service to local government work meeting public – societal – needs. As shown in the findings chapters and set out in a preliminary form in Table 5-4, data professionalism is a murky concept that incites evasion by local government staff.

Data workers, meaning those internally based local government employees who interact with data (broadly or specifically) during their job role in public services delivery, sit

centrally in this research. The intention of the study is to explore the varied ways of and motivations for data use. As has been set out already, these predominately fall into two categories: reporting and decision-making support; or intelligence, which can align to different decision levels (policy, operational, discretional). Throughout the thesis, local government staff's descriptions about working with data and expectations thereof – including value from specific datasets derived in use, or standalone usefulness – constitute a primary source of material from which the insights about local government data use culture in Scotland are built. The research design explores staff accounts of the data use process alongside their views of themselves in relation to transformation goals (PSDT) via data use, drawn partly from a pre-interview survey (see Appendix D: Plain Language Statement – Invitation to Interview), within the wider organisational setting.

All 55 respondents worked with initiatives intending to do more and make better use of data in public service delivery to achieve transformation, as overarching improvement (what the thesis terms PSDT). Imperatives to do more with data also apply to respondents not directly associated with smart or data-driven projects and initiatives, and Chapter Four explained the original research design and the split of three staff groups related to initiatives included in the study. This is because all council staff are subject to policies to better use data, be data-driven, and increase smartness in support of (digital) transformation. In this way, whilst not linked to new initiatives, 'old' projects or simply normal, standard day-to-day work practices get loaded with additional expectation – and pressure – to do better public service delivery related work, realisable with more data and data use.

In this research, details of specific service areas are not in focus. Instead, the emphasis is on the way data is considered by respondents as available and relevant in their local government work environment, actioned via use in varied day-to-day public service delivery activities. In the study's fieldwork scoping phase during preliminary discussions with key contacts before formal interviews commenced, it was possible to identify that there was tendency, and trend, of centralised data work teams in the primary (bigger) locations. Accordingly, the study looked at ways data was used, as usage types, where data was used, how, by who, when and for what reasons.

Tangible data

At the outset, it was thought each qualifying data-use initiative would have a discrete dataset or collection of datasets, with different categories of staff working in relation to the initiative – be that directly in an operational manner linked to the public service such as on the frontline in public-facing positions, in an operational managerial capacity (overseeing frontline workers), or in a distinct but connected service delivery area (operational or managerial), such as in roads rather than transport. However, it quickly became apparent that datasets are infrequently named and discrete in the manner that I originally imagined. Even in NLC with public-facing information assets clearly presented in a table on their website, from the empirical work it is clear there are many 'sub' categories of data, less official sources but 'data' nonetheless. This flexible data is constantly used to update on work underway or to help make various day-to-day public service delivery decisions, data 'used' in reporting, sometimes given further use after reporting – or without official reporting – to influence decision-making.

5.3.2 Location Blue

From Location Blue, eight staff members held a 'corporate data' role in a central function for the full council. Operationally, directly pertaining to public service areas, there were six staff members: two in 'education'; three in 'children's social care'; and one in 'adult social care' services. Two roles that had been based within operational teams directly associated with provision of care as a public service had been re-organised into the centralised 'corporate data' function.

In Location Blue one of the data-driven projects that qualified the council for the study was a focus on care services. The new data work activities followed feedback from a national oversight agency that to better serve the public, more should be done with data obtained from the process of providing mandated services. The advice was not explicitly to be data-driven in this instance, but it was implied and interpreted in that manner by internal staff.

In total, five respondents at Location Blue were working to enable improved data use across health and social care service provision broadly, following guidance pertaining to the context of children's services. All were working under the expectation that there could be increased and improved usage of data gathered during the delivery of social care. Three of the five were staff working directly with the service delivery function, albeit based in

different work teams and with differently emphasised responsibilities, and two were based in the corporate data team, both with the same job title. Before the council's organisational changes, both these corporate data staff members had held roles within the service area and were relocated due to their interface with data in day-to-day work.

5.3.3 Location Yellow

In Location Yellow, six staff members are categorised with a 'corporate data' role. These interviewees were based within different teams, respectively covering mandates for (i) service design, incorporating data science, to better understand public service needs, and (ii) mechanisms to derive greater value from data assets across the whole council, as business intelligence in relation to public service delivery.

Linked directly to thematic public service area, six staff at Location Yellow work broadly in transportation. This thematic area covered physical infrastructure (roads, pavements, and traffic management; with the latter a crossover of a physical and a software systems), various modes of travel (i.e., motor vehicles, bicycles, walking), and covered staff roles that pertain to the 'technical' engineering requirements of this area as well as the planning aspects, both in land use management and strategically.

Here, there were several projects or initiatives that qualified the location to be included in the research. This location undertook work to improve provision to vulnerable residents during the pandemic in a pragmatic, 'common-sense' approach that utilised insights gleaned from analysing shielding lists in cross-reference to other applicable datasets, to build a picture of who would likely benefit most from being called first (promptly), as opposed to progressing in alphabetical order.

In Location Yellow there has been significant buy-in to the benefits from adopting a centralised or corporate data approach, albeit that some of the initial work to 'prove' the value in data science required work to be progressed *"by stealth"* (respondent K-4).

5.3.4 Location Red

In Location Red, clear senior leadership support for the digital transformation agenda meant that during the past decade many supportive decisions were taken for the whole organisation, in an all-encompassing, strategic way. Therefore, extensive reimagining of

the ways that services can be provided has taken place, with certain core elements addressed, such as staff training programmes and audits to identify data use details from the usual working of staff across the council in focus.

Most respondents, totalling five, aligned to operational activity came from the same thematic area broadly termed here 'Housing and Planning', and of those two worked directly with the organisation of repairs to physical infrastructure. One respondent worked in Education. A further five respondents held a range of 'corporate' data roles, spread out across various teams, i.e., not solely in a centralised location severed from being hosted in a thematic service department.

For this location, there were fewer overt and contained smart projects found, possibly due to the whole-of-organisation approach being progressed. The qualifying activity was the strategic commitment to action new ways for data use in business intelligence in handling customer (public) needs. An interesting element from Location Red was the way that operational staff spoke of the new data work approaches as directed from staff in a corporate data team but ultimately associated with service delivery (partly by design and partly from necessity due to capacity pressure) as something exciting that would give them public service delivery insights they had to-date been missing.

5.3.5 The Study's Data Work Contexts

The below tables show the overview of the respondents and thematic area, and the split of respondents by colour-coded location, showing thematic service areas in focus alongside the 'corporate' data grouping. The number of research participants that viewed themselves as a 'data professional' is also presented, which participants were invited to decide in a pre-interview survey.

Table 5-3 Grouped respondents, thematic area or corporate data role (All Locations)

PUBLIC SERVICE AREA	LOCATION/S	TOTAL RESPONDENTS
Health and Social Care Services	Blue	7
Education	Red, Blue	3
Physical infrastructure maintenance, and Housing repair	Yellow, Red, Green	5
Economic development, and Poverty alleviation	Yellow, Red, Green,	8

Roads and Transport	Yellow, Green	7
Sustainability	Yellow, Green	4
Centralised locality operations, and automated scheduling	Blue, Yellow, Green	8
		42
Centralised, dedicated 'corporate data' staff; variously with or without direct thematic public service link	ALL	13
		55

Table 5-4 Grouped respondents, thematic area or corporate data role (Primary Locations); with data professional self-identification

Role / Identifies as a Data Professional	Yes	No	Uncertain
LOCATION BLUE			
Corporate Data (8)	0	2	6
Education (2)	1	0	1
Children and Adult Social Care (4)	1	3	0
TOTAL	*2*	*5*	*7*
LOCATION YELLOW			
Corporate Data (6)	2	2	2
Roads and Transport (6)	0	5	1
Environmental Services and Sustainability (4)	1	3	0
TOTAL	*3*	*10*	*3*
LOCATION RED			
Corporate Data (5)	2	0	3
Housing and Planning (5)	0	5	0
Education (1)	1	0	0
TOTAL	*3*	*5*	*3*
OVERALL TOTAL (collated)	***8***	***20***	***13***

5.4 Conclusion: Data Work Landscape

This chapter has provided a contextual basis to support an understanding of the setting for the accounts presented in the following chapters. Detail was given on the places, projects, and people to which the data use accounts pertain.

Against a backdrop of imperatives to embrace digitalisation, the provision of public services in Scotland is conveyed as needing to be undertaken differently: ultimately transformed in the digital age, within a context of (super)abundant data to be leveraged in support of better – optimised – delivery. Advocated new ways frequently put data use at the centre of the transformed approaches, framed as both a need and an opportunity. The idea is that in data the answers to complicated questions, and solutions to problems, can be found. Furthermore, difficult decisions can be explained and justified when able to be tied back to a clear, objective (immutable) data source and interpretation of said 'raw' and reliable data. Challenges are presented alongside the good to be gained from making the change i.e., giving pressurised public services and budgets the chance to re-invent (transform) both delivery and substance of those services for realisation of desirable improvements measured – overtly – in the satisfaction of public service recipients.

The selected locations all seek to improve performance in their core mandate to provide essential public services, and – where feasible – go beyond that level in better meeting the needs of those they serve. The perceived and stated role of digital capability in this regard, encompassing technologies and data use, is unequivocal.

Whilst there are many promises and even many tangible actions listed to deliver on the promises, the role played by data use as a means of making value from data is arguably inadequately considered / interrogated and developed. The study ultimately points to an over-focus on data as holding answers to complex societal challenges, and a dearth of attention on use contexts where data is spoken for by public servants responsible for the 'Public Good'. Therefore, the data professional in local government is seemingly misconstrued as an enabler for data – rather than data as an enabler for the user.

In describing the settings for the research and units of analysis (data, data uses, data workers), an important point about who constitute data professionals in local government – and what it means to work with data – has been introduced. This observable amorphism, and messy nebulousness of local government job roles, has a bearing on internal data work culture, considered more closely in Chapters Six, Seven and Eight.

Chapter 6: Data Workers – Using Data in Practice.

This chapter presents the research results. Findings from analysis of the project's empirical data are described, showcasing data use practices to construct six overarching expectations embodying the data promise. These findings form the basis for the second findings chapter, which further unpacks how and where sought-after transformations from data work are (or are not) being accomplished across Scottish local government.

Collated below are examples from respondent accounts of data use practices, working with data in public service delivery and seeking transformation. During analysis, assessment was made of varied ways data is talked about by respondents and how it is applied for –

(a) public service delivery, and

(b) potentially transformational changes, improving service/s provision.

I seek to accommodate duality of public service as an act (by a public servant) and public service as a specific deliverable to the public as recipient of services from the state. Where appropriate, the examples highlight distinction between reporting and intelligence functions. By grouping the findings in this manner, the thesis offers a novel data use classification system, further developed in Chapter Seven, and discussed in Chapter Eight. Classification enables determining if data and its' uses serve the goal of data-enabled improvements (i.e., transformation) during work to meet public needs across the multiple service delivery areas for which local governments are responsible. This permits description of cultural attributes characterising data work in Scottish local government (addressing the primary Research Question). Where possible, the findings account for data materially, as any 'named' datasets derived from the acts and purposes of its specific use in each example and unpicks where and how data is utilised sociomaterially in interpretative acts between local government staff as data users[65] (socio- aspect) and their selected, admissible data (material aspect) during data work.

6.1 Using Data

This section provides a reminder about the duality of data work at the centre of the thesis. It also provides description of the sample from which the following findings were drawn.

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[65] Could be AI but would still have a 'people' socio- component in the build / algorithmic construction.

6.1.1 Two Types of Data Work

Central to the thesis is (granular) variation of data work in use type at the operational level in public service delivery (henceforth PSD), understood as aligning to two main functions. Data work is found to be layered, covering work accounting for work (reporting), and substantive public service/s work itself, which is multiple and complex (including many decisions, and intelligence or knowledge to enable those decisions). Data practices cover these two use types, plus myriad activities, and tasks therein.

At a basic level, data work in Scottish local government falls into two main categories, termed in this thesis as 'Functions', introduced in Chapter Three:

- Function 1, where data is used to report on public service delivery work undertaken (past), and
- Function 2, data contributing directly to work underway (current, future) for delivery of services.

A more mature presentation of the second grouping is to term it as intelligence, enabling decisions to follow. Reports can feed into decision-making during acts that serve other working processes, or public service tasks, to – perhaps - catalyse transformational changes in ways of working pertaining to public service delivery. This was denoted, during the conceptual framework described in Chapter Three, as actionable and actioned insights, to differentiate between reports' lower tier usefulness or value, and insights with direct tie-in to working processes, holding greater in-use value. The concept of insights becoming actioned corresponds to the stage when data gets leveraged for public service delivery transformation (henceforth PSDT), when a local government may lay claim to being data-driven in a substantive way for delivery of public service/s.

The examples now presented ascribe to the two 'Function' groups, although not the chapter structure, since the data work practices do not only fall into one category in opposition to the other. There is often blur between the groups due to expectancy that, and oftentimes occurrence of, decisions stemming from reporting, where actors have agency to do so – a point further developed in the Chapter Seven. Decision-making can take the form of official, formalised adjusted or new courses of action, or as more mundane in-work decisions, with opportunism often evident. Data work is a fluid and at-times nebulous process, of ongoing interpretation, translation, and application, where data uses are not

fully (or reliably) static. Through data work, usefulness and value of data is constantly shaped and determined in evolving use practices, determined by data users in the processes of their work.

The overarching result sought in data work, as accomplishment of reporting or as a contributory component to decision-making (intelligence), sets a frame for usefulness and value. Since local authorities are part of the broad government machinery to facilitate and enable societal functioning, there are many formal channels for data work predominately for reporting. Increasingly, responsive, 'informal' data use, to better understand service delivery areas, is causing tension and contradiction with 'formal', official data expectancies. The unequivocal, unrelenting requirement for official, state sanctioned data outputs (statistics in reports for accountability and transparency), and the in-use practices of creative data work are challenging and testing those tasked with doing the work. Data workers are pulled in opposed directions: to produce formal data to report alongside experimentation – able to try, and perhaps fail - to generate new insights, and increase PSD-linked intelligence.

6.1.2 Description of Interviews Sample

The following findings are drawn from interviews between October 2020 and May 2021. Chapter 7 delves further into the pre-interview survey, in conjunction with the interviews and other data sources (i.e., council materials, job descriptions: see Table 4-4, in Chapter Four), particularly on the core finding of the low levels of assuredness and self-determination as data workers, termed data professionals in the survey. For now, descriptive information about the interviewees is provided to help further contextualise the findings presented, beyond methodological detail and the wider context provided in Chapters Four and Five.

The majority of interviewees were male (62%, at 34/55), with a satisfactory representation of female respondents. Most respondents were over the age of 45 (75%; 41/55). The age range category of 45 – 54 was the age group of most respondents (51%; 28/55), followed by the 55+ age-group (24%; 13/55), and then those aged 35 – 44 (18%; 10/55). Only four were aged 25 – 34 and none were aged 24 or under. As regards length of service, taken as a total where respondents had moved between councils, the longest serving local government public servant had been in a local government post for 40 years and the shortest 1.5 years. This aligned with age, with the longest serving being those from the 54+ age-group, and

the shortest in the youngest group, 25 – 34. As a total, there over 1100 years of local government public service across the full sample, with the average approximately 21.5 years per respondent, and the harmonic mean at 12 years. This detail is offered to afford some descriptive insight on the sample, where length of tenure could reasonably be linked to experience in local government and the topic of public service (as an act and in delivery of services). However, the changes in approach through increasing digitalisation may be more familiar with the younger cohort, having grown up with the internet rather than those who started a local government career in the 1970s or 80s, before the internet and other aspects of digitalisation.

From the academic and policy literature material presented in Chapters Two and Five, meeting public needs in (increasingly) efficient and effective ways constitutes a central motivator for local governments, at the organisational level, elevating data's role in service delivery. The premise is that through data comes greater understanding of public needs and a more tailored meeting, and satisfaction, of those needs, thereby resulting in solved problems of public service delivery. This collective perception is clearly demonstrated, rooted in the New Public Management reform ideology apparent across (Scottish local) government since the 1990s. The fundamental concept can be understood as an expectancy: from data, insights may be garnered revealing any suboptimal activities that do not result in intended outcomes. To identify inefficiencies, the council organisations mandate better data work, drawing on the plethora of sources and computational (technology) assistance, from colleagues or external entities contracted to provided ICT services (as described in Chapter Five).

6.1.3 Respondents in This Chapter

The table below presents an overview of all respondents featured in this chapter, for ease of reference. Whilst the respondents all came from the 'primary' locations (Edinburgh, Glasgow and North Lanarkshire), numbering 20 from the 41 respondents from those three locations (and 55 of the full sample), analysis of all respondents' interviews informed the understand and subsequent presentation of the following insights. The other data sources also helped to generate the insights (as detailed in the theme generation process, see Chapter Four).

Table 6-1 Respondents in Chapter Six

Respondent ID	Location (Red = 6; Blue = 6; Yellow = 8)	Department / PSD theme
N-8	Red1	Corporate Data
Nn-8	Red2	Built Environment / Housing
Hh-8	Red3	Built Environment / Housing
Xx-8	Red4	Physical Infrastructure and Communities
Ll-8	Red5	Built Environment / Housing
L-3	Blue1	Care (Quality Assurance)
F-4	Yellow1	Transport
D-3	Blue2	Care; Corporate Data
U-3	Blue3	Education
B-3	Blue4	Education
Jj-8	Red6	Education
S-3	Blue5	Care (Quality Assurance)
A-4	Yellow2	Infrastructure (Roads)
Ss-4	Yellow3	Infrastructure (Roads)
C-3	Blue6	Corporate Data
V-4	Yellow4	Corporate Data
P-4	Yellow5	Corporate Data
Gg-4	Yellow6	Physical Infrastructure
Cc-4	Yellow7	Physical Infrastructure & 'Non-Corporate' Data
K-4	Yellow8	Corporate Data

6.2 Data Practices

The chapter turns now to the research findings, to account for the promise of data experienced and perceived by those undertaking data work and interfacing with data through use. Across the examples of in-work data practices themes of fluidity, opportunism, and informality are evident. These themes sit in conflict with the official, formal, and rigid data requirements of a reporting, that serve fundamental, democratic procedure of accountability and transparency.

6.2.1 Efficiency in Reporting; Effectiveness in Service Provision

The first two examples, Housing Repair and Elderly Care, demonstrate the relationship between reporting and intelligence. The connection between reports and service delivery intelligence is revealed as faltering. Where reporting is automated and streamlined, the findings presented below challenge the assumption and expectancy these reports then constitute a useable, useful data source with onward application to improve delivery of the public service. The examples below convey a conflicted picture of data's part in PSDT. When 'digital transformation' projects seek to advance data's role and improve the reporting-to-intelligence progression, substantive public services transformation is what (may) come afterwards and requires additional action.

Housing repairs - Location Red

The accounts forming this example were given by five respondents from Location Red's Housing service area, corporate data team, and strategic oversight for transformation, i.e., Performance and Improvement Manager Nn-8, Repairs and Maintenance Manager Hh-8, Built Environment Manager Ll-8, and the two strategic data roles, corporate data metrics N-8, and C-suite infrastructure and communities Xx-8 (see Table 6-1 above for overview of all respondents in this chapter, and Appendix A for job roles of full sample). This project sought to gain more from reporting data via a pilot initiative, as a proof-of-concept, which thereafter could be applied to all public service areas applying computation and analytics to get insights from reporting data.

This initial excerpt sets the scene, with Performance and Improvement Manager Nn-8 lamenting the limitations of typical data work, used to report –

> *We're just kind of chasing the tail reporting on what's already happened.* (Nn-8)

The respondent explained how many of her work area's reports were not processed (reviewed) until several months had passed. Often, simple (human) errors were not identified until a later date, with straightforward solutions if issues were observed more promptly. This shows how the reports are made but destination and analysis thereof were lacking.

Reports were deemed necessary, even where it seemed these were under used. Nn-8 went on to remark that if reporting was automated then her and her colleagues time could be spent in better ways, exploring their service area data sources -

> *...there's an awful lot more information that's held on our systems that that we haven't touched on at all. So, if we're able to get the time to automate the performance reports we've got, it would free up time for us to be able to use data in a better way.* (Nn-8)

In the pilot project, data's onward use progressed from reporting and applied to gain deeper insight, enabled operational staff working with property maintenance in Location Red to discover consistent failures of service delivery and certain repeat problems. Issues included doors not closing correctly, windows loose in their casings, and persistent ceiling / roof water leak. Location Red staff's new insights were achieved by looking at internal reporting from workers in maintenance roles (i.e., plumbers, joiners, electricians), then applying data-analytics techniques and computation to identify the points of failure and their root cause.

As standard across the full respondent sample, none of the Housing service specialists (Hh-8, Nn-8, Ll-8) self-identified as data professionals. Each of these respondents stated an unequivocal 'no' to that pre-interview survey question. These respondents working with Location Red's council's housing stock in delivery of maintenance or repair, did nonetheless apply their service area expertise to enrichen data-derived understanding of the public service coming from standard reporting.

Respondents Nn-8, Hh-8 and Ll-8 explained how analysis of their reporting data, undertaken as a pilot initiative, part of Red Location suite of 'digital transformation' activities focusing on increasing data use, showed regular inability for on-site property maintenance staff to progress repair tasks. This was either due to inability to get access to a property, or because the maintenance issue was at bigger scale than a quick repair could address. Inability to undertake substantial repairs, such as replacement of a roof, meant there were multiple inadequate temporary solutions not the extensive work known to be needed.

However, respondents working with Housing indicated no immediate scope for comprehensive redesign of their team's property maintenance approach to enable the data-derived insight to be actioned. To propose redesign required the complex undertaking of

developing a business case demonstrating how to increase efficiency and effectiveness in property maintenance. Respondents explained how some of the blockage in arranging major works relates to co-ordinating between private owners and the council (as a social housing owner), since in a residential block there may be a mix of ownership, tying back to old policies such as right-to-buy, and their downstream consequences. A major block on scope to develop the business case was time, and utilisation of the data expected to inform their proposition. With paucity of time and agency to explore options, the pressure to 'prove' need for a particular approach undermines possibility of making and interpreting data of varied sorts to better understand service delivery issues, and trying a new, innovative approaches, where the upshot remains to be seen. In other words, simply trying something out is not an easy option.

Additionally, and significantly, in this same example the property maintenance team are not the same team providing finances for large infrastructure projects, necessitating linkage to other parts of the organisation. Expenditure for major works of the extent known to be required, necessitates funding applications to be made internally with the aforementioned viable business case for the requested financial investment. The process is slow and entails an inherent paradox: against a backdrop of strained council budgets where one team holds the purse-strings and another team must make a convincing case for the spend, the incentive lies in the favour of not releasing sought funds since this invites less risk of approving a project that incurs overspend. Going further, it permits the purse-holder to retain the funds and if the service area is making do with the *"sticking plaster"* (quoting Rr-8, holding a Location Red strategic role, aligned to corporate data) and reactive *"fire-fighting"*[66] service provision (term used by: Location Blue Education Senior Support U-3, Location Red Performance Analyst Bb-8, Senior Research and Information Officer Aa-2), then any reporting burden, such as in the public's dissatisfaction with the provision, lands with the service area (council department, or division) themselves.[67]

The same respondent further reflects on ways that data, as 'information' (data in context) presented to service area staff, permits translation by their spotting patterns or trends. She explains how some PSD issues are known from experience and can be anticipated by

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[66] Term not used by respondents in Housing Repair example, but was used in other examples (e.g., U-3 in education).

[67] There is a conundrum here since the services benefit from thematic service specialism but also thematic siloes (may) undermine council holism at the organisational level.

drawing in other data (such as weather). She goes on to suggest that dashboards for support to service delivery staff might replace the need to train new starts –

> *...have dashboards giving information daily, so we can look to find out if there's trends or patterns. Like severe weather, we would expect a lot more emergencies for heating and things like that. We know that just from experience. But if I get a new member of staff, I'm not going to have to spend the same time training them because they'll be able to see the trends from the data hopefully, rather than just what we know from experience.* (Nn-8)

Here, the respondent recognises the significance of her and her team's experience for translating service area relevant data and information, but then undervalues that stance by her anticipation of relief on her time to provide new-start training. Expectancy that data and infrastructure that enables it, could provide staff contextual understanding instead suggests elevation of 'data', seen as the source answer rather than as a part of determination of a (possible) answer when interpreted.

There are three main points from this example. The first is that reports may be of suboptimal usefulness. The next is that even if data from reports is utilised to gain PSD insights, transformational changes need intelligence to be acted upon (which here was out of scope). Finally, data (un-specifically) gets viewed as the solution rather than part of a solution, with paradox where staff simultaneously recognise and diminish their part in data work processes.

Elderly care - Location Blue

Building on the property maintenance example, this next example concerns provision of care services in a Location Blue elderly care home. Respondent L-3 is a Quality Assurance Officer, employed to support quality in service provision across social care. He is based within the broader service delivery area of Health and Social Care, not in a central cross-council corporate data function. The respondent was keen to confirm he is not an intelligence analyst, does not (and cannot) construct technical digital dashboards to serve managerial staff in better decision making from visualised data. Furthermore, his skillset was not in programming or data visualisation. Again, L-3 did not self-identify as a data professional.

During a period focused on updating service management, including moving to digital channels, Blue Location care homes accident reporting eventually required staff to submit

reports via four different now-digitised systems. This was determined by council managers as inefficient and ineffective. The ineffectiveness was evident in the fact the care home was 'under enforcement', meaning that it was beset with failings and problems in its provision of care, necessitating allocation of dedicated quality assurance support as an extra staffing resource, i.e., L-3.

The core public service provided in this example is care for vulnerable (elderly) people, with statutorily mandated requirements associated with delivery. These statutory requirements exist to support aims of accountability and transparency, as well as quality in care provision. The basic requirement is to report relevant occurrences, such as accidents with residents. The respondent remarks -

> *people were being asked (...) to report the same incident on four different systems to four different areas (...) time that diverts attention away from the actual delivery of care.*

> *care home managers are quite excited at the thought of not having to fill four forms in and still not really have any oversight of what's going on because they're just filling something and it's being sent away.* (L-3)

This example shows is how care home staff serve data infrastructure and prioritisation of reporting, over meeting the public's needs at the street-level (in linkage to the perspective from Lipsky, 1980) in the delivery of the public service itself. Here, need to account for work done to report is weighted more than the ongoing work of delivering care. From L-3's account, the view was of diminished emphasis to the substantive service activity, due to excessive time on reporting. The comment about how reports are *"being sent away"* particularly highlights the removal of data from the immediate care provision public service delivery setting in which it could be useful, transferred to intelligence in onward usage.

The initiative in this example concerns a pilot project introducing and establishing Intelligent Automation processes, seeking to institute new data-linked work to achieve transformation. Under the new process, after an accident, home care staff make one record with core information then reported to each of the other places the report must be sent. It may ultimately be better for the efficiency and effectiveness of this home care public service to review historical accountability or transparency processes rather than automating the multi-direction reporting. In this example, the reporting requirements were inefficient because there was over-attendance to the making of the reports rather than time to

understand what these (might) mean, and how to action any pertinent insights. The care home, as a public service, had a fragmented oversight characterised by multiple directions of reporting and lack of time and capability to evaluate the reports. However, comprehensive transformation of the delivery of the services may be out of scope since democratic procedures mandate the reporting to the multiple places, as named persons and / or entities that receive the reports.

Another point made by L-3 was surprise – and doubt - that care home managers were able to safely run public services in provision of elderly care without basic data and necessary processing time, translating data to insights for their PSD practice. L-3 flagged the absence of a systematic way for measuring elderly care outcomes, part of the reason for introducing intelligent automation reporting during the quality assurance process. The tie to outcomes here was unclear, beyond reporting metrics and numeric targets (for example, number of accidents or falls decreasing). The respondent noted lack of time within their work team for the Elderly Care project, or in interaction with related work in the broader departmental (Health and Social Care) level, to determine alternative ways to deliver this core service. He viewed the automation in reporting as a good way for the service area to gain that time to be spent in better provision of the public service itself.

> *…it's exciting that managers are going to have the information they need to be to make informed decisions. But the thing that's really exciting is that's going to, over time, ultimately improve the workplace for the staff working in the care home.*
>
> *(…) …it's about getting the right people round the table and drawing skills and expertise from people so that we can get it right, basically.* (L-3)

As with the previous example, there is a view that if reports are made more efficient, effectiveness in the provision of the care home as public service can follow. This is seen to be an inevitability from redirected staff time, ceasing to serve reporting and reassigned to the intelligence-generating data use that would better inform delivery of the service, and improvements thereof. L-3 highlights how to *"get it right"* means drawing in the skills and expertise from people (staff). This shows how staff are the arbitrators of value from data in PSD contexts. However, the tie-in to improving the workplace by automating reporting is again unclear and even spurious. There are many elements being assumed, such as redirection of staff time rather than removal of staff if the (automated) reports show satisfactory meeting of targets.

Summary: digital technologies and automated reporting data

Using automation (including Artificial Intelligence and Machine Learning) in reporting, and thereafter intelligence to scan for anomalies, is viewed as part of the solution for councils' PSD inefficiencies and ineffectiveness. Having data, then advancing its application to address specific problems is of great interest to cash-strapped local government: the supposition is that the answers and solutions lie hidden in the data, waiting to be extracted (often termed *"unlocked"*, see Scottish Government's digital strategy for planning 2020, 'mission 1', and recent work to enable greater access to public sector held personal data for usage by the private sector, Scottish Government, 2022). Due to reporting, much data already exists, or where it does not, interventions in data, materially, are the preferred investment to support the digital (government) transformation agenda. There is a tendency to hype data as the solution to myriad issues, without the same attention on the ways that data is 'made' useful.

The examples above show the complexity of justifying major works (Housing in Location Red) or foundational service area re-design and connection to myriad other partner agencies (Elderly Care in Location Blue). Time - plus money, as cost of staff time – is needed to develop credible business cases arguing, for example, one large project is a better use of council resources than many small fixes. There are many variables. Indeed, the best business decision may be, for example, for local government's not to own housing assets due to ongoing maintenance costs, or not to provide any elderly care services directly, and to contract these services out, as does happen. This could lead to unintended consequences and may not be politically viable in relation to the statutory duty and responsibility to provide social housing or health and social care services. The preferred decision is dependent on what aspects are weighed more heavily, such as economic versus social, political preferences (ideologies), and accommodating public opinions.

The key point is taking the time to develop questions or define problems, then use ('the', selected as admissible, and translated) data to address these questions, illuminating the problem. Framing public service delivery problems to matters of inefficiency and ineffectiveness, tying to root in New Public Management (NPM) ideology, begs the question: inefficient or ineffective on what basis? The Housing example suggests this comes around to the matter of financial outlay for 'outcome' achieved from monetary spend. Within NPM, reporting dominates, with various metrics to confirm success, and the

progression from reporting (data) to usefulness as intelligence in actionable PSDT-apposite insights is underdeveloped - or seemingly assumed as an inevitability.

In many service delivery areas, the outcome sought cannot be simply articulated as a quantifiable indicator of success. Furthermore, as presented above, surfacing insights from data use about inefficiencies or ineffectiveness does not inherently lead to action, especially if to action an insight requires more fundamental re-design of the public service delivery process such as may be out of scope for operational staff to undertake, for instance due to their skills, resources (money, time, other staff in a dedicated work team), or agency and permission to access and utilise whatsoever data to generate novel insights.

In summary, the pertinent point is the type and quality of data's use. The higher usefulness is data used (put to a use) to assist in understanding the public service delivery area/s, to generate intelligence. The data use in both examples was of more value that 'mere' static reports to account for work (as activities and decisions) and did enable an intelligence to inform 'what next' options. However, in the Housing Repairs example, to act on the insight was out of scope for the service specialists. In the Elderly Care example, the reporting pressures were distracting from effective delivery of the public service (care), with minimal onward usage of data to inform the delivery of care, a situation placing the care home under enforcement, needing support to achieve the standard of quality sought.

6.2.2 Developing Data-Basis for Public Service Delivery

Next, the collated examples turn to how data use occurs specifically in the context of intelligence to inform the public service activities and tasks being undertaken.

Transport plan – Location Yellow

Location Yellow's transport plan strategist F-4 was progressing an evidence-gathering, exploratory work phase to inform a new, cohesive vision for transport (across multiple modes) in the Location Yellow city. During the interview F-4 spoke assuredly about data use for their clearly delineated work task: the development of a new plan as an actionable, evidenced strategy in transport. This individual was new to the council, and to the public sector, having joined the council from private sector work with the same topic. The respondent had confidence in data and was relaxed talking about ways to use data (and what datasets) to support / underpin the plan they were developing. This respondent gave

what was interpreted during analysis as a tentative 'yes' when asked if they say themselves as a data professional, saying *"not exactly but I am experienced in data"* (F-4; see Appendix A: Respondents – (Select) Information from Pre-interview Survey).

Respondent F-4 needed what she described as a *"supercomputer"* to run advanced hard- and software packages, including ARCGIS, during her data use work. Standard council equipment is incapable of launching the required tools. F-4 explained difficulties in getting approval to be added to the council's licence to use this proprietary product. Getting access to technology and proprietary data-analysis software required for the transport work undertaken at Location Yellow consisted of vetting by a small team overseeing who uses GIS tools. In F-4's view, this departmental unit did not have service-specific expertise but were nonetheless positioned to arbitrate on the financial outlay of providing access to data interpretation work tools and equipment (a cost/benefit analysis). This team lacked service delivery area knowledge and were operating against backdrop of immense financial pressures. F-4 described ways Location Yellow colleagues in other work teams acted as gatekeepers, requiring a strong application to be submitted evidencing need to avoid refusal of the upgraded software permission and access.

As in section 6.1.1, it is notable to highlight relevance of money: every new user, every staff member granted the (proprietary) licence incurs a cost for the council, so there is an incentive to reject applications. This is especially apparent since budgeting arrangements mean the cost pertained to the department and not a corporate team. There is disincentive for an open interpretation of who needs access to expensive software and datasets therein, particularly if those staff applicants come from elsewhere within the full council organisation (since the payment and cost lands on one particular team). Also, there may be a control aspect, where technical staff are inclined to limit access to others, protecting their role overseeing or enabling data use, in this example pertaining to GIS skills.

Respondent F-4 demonstrated agency. She enabled herself to utilise data as a tool in the process of undertaking her work tasks, related to usual ways of working, common in private sector consultancy from where she came. When asked about the employer council's investment in education or training in ways to use data or digital skills generally, F-4 remarked about how she was not asked about specific digital or data skills when interviewing to join the council. The respondent noted that she did not receive support to develop or apply data use skills. During the interview, when I posited that she did not require support given the fluency with which she explained the ways data was being used

to progress her work (i.e., to inform the plan; providing an evidence base for proposals), F-4 commented from her viewpoint, her employer knew little of her digital and data-use skills. This suggests weakness in the general data culture, with discussion with line-managers infrequently addressing detailed practicalities since data using practices are nascent within the council landscape working environment. The granular data use topic does not feature consistently in organisational vocabulary, beyond high-level proclamations to work with data.

The same respondent, reflecting on permissions, remarks access is granted to those whose tasks include day-to-day data work for public service –

> *I suspect from what I know that the people who really do need access to [data use tools] in their day-to-day jobs do get access* (F-4)

If it is necessary to know how and advance opportunities for data work, this suggests a catch-22: one needs to already use data to get supported to use data. Where staff don't already see the benefits and push for these, they may be relegated to spaces where it is not possible to advance dynamic data-work opportunities. This could be a barrier, limiting strengthened and expanded operational data use for transformation goals within local government.

In the same example, transport planning, after having obtained approval to access the technological tools, F-4 found herself unable to share transport plan proposal work - containing multiple embedded datasets, analysis, and insights - with colleagues in her wider team. This resulted in having to screenshot sections of her comprehensive and dynamic scoping work for the new plan and attach these to emails. This action reduced interactive data insights to flat visuals, undermining scope to embrace digital data dynamisms, and for her colleagues to engage interactively with data-based transport plan evidence and insights. Respondent F-4 was unable to share her substantial data use work effectively and efficiently with colleagues. This example highlights how possibilities in technological (digital and data) capacity get prevented by realities on the ground, where there is not scope for the wider staff base to get support for data work in novel, potentially transformational ways.

Summary

The main points from this example include varied awareness, including at senior managerial level, of staff skills in data work, and having those who lack service area expertise decide whether to grant permission to access data or technology. This example centres on skills in data used as a tool and highlights the need for bricolage (aligning to findings in the Danish local government context by Pederson, 2016) as work-arounds such as shown in the ways that workers need to bypass restrictive systems. This is due to technological and data work advances for some, but not all.

Understanding poverty - Location Yellow

Location Yellow advanced award-winning work on the topic of better understanding poverty, primarily told via V-4 holding a rare internal role as an actual 'data scientist' and based in a dedicated data science and service design team. In this example, a small team of data use staff had official mandate to work with other key parts of the council, such as Financial Services, to collaboratively generate new perspectives on understanding poverty. The team provided insights on experiences of poverty at greater level of granularity. This team partnered with others, all of whom agreed the project scope and intended deliverables, with clear project governance. Data use staff, covering several job roles, had a mandate to better understand poverty. Their access to relevant datasets was relatively straightforward due to the initial cross-departmental buy-in. This project had clear oversight and management, and dedicated staff resource assigned to progress the work.

In their poverty work, the staff - which include some (not all) whose job titles unusually are 'data scientist' - fulfilled the prospect of enhanced understanding of problems relating to public services, obtained by using data in more and better ways. This happened by the team taking a creative and experimental approach to surface new insights and establish a data-basis foundation for poverty-alleviation solutions. The extent to which this format can be expanded to precipitate more sustained and comprehensive data use across the council remains to be seen. This team progressed a pilot project benefiting from protected space to do their creative data use work.

The internal council team consisting of data scientists and service designers is a unique group that by their own account were established *"by stealth"* (quote via the team lead, P-4), owing to the agency of an empowered (significantly) senior staff member who had the

leadership and vision to enable their formation. Prior to work understanding poverty, this small team were initially afforded a safe-space somewhat off-the-radar within the council, operating across services as an unofficial mini corporate data function. They found their way, learning how to most usefully advance opportunities to use data (and design) in new ways, to help change how the council works in linkage to data.

From accounts by the respondents in this small team (three in total), there were times of trial and error, with scope to experiment. At senior levels, negotiations meant that the staff were let be - although eventually the team had to make clear demonstration of value to gain recognition as a useful and trusted part of the council's broad data efforts. It is also important to flag that the topic, poverty, does not correspond to a service delivery area: it is a broad subject that the council must demonstrate its efforts to address, since a society with worsening poverty is not serving the public good. The fact 'poverty' is not a siloed, contained service area is relevant. There is less immediately at stake should the work not surface anticipated insights and scope to act. It will not impact normal democratic procedural elements pertaining to statutorily mandated public service provision.[68]

The key point from this example, is that there was advance recognition of the value in data experimentation and the work team being provided the data, tools, and time necessary to generate insights. The senior support is a relevant aspect, as is the initial period prior to the poverty work that enabled the small team to build relationships and learn how to operate as a creative intelligence unit.

6.2.3 Creative, Experimental Data Use

Examples of respondents gaining time to be creative with data are often based, as above, in demarcated 'special' teams to do so (such as in Glasgow City Council, with the Centre for Civic Innovation and the Strategic Innovation and Technology team, both described in Chapter Five). Local government staff afforded time and scope to be creative with data does not necessarily follow from increased work with data. In the next example, it is shown how some thematic areas of public service delivery indicate greater tendency to take - or make - time to do creative and exploratory data use work, and how doing so is in

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[68] It is acknowledged that there are legislative requirements to alleviate poverty and political commitments / targets, but there is not a public service staff team with the day job of delivering the public service of 'addressing poverty'. Poverty reduction is at a higher level of strategic intention as an overarching aim, supported by many service areas across multiple categories.

the cultural norms of that service area. Thereafter, other cases of creativity in data use are presented.

Education - Locations Red and Blue

In the context of education across two Locations (Blue and Red), teaching staff - teachers directly, teaching support, and at strategic level for this service - convey normalcy in reviewing and analysing data to make service delivery changes that improve outcomes. For Education, the types of data are varied, often covering results obtained by students in final exams, school attendance / absenteeism for students or staff, alongside more board socio-economic statistics about school-leavers.

The professional curiosity of U-3, who holds a senior 'Head' role and has been with their employer council in this service area for over 20 years, permitted him to do explorative, creative data use work. Although making no account of using digital data analysis tools to leverage value from data technologically, U-3 assuredly self-identified as a data professional in the pre-interview survey. This example is instrumental to demonstrate how certain people have the abilities and are known to be able to do these things so have carved out scope based on their long-standing role and cultivation of creativity in data work. A core element in the findings from the research is that often job descriptions (see Table 4-4 for all empirical data sources analysed for the thesis) offer little insight on whether a person does - or can - do creative data use work.

Whilst U-3, alongside Location Blue colleague, teacher B-3, and Location Red's, educational manager Jj-8, all pride themselves on working with data in delivery of the public service of Education, it is notable that none have what would be defined as conventional data science skills based in ICT. In each interview, the accounts of data use are predominately analogue and unrelated to any dynamisms from new ways to get at data's value. Rather, as B-3 describes, they love to lock themselves away from technology, in a room with their colleagues, and sit with the data to understand what it means. The creative work is in this case at a remove from the technology and digital setting, made up from exploration of various sources, covering pedagogical research, statistics and other - often unstructured - data, such as staff or student evaluations, focusing on ways to improve the educational experience (in teaching, for students and staff).

Child protection care - Location Blue

Returning to the service delivery area of Care, this time for vulnerable children, there was disappointment for Quality Assurance Manager S-3 in Location Blue. This is an example of where the respondent saw a way to be creative and exploratory with data but was stopped.

Here, a data collection and analysis module deemed useful by the staff team, supporting their public service delivery work, was removed during a technological upgrade; showing how technological advances are not the panacea sometimes promised. The reasoning was that across the full cohort of Scottish local government authorities (councils) there was no consensus that the module constituted a core package, and finances limited what was possible. In this case the module granted a data source, the use of which was working well in Location Blue, but since this service topic linked two major core delivery areas (Social Care and Education), the micro specifics of data usefulness in one locality, and team therein, were not of adequate significance at the scale of the national technology upgrade.

Another example, from the same Respondent concerned his inability to get datapoints considered helpful to improve care provision for the group in question (vulnerable children): the missing data of whether a child in care had siblings, and if they were also in care. S-3 explained the blockages to adjusting formal data collection to get this new datapoint on record, and then be able to apply this in explorative data work to improve care outcomes in the delivery of this service. Making changes to official, formal datasets requires application to national agencies. As above, there is risk that if others progress PSD data work differently, then regardless of creative work ideas to explore, the 'one size' and standardised approach can undermine efforts to engage with data to improve service provision. This confirms the frequent opportunism (see Gulley Maintenance, next), where some data work progresses because of the serendipity that makes it possible (in other words, it is somewhat random, and less intentional).

These examples show again how staff efforts to be creative with data in their work are at times undermined, due to rigidity in formal datasets, used for reporting. As with the Elderly Care example, also at Location Blue, there is indication of serving data infrastructure rather than definitive control of the data in translation, interpretation, and creative acts. The themes of formality and informality in data, including the material form of official data for reporting, with more fluidity in data sources for intelligence, comes up

repeatedly. Also, whichsoever data type (in use for reporting or intelligence) always includes interpretative work.

Gulley maintenance - Location Yellow

Senior staff member Gg-4 is an operational manager in the Location Yellow Physical Infrastructure department. She explained how she was tasked to make financial savings in maintenance costs. Building on her historical personal-professional awareness that data science approaches can illuminate problem areas, this individual made the case to their own manager for permission to expend time and energy drawing in the expertise of a data professional (self-identifying as such), respondent Cc-4. The prior involvement of Gg-4 in previous Location Yellow transformational, smart initiatives, meant she had some certainty that the creative work would pay off in terms of the savings being sought.

Respondent Cc-4 is a dedicated staff resource retained in the service area division in question, for data use covering both reporting and intelligence dimensions. He is not part of Location Yellow's centralised corporate data team. This is an anomaly, indicating lack of trust by the host department in the benefit to them from centralised corporate data undertakings, as was the perspective of strategist K-4 in the council's central intelligence unit (corporate data team). The services of data use specialist Cc-4 were not paid by internal accounting. Rather, senior negotiations took place to assign Cc-4, as a general 'Physical Infrastructure' team member, to the problem area of water gullies, in the culverts by roadways. This was arguably easier to do given the general data specialist role based within the service area department, and not needing a full business case demonstrating 'return on investment' from the exploration with data pertaining to gulley maintenance.

Between the various staff working on the problem, including Cc-4's own personal-professional knowledge that certain datasets were available owing to his time based in another part of the council dealing with complaints about blocked / flooded roads, insights were surfaced that enabled cost-savings. Cc-4 here shows an opportunism in applying (named) datasets from elsewhere, known, and available to him. From the account of this project, as told by two respondents holding the commissioning role and the data-use role, opportunism played a significant role, as did already being convinced of the possible value in data use.

The whole process involved Cc-4 working with the data they were given by the service area sponsor (Gg-4), as well as pulling in other sources. There was a moment where the datasets did not make sense, and Cc-4 told of having to go back to operational staff to find out the schedule of the maintenance work since key metadata was not included in the dataset. This points to the issue of data not being inherently valuable without preparatory efforts to apply the data to the use context at hand: work is needed to ready datasets for specific use. It may be that the reporting of the maintenance work was inadequate for that data's additional, onward use to contribute intelligence insights. As will be further explored in later chapters, the inadequacy of the data could be because it was not ever expected to be used beyond the original purpose, i.e., to report that the maintenance work was being done and have the documentation of that fact (for audit and accountability – democratic procedure – purposes). Objectively 'better' data with clearer metadata detailing parameters of data creation may help; this at the 'preparations for' data use, rather than 'instances of' stage (see Chapter Three Figure 3-1).

In this example, the question was clear: find cost savings, which were very clear parameters and not open-ended 'do better with data', as a data-driven transformation edict. The clear goal, as a guiding motivation, may have helped the clarity of action. Also, the success was easily measured in the manner that is preferred: quantifiable terms in literal pounds and pennies saved to make the service – notably non-social, as physical infrastructure activity – more efficient.

Corporate data work - Location Blue

The example presented now is of someone in a newly created organisational corporate data function, however scope to focus on more creative activities is unfulfilled. Respondent D-3 is a Change and Delivery Officer, moved to serve a central team, owing to her Digital Data and Technology and data work (especially statistical) abilities. Her explanation for feeling unable to action creative data use work stems from removal from their service area to instead apply their data work skills for reporting requirements and not developing service specific insights.

The individual in this example was skilled in multiple types of data use work, she wanted to do that work, and was also a specialist in her former public service delivery area, care services. Her account told of someone who was a talented and capable staff public service delivery staff member. However, under the banner of advancing transformation in data and

it's use pertaining to public service delivery, they were experiencing a reduction in ability to be creative with data. It was their data use abilities that marked them out as a prime candidate for serving a centralised reporting function, drawing in more data to make reports better.

Respondent D-3 had clear difficulties in letting go of her previous role, not least because she was still asked to do things for the pervious team. D-3 evidently felt great responsibility as a public servant and was conflicted because she knows that the work they previously did using data to inform service delivery in health and social care services, assisting in monitoring performance, was no longer happening.

> *Our roles were not replaced when we were taken away. I think there's sometimes an expectation from the corporate centre that there should be people monitoring performance in the service area. (...) There is absolutely no one in home care, which has around a thousand frontline staff, looking at their performance* (D-3)

This point about not replacing staff when they are re-organised to a new team such as in D-3's case or when they leave for myriad reasons, was mentioned during multiple interviews across all locations. In some locations it seemed more problematic, but it was a standard occurrence. Also based in Location Blue, working in a technical role in a corporate function (in a distinct team to D-3), respondent Zza-3 told of how delaying hiring to replace staff allows 'savings' to be made for that budget year. The hiring pause technique is apparent as a common mechanism, across all locations, when seeking to satisfying cost reduction pressures at the organisational level. This again highlights the role that money plays, and the manner which it is arguably undermining the sought improvements. That *"transformation is code for cuts"* was noted by multiple respondents (unprompted, in all locations), means making changes that automate reporting leaves room to eliminate staff positions. This will undermine scope for staff time that may be freed up to be spent being more creative with data.

The role D-3 now holds in the corporate data function requires them to produce reports, populate those with data, and to write the narratives for the reports. Not only was D-3 not freed from mundane reporting to be more creative with data, producing data-basis for PSD (see examples in 6.1.1 and 6.1.2), she was removed from a role where she had been creative with data to instead act in service of data by producing required organisational reports. This is data use work for data's own sake: data for the purpose of reporting, and

not using data towards generation of business intelligence insights and acting on those, i.e., what data use can enable to be done.

> *It's frustrating that we know there's lots of good stuff we can do. But there's just not an ability or capacity to do it. (...) Am I just going to be somebody who does lots of downloads and punts it over to someone else to do the analysis?* (D-3)

Little analysis work in this example is taking place, even where there is desire to do so. Reports go out and up, and specialist staff are being pulled to serve demands of greater data use in a shallow but obligatory way since the reporting is vital in local government for to satisfy democratic procedures. This has consequences for scope to derive intelligence and insights.

6.2.4 Data's Value in Onward Use: Service Area Expertise

In Location Yellow now presented are two similar examples, from different respondents, that detail challenges experienced by original data holders when data is applied to onwards uses. Both examples cover transport related data. Problems arose when internal colleagues, data science professionals in a corporate data team (both as job role and as intelligence-generating data workers), put data into a secondary use without due regard to the parameters of the original data purpose. In effect, a confident and enabled, organisationally permitted data use actor - a staff member with agency to experiment and be creative with data - showed disregard for the construction of that data, viewing it detachedly as raw facts, rather than contextually based. This caused problems for the original data 'owner' in both cases because the secondary data use reason would be inadmissible or lacking in integrity (disingenuous), unless the details of the making of the original data were factored into the process of seeking to surface new insights.

Transportation datasets - Location Yellow

There were several accounts that indicated tendency to disregard details pertaining to data creation. In the Physical Infrastructure Department of Location Yellow, respondent A-4, a physical infrastructure department Engineering Officer working with transportation, recounted inability on the part of a corporate data scientist to appreciate the foundational logic of A-4's created dataset about the total number of vehicles on the council's roads. The upshot of the problem was that the onward user (data re-user) did not realise that roads do not go exclusively north, south, east, or west, such as was assumed. This meant that data

visualisations intended to demonstrate road busyness during the COVID lockdown period were at best inaccurate and, to A-4, *"nonsensical"*.

Another element of this example, in the same location and department, covered traffic count focusing on transportation mode type. Transportation datasets are a popular data type. Here, engineering officer Ss-4 experienced frustration that secondary data (re)use risked negative reaction, both across the council (including by her line managers) and by the wider public. Ss-4 considered there had been an oversimplification of the dataset to enable a convenient, interesting 'headline' insight. The respondent was concerned about the repercussions within their service delivery area, and their overarching policy objectives that were being addressed via certain public service delivery actions.

As the original data owner Ss-4 was conflicted about her role and the value of their service area data to others. As a data use actor – albeit not viewing herself as a data professional – this respondent was acutely aware of the reporting requirement that the data referred to and limitations on further use. They noted initial surprise that others could find value in their data. This points to two conclusions, one that data is viewed in a blinkered and closed way, for a particular original purpose and that data is often necessarily for a particular purpose. To ready data for broader applicability in wider contexts needs considerable preparatory work, to detail the attributes, parameters of the data-making (since data is always created), and the assumptions, the variables, terminology definitions and so on.

The problem of surfacing data to be a readily available asset at organisational level is well documented: there are a lack of incentives on stretched local government staff to go above and beyond for speculative and at times spurious or even problematic data use needs. In this case there was a clash between the service area specialists and the members of the organisational corporate data team, perhaps with a lack of understanding on both sides.

The point here is where the gain lands versus the pain: who benefits from the efforts, and indeed who might lose out from the pressure to mobilise – or liberate - data. Also, councils are 'political organisations' that act based on political requirements and sometimes what the data might show is not what the preference may be; and this can be appropriate, such as where there is a political will to introduce a new status-quo in the boarder public interest but the process of getting there might require a judgement call and not acting purely on the basis of the data (i.e., the data is applied in the context and informs a boarder intention, for

instance advocating for more active travel or greener transport choices even where the data makes clear people would prefer to take their car).

The above examples show ways that data might – or might not - becomes an organisation-wide resource, available for re-use and re-purposing. We saw how the scope for data use and re-use is not seamless where all data in all service delivery instances is admissible. We also see how there is an apparent weakness in data and data use understanding, from a methodological basis.

Data can be used in multiple ways. These cover: to argue, box-tick (in reports or statutory returns), convince, defend, deflect, explain, prove, reassure, satisfy (especially linked to new national enactments, to meet policy or strategy requirements, in being data-driven and evidence-based). This means it is necessary to determine what is the use context of this data, now? To address the epistemic expectations of the data, in this instance, and to disentangle those from considerations about data, viewed broadly and in general.

Seeking answers – Locations Blue and Yellow

In Location Blue, respondent C-3, Data, Performance and Business Planning Manager told of their experience working in a central corporate data function supporting service delivery areas. C-3 did not self-identify as a data professional (saying they *"manage data and performance analysts"*), but was themselves acknowledged as a data professional by various colleagues in different parts of the council –

> *There's a place for professional judgment. But often that's not underpinned by any sort of data to back that up. I think very often there's a thirst for information as opposed to data, there's a thirst for information. (…) people think when they ask us for a report, they think that's where the answer is, but often they don't understand the importance of the data, and often the organisation, to realise that's not going to answer their question. (C-3)*

The respondent notes how their colleagues in service delivery teams, who have reached out for support in getting data reports, often do not understand the importance of the data. There are many examples of how at the organisational level the trend of greater data basis as proof, means operational workers seek to provide that basis. Oftentimes for C-3 the collated data report operational colleagues seek will not answer their service delivery related question. It is interesting that C-3 asserts this, without having the service specialism (rather having a centralised, corporate data specialism).

In ways, the above quote is contradictory. The respondent highlights a thirst for information, which requires data placed in a context of its relevance to some purpose i.e., necessitating some professional judgment and subjective assessment. However, she also refers to data needing to sit behind judgement. Data gets interpreted and translated to information to have relevance to a use context. Data gets spoken for; it doesn't speak for itself. What I mean by this is that data is necessarily interpreted, and before that stage (interpretation) there is a interpretative effort in determining appropriate data sources, by evaluating the credibility of possible sources and deciding if the necessary quality is there in the data (undertaken with both objective and more subjective – qualitative – indicators in a case by case way). However, the imperative to base more public service delivery activities on data under-emphasises the necessity of local government specialists speaking for data and balancing what it is showing, to determine courses of action in public service.

The same respondent tells of their team having to 'cut-off' service areas from reports that they in the corporate data function could not see had a purpose beyond historical and habitual reporting. It was C-3's position that when seeking clarity and receiving silence, certain reporting C-3's team did was not meaningfully supporting various core service delivery since the service specialist could not explain what the data was being used for (besides to report), so should cease. Again, this demonstrates reports for their own sake without clear usefulness and value for PSDT.

Additionally, where the corporate data team were unable to provide a data insight as requested, C-3 tells how she recommends revision to the public service delivery process to enable that data to be created. However, in so doing she and the team are met with pushback since to revise the process would be *"too much work"* for the service areas. There is a core issue where service delivery teams are unsupported or disincentivised to follow through on a query, a moment of professional curiosity. The public service delivery related value in data is not held therein, inert. Reporting, as an aspect of democratic procedure, is intended to ultimately improve public service outcomes via better delivery. Data's best value, apparent in all interviews, is not in it ticking a box for a report requirement, it is in the possibility of it being applied for the purpose of improvement to service provision, which needs staff agency. There are many reasons why this may be the case, such as no time or no permission, as managerial buy-in for a speculative creative data use experiment.

There is a conundrum apparent in the notion that staff not basing their actions on data but also needing to apply the data to a problem context i.e., translate to information. This shows a weak understanding of the essence of data (and its limitations). It could be partly a result of by the pressures felt by local government staff and in bring to realisation the messaging in marketing materials from the organisation, such that underplays the inherent complexities of public service and reduces these to bright promises about transformative potential from digital tools and the role of data.

Councils have many staff who make decisions based on professional judgment. There is an apparent drive to reduce this subjectivity, but central to the role of a public servant is to have a trusted opinion during acts of public service. The implication is that professional judgement needs data but translation of data to information is required to achieve any insights. Ultimately there are few simple 'answers' where the core function is to serve the public collectively and balance competing needs. There must be trust in the PSD professional data user. This is about more than data scientists led by data: good data science needs many roles. Data science roles needed in local government require sensitivity to misfit of following data use work developments in other sectors (in particular, assuming to emulate private sector).

Rejected insights – Location Yellow

This final example shows how a lack of advance agreement regarding data use insights resulted in their dismissal. In this case it is apparent that the central greenspaces team did not perceive there to be a problem needing to be better understood. Business intelligence strategist K-4, leading a team dedicatedly tasked with advancing corporate data use in Location Yellow, discovered an opportunity to save money in the provision of grounds maintenance, in grass-cutting services.

K-4 and her data analysis team explored historical datasets and found a way to adjust the service without impacting quality and saving money. However, they were told *"I don't want to know that"* by the ground maintenance representative. In short, the maintenance team did not want to receive information showing they may be doing their job inefficiently, which may or may not have been the situation if a more complete evaluation was undertaken, with buy-in for the explorative work.

This is an example of how detached data use can fall flat when not sufficiently tied to the needs of the work group that the data pertains to: the team whose work was the subject of the data did not have ownership of the result of the data's use and so rejected the insight. More attention could be paid to why the team would react this way: it is unclear why efficiency in delivery of a public service and the cost would be deemed undesirable. It could be speculated as linked to concerns about job losses and interaction with labour unions, or perhaps belies core misunderstanding on the part of the corporate data team about the nuances of this particular service delivery methods, and interlinked to other activities not apparent from the singular grass-cutting schedule dataset. Again, this points to an issue with trust.

6.2.5 Summary

The core finding is that 'use' is overlooked, with overemphasis on the (material) data artefact. By highlighting the opposed uses as (simplistically) reporting or intelligence, greater depth is afforded to help understand the data promise experienced by staff across local government. By setting out multiple data practices and these six expectations, the thesis focuses on specificity in data's use/s, to better understand ways the overarching promise can be 'kept' or achieved; or, that which blocks the realisation of the promised benefits from data.

Overall, there are vast complexities and contextual nuances within data uses, informed by purposes and acts. In each use, data is shaped by the users in interpretative translative efforts, drawing on inborn knowledge by data's multiple, multifaceted local government users during work to gain public-service applicable intelligence.

6.3 Data Work Expectations

To close the chapter, the 'data promise' is articulated by six expectations of data, derived from the research findings. These expectations increase understanding of the data work practices observed and the motivations of the data workers, covering the varied acts and purposes of their data use. As varied types, use of data is shown to inconsistently correspond to activities which may transform (improve) public service delivery.

From analysis of the project data, including where data and the work thereof was observed as being used alternatively or concurrently as a tool, a skill or an answer during data practices, the following expectations are found.

The Promise and the Practices

Table 6-2 Six expectations

#	PROMISE	PRACTICE
1	Data solves public service delivery problems, by addressing inefficiencies and ineffectiveness	Data necessary but insufficient. Housing Repairs; Elderly Care.
2	Data will allow staff time to be better directed, by freeing staff from mundane reporting tasks to focus on more creative data use activities	Reporting is prioritised duty: staff serve reporting needs. All thematic services.
3	Technological advances for data enable better support of local government in delivery of its mandate	Not all workers get permission to use software and technology. Transport Plan.
4	Data 'troves' held across local government hold inherent (natural, core) value to transform public service delivery	Datasets are often inadequate with limited means to adjust attributes due to database structure (formal reporting parameters pre-set). Child services and siblings in care.
5	Increased understanding of public service delivery problems comes from more and better data	Varied: needs creative, experimental data work to generate insights. Poverty alleviation (+ve); Grass-cutting (-ve; lacking worker buy-in).
6	Data is as a valuable organisational asset or resource and should be treated as such (meaning unencumbered availability, sharing, onward use scope)	Data entitlement, disregarding methodological aspects and necessary limitations; data repurposed in problematic ways. Physical infrastructure, inc. Roads.

Expectation 1: Efficiency and Effectiveness

A clear motivation for local government work with data is to derive improvements in public service delivery, both as substantive public goods provision generally (policy development, 'goods' as broad, collective public benefits) and as literal delivery at recipient-source (point of contact, 'goods' as commodities issued or services granted, between state service provider and recipient public). Reduction of public services and their delivery to matters of efficiency and effectiveness requires determining what basis they are deemed inefficient or ineffective as a measure of value/s. The efficiency-effectiveness relationship is not straightforward: depending on the assigned value/s 'weightings' (the basis for efficiency or effectiveness), a change in public service delivery may be efficient and not effective, or vice versa.

In many service delivery areas for local government, since outcomes sought are interconnected, the public / societal good cannot be simply articulated as a quantifiable indicator of success. Furthermore, as presented above (Housing Repairs; Elderly Care), surfacing insights from data use about inefficiencies or ineffectiveness does not inherently lead to action, especially if to action the insight requires a more fundamental re-design of the process of the public service delivery such as may be out of scope for operational staff to undertake e.g., due to their skills, resources (money, time), or agency.

Going further, efficiency in services provision is potentially a problematic goal, given parsimony and budget pressures, plus government and its agencies role in metric-setting for evaluation and measurement (audit) to confirm progress on targets and successes. Forthright statements of inadequacy and failing is an uneasy task in political settings, absent or distinct in other public sector (e.g., Universities / HEI), third, or private sector contexts also seeking to leverage their data and offering guidance to local government. Efficiency is not a goal that well suits getting it right for individual members of the public each time, but starts with one-size for all, streamlined services, and ties to a 'client' or 'customer' view of public.

Expectation 2: Freed-up Worker Time

In all six research Locations, better utilised staff time is a central component in calls that councils progress opportunities from new ways of working with data. One of the most mentioned improvements deemed to follow from getting a handle on reporting was scope to advance more public service delivery focused (business) intelligence work. Therefore, unburdening worker time spent in prosaic reporting translates to expectancy of insights gained from staff's time spent more usefully for PSDT.

In the examples above, those with scope to be creative with data are those who have the agency and permission, either because they gave it to themselves from longstanding personal-professional skillsets (Transport Plan; Education Workers), or because there is a clear intention in the organisation to carve out this data use spaces in dedicated roles with clear mandate to be creative with data (Gulley Maintenance; Poverty Alleviation). Without advance buy-in from the service area teams, corporate data-initiated improvements are shown to fall flat (Grass-cutting), and perspectives that *"transformation is code for cuts"*, of budgets or staffing.

Directly contravening assurances that better use of time, spent in more meaningful data work, will follow data work changes, there are several examples showing workers re-directed to reporting tasks or beholden to historic data collection limitations, such as attributes in formal datasets from national databases (Care / Child Protection). Where it is recognised that data needs more translation and interpretation, such as by N-8, the basis whereby transformational data initiatives automating reports result in staff permission and agency to better understand the data in those reports is unclear. With an organisational view of staff as a resource to be allocated in ways that best serve the council, including seeking to be effective and efficient digital business, it is unclear that staff can avoid redirection to work where reporting has yet to be automated and streamlined. Furthermore, the transactional nature of data work predominately to report, perpetuates a culture in service of data rather than in service of that which data can enable. The way staff tend not to view themselves as data professionals is revelatory in this regard.

Expectation 3: Technological Enablement

It is well documented how technological advances are widely (and often uncritically) viewed as an enabler for digital transformation. Technological advances for data cover management, storage, availability, analytics, among others. The view of technological possibility pertaining to data and its use automatically, seamlessly, resulting in better support to local government mandates is unclear, since public service specialist professionals must translate or interpret the data in a defined use context. Technology and data will not in and of themselves bestow benefits: an actor (be that human or otherwise) is required, to define the setting, as a use context, in which technological tools are applied. In local authorities these vary in role, skills and insights, closely associated to the service delivery topic.

The core mandate of local government is responsibility for multiple public services, delivery of these, and ultimately facilitating (collective) benefits for the public good. In the above collated examples from practice, a key theme is that of agency, found in permission to work with data and to have access to advanced technology. The examples show where technological possibility connects to socio-technical themes, built from the practice-based accounts of how staff work with data.

Expectation 4: Innate Data Usefulness

The attractiveness and convenience of perceiving data itself as the solution to local government challenges is evident, since in the context of extreme financial difficulties the councils already have data, perceived to be an abundant, underused resource that might not need too much financial outlay to derive PSD results, perhaps even transformational effects. ICT partners contend that underuse of data resources is evident, and targeted monetary spend is needed to get at the data troves and process these in the 'right' way. That targeted spend is almost entirely about the data or data-related technology and rarely – or minimally - about understanding public service, processes of delivering public services operationally and staff capabilities, inclusive of the embedded expertise of thematic specialists.

Core to this expectation is that to get value from data there needs to be efforts to privilege 'value from data', not only privilege data itself. Getting this value from data requires a use case, a context. In the research findings, across all locations, there are instances of conflating data related efforts with capability to derive actionable insight from that data.

There are multiple facets here: the difference between

   (a) basic, potentially relevant / insightful data (pre-use),
   (b) the insight, and
   (c) action deriving from that insight.

In local government, at point (a), the data must be admissible and credible to the context for its proposed public service-related use. Who or what determines the admissibility? At (b), there is the need for a clear problem space. Who or what sets the parameters or the problem? Finally, (c) necessitates scope to change processes to act on the insights. Who or what has the authority to do this, especially if doing so greatly disrupts the status quo and the dominant old ways?

Overall, data's usefulness derived from acts of use, which are shown to serve reporting or intelligence outcomes, pertaining to a public service area. The latter are the more useful for PSDT, where data requires translation by thematic specialist data users.

Expectation 5: Increased Understanding

This expectation links very closely to 'data as an organisational asset' and 'data holding innate value'. In some ways, this articulated expectation is trite or mundane. To provide a clearer overview, it is helpful to break down two elements, better understanding of problems via (i) more data, and (ii) better data.

The research findings show a prevalent tendency across all locations to elevate the value of data, in some ways placing it above information. There is uncritical agreement that more and better data – in substance and then use – will improve understanding. If – or when - there is improved understanding, it will follow that the understanding will be acted upon. This shows oversimplification of the data use practices, and types, in Scottish local government for public service delivery including of work processes, which are rarely linear and are all subject to democratic and legislative procedural requirements (of accountability and transparency, and optimal public monies assignation, per Best Value[69]). Improved understandings might show that more public money should be spent, but spending money is contested where the argument is that the inefficiencies and ineffectiveness are the drain on finances, and these can be 'solved' (cured) by data.

Lack of scope to understand what data can show is the missing piece for all councils researched during this project. The disconnect between reporting and achieving business (or, public service delivery) intelligence is well-encapsulated in this quote from N-8, who is based in a corporate data team as a 'metrics' strategist –

> *We have reported our numbers, but we've not spent a lot of time understanding what those numbers mean. (N-8)*

Generally, it is shown how increased understanding of public service delivery problems, whilst necessary, is insufficient. A clear business case is needed to permit acting on any understandings, which eliminates spaces of the trial-and-error of data work (in action for PSD motivations or purposes). Additionally, there is a preference for any monetary outlay to be targeted spend destined to reliably result in eventual cost-cutting / savings, termed *"spend to save"*. Overall, there is limited scope for experimentation with data, and beyond it, carrying forth insights derived from data's use for intelligence, with limited groups of people who can do creative data use work. Those who can do creative data use work are not only those with the digital data skillsets, since many different skillsets are important in

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[69] Legislation mandating public sector make accountable, effective and efficient spend of public monies.

data science. For example., K-4 comments about the role of *"story-tellers"* in data work. This is understood as abilities to draw out the 'story' from data, to make it applicable and relevant in the context to which it connects. This requires those with organisational permission to progress that work.

Expectation 6: Data, An Organisational Asset

Whether viewed as linked to the challenges of austerity, it is evident that maximisation of all local government resources is sought. Data is perceived as a resource. There is pressure in local government that quick answers are required, answers that demonstrate their correctness since democratic institutions must account for its public service delivery actions, showing (proving) delivery of public benefits. There is strong attraction towards the possibility of solutions that stem from 'raw' data sources, detached from subjective assessment.

One of the crucial ways in which this expectation is problematic in that it treats data as detached from the process of its creation and original use context. Data may be prepared to be re-useable or become re-purpose-able data, but this needs regard to the parameters of the first use. This requires time, effort, resources and commitment – and, overall, needs clarity about the purposes of the use, which encompass limitations for onwards use.

From the examples, it is shown that a view of data as an organisational-wide asset glosses over the detail of how data might be better used i.e., by staff more supported with scope to be creative with data. It is treated in some ways as an inert material substance, that can be applied here or there in varied public service settings. Much is lauded about the great insights that can derive from data sets being brought into the light, connected with other data sources, throwing out wonderful revelations. Again, this underestimates the rigidity in the organisation and stifled setting to act on insights. Random insights are unlikely to have much scope for action due to lack of buy-in and under recognition of the public service delivery process – as a public administration information system structure - to which the insight pertains.

6.4 Conclusion: Data Work - Pressures and Paradoxes

What the above findings show is the data promise evident from but entangled in work practices with data, in varied uses. The promise is articulated in six 'expectations', drawn from the main empirical data source for the project, via 58 interviews and a short survey.

Regarding the data promise, respondent accounts show how working with data enable insights offering directions to improve PSD. However, acting on insights to address, for instance, inefficiency or ineffectiveness, is a distinct, onwards matter. Analysis of local government data practices shows that there are different data work activities where data is put to use for alternatively reporting or intelligence. Where there is intelligence, actioning the intelligence insights requires both operational PSD process-aligned mechanisms (business process, information system, software, hardware) and the personnel (staff as the social actors in the process) that can institute the desired changes. The enactment of value and usefulness from data work depends on what use it is serving, and where the intention is PSDT, ability to action transformational changes requires more than the insight; it needs the capability of the data actors, covering more than Digital, Data and Technology skills.

From analysis of the project's empirical data, across multiple sources (see Chapter Four Table 4-4) and including strategic documentation conveying each Location's 'digital transformation' policies, there is an overarching intention everyone in local government work with data. The target is for all PSD staff to draw more data into their working tasks, utilised in better ways. Scottish local government activities are encouraged to be data-driven, since doing so transforms public service delivery, implicitly resulting in improvement. The granular variation in data use, serving reporting or intelligence functions, is under-appreciated in this picture: whilst the same data may be applied for the two use functions, it is not handled in the same way for these distinct purposes.

Across all locations in the research, there were at least one mention of the benefits from having *"one source of the truth"* in official approved datasets on a subject. This stance does not align to the analysed accounts of working with data often referring to informal data sources, as well as responsive or reactive data use pieced together, weighed, and balanced by a specialist in serving public needs. Data work for PSDT is a phenomenon in transition, characterised by movement and flux in negotiating the work and parameters thereof. Through the findings, expectations are evident, and these constitute the 'promise' of data for PSD which local government data workers seek to fulfil.

In the next chapter, the concept of the data professional as staff actors working with data in their professional settings (i.e., during local government PSD work) is further explored with the 'Data User' archetypes, developing the findings to better understand the ways that PSDT occurs from data use, and what factors support (or limit) the accomplishment of the transformation.

Chapter 7: Data Work Professionals - Two Data Use Personas

7.1 Introduction

The previous chapter presented six expectations from and of data use via practice-based examples from across Scottish local government. All examples are drawn from public service delivery transformation efforts. Through the analysis and examples derived from the empirical data therein, a variety of data use practices were shown occurring in alignment to expectations from data use at local government level in Scotland. Further analysis of the examples enables identification of four salient factors. These factors affect the realisation of the expectations. This second findings chapter starts by elucidating these. An illustrative mechanism is used to further explore the way the practices collide with the promise, through two personas. This builds a foundation to then articulate and more closely consider the core issues at the centre of Scottish local government pertaining to the culture of data and its use, in Chapter Eight.

Below, the complex landscape of working with data use within Scottish local government will be further explored, to address the thesis aim and objectives.

This chapter presents data from a pre-interview survey completed by respondents. Thereby, the chapter highlights a fundamental finding: the central, conflicted role of the local government data professional. The chapter then moves to present two personas, as composite archetypes, serving to illustrate extremes across data use work, following the increasing popular approach from design in understanding 'user journeys' in interfacing with governments (or other providers) to access services. There is an academic basis in the usage of personas (see Jansen et al, 2022), although these more common in practice, for instance, frequently used to understand the public service journey (such as by the UK Government Digital Service).

The personas align to the two functions of data in local government, first presented in Chapter Three, serving purposes of reporting and intelligence. The personas are built around four crucial factors found during the analysis as influencing the possibility of realising the expectations from data in Scottish local government; these six expectations were laid out in section 6.3 of the preceding chapter.

Therefore, this second Findings Chapter does three things:

- States the factors that operate to influence realisation of the data promise, drawn from the practice-based examples in Chapter Six

- Showcases pre-interview survey data, complemented by interviews, highlighting point of interest about which local government workers constitute a Data Professional

- Offers two Personas within a qualitative 'Public Service Delivery Transformation (PSDT) Usefulness Scale', as a mechanism illustrating the way the four salient Factors influence realisation of the Expectations; linked to the two Functions of data use, and building on perception of the Data Professional

7.2 Salient Factors

In the previous chapter, six Expectations constituting the 'promise' of data were presented, built from data-work practices examples analysed. The expectations accommodate data materially as an artefact (Expectations 3, 4 and 6) and sociomaterially – relationally - from its use (1, 2 and 5). In this second findings chapter, I show how these expectations collide with practice-based realities of data work due to four critical, salient Factors. That collision results in those Expectations' fragmented and inconsistent on-the-ground fulfilment in Scottish local government. The presentation of two archetypes as data work 'Personas' have been created to illustrate the factors in action, and the division of use type by Function.

The Factors are:

1. Data itself, of broad forms: not only structured or digital, and Technology, including availability, then accessibility of suitable work equipment as hardware and software

2. Time, including permission to expend workhours, scope to self-train or attend training; also, technological support covering time availability from others[70]

3. Individual Professional Curiosity (linked to Agency and Permission)

4. Creativity / creative ability, including (but not limited to), digital[71] skills, new qualifications, data literacy, and critical thinking for problem formulation, then solving

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[70] Time in data work would also ideally include time for longitudinal data collection and analysis, and time for policy implementation and adjustments to improve scope to achieve outcomes (e.g., alterations to approach keeping same overarching goal).

[71] Ideal but not necessary (can do good data work analogue / offline).

Factors 1 - 4 are drawn from the empirical sources for the project, presented in Chapter 6 (see Table 4-4, Chapter Four). Taken together, these are the elements constituting capability and are a central part of the data work culture. Additionally, since these factors apply in the (local) government context in Scotland, which is a politically accountable country so requires government work to conform to democratic procedure, such as public participation via both elections and wider consultation. Activities occur within a (party) political setting. The capability encompasses both the worker and the workplace: where the data use worker is capable of progressing their tasks towards the overall goal asked of them (PSDT via data), also that the workplace environment enables the progression of the task/s. This invites consideration of more than data and technology (just one factor), whilst recognising the importance of this aspect.

The factors detailed above are found to operate, both alone and in interplay, to influence scope for the data promise expectations to be realised. Local government data use categories, Functions 1 'Reporting' and 2 'Intelligence' are utilised in this chapter in relation to the factors, by construction of two data professional extremes: composite, fictional personas called 'Jane' and 'Jim'. These serve to illustrate the contradictory trends in the ways roles of data work in local government are evolving.

The central importance of who are (and are not) perceived data professionals arose as a main research finding from responses to the interview survey, and then through the interviews. Two personas are built from the latent meaning found from analysing accounts of data use work from 55 respondents, further supported by evaluation of multiple respondent job descriptions and job adverts analysed during the project.

The intention is to frame findings around the most important themes obtained after examination of the research data: the Factors. There is an overarching finding about varied influence of these salient Factors, found to feature at different levels for the individual staff member. For instance, staff may have high ICT skills / proficiency, strong professional curiosity, or scope to expend worktime in varied combinations in each individual case. Accordingly, the effect of the Factors is drawn out via the concept of a data professional, or worker in / with data, during their profession (job). The description of the personas enables communication of how the Factors contribute and converge to accomplish a varied realisation of the central data promise, the Expectations.

7.3 Introducing the Data Professional

Leading to presentation of the 'Personas' in section 7.4, findings are now shared from the research project's pre-interview survey responses. Thereby the chapter explores the concept of a (local government) data professional, highlighting evasiveness, or reluctance, shown in staffs' lack of confidence to term their form of data work as being of significance to their professional activities. It is shown that whilst all staff respondents undertake acts of data use at work (i.e., they all use data, of various types and in various ways, in their workplace), respondents tend towards defining 'other' data use, based at a remove from them, as being proper, professional data work.

Within Scottish local government there is uncertainty about who does data work, and in what ways. That uncertainty often comes from data workers themselves, as well as the operational environment in which they work. There is a lack of granularity in defining what data (as named datasets or otherwise) gets drawn upon i.e., used, how so, to do what tasks, by who, where and when. Data maturity audits and data work/ers 'stocktaking' (including by national level entities, such as the Scottish Government in their Data Maturity work) have tended to focus on data skills conventionally classified, covering technical abilities. They also sometimes cover the more novel abilities of data story-telling, consisting of forms of communication with data, for example as data visualisation. Telling the stories of data, or with and from data, can be understood as interpretative and translative effort - but the thesis finds that local government data work is not typically conveyed in that way; rather, the data workers' goal, in service to the local government organisational demands leans towards showcasing data objectively, as clearly conveyed pure facts from which acceptable public service delivery decisions may follow.

Both Chapters Two (Literature Review) and Five (Context for the research locations) reveal the edict, both broadly and from local governments specifically, to do more and better with data. However, within data work, the in-use detail and specificity are lacking. Therefore, data use classification is offered by this thesis. Paucity of clarity is contributing to a muddled data work landscape across Scottish local government, with pervasive inconsistency and varied support levels experienced by local government data workers. By advancing greater, granular, and focus on data use work aligned to public services operation, a clearer understanding of the data work culture in Scottish local government can be gained.

The research finds only a small proportion of local government respondents self-identify as data professionals even where the full sample work with council digital transformation initiatives that seek to gain more from data at an operational level. This evasiveness suggests unwillingness of many staff who interface with data at work to assert their type of data use as being of significance, of usefulness and value, as professionalism[72] in data work, or corresponding to they themselves being a data professional.

7.3.1 Pre-interview Survey

During the interview process, respondents were asked to complete a simple pre-interview survey consisting of nine questions (latterly ten, for interviews thirty-six to fifty-eight, barring repeated respondents[73]). The final - latterly penultimate - question asked interviewees if they identified as a 'data professional' (see Appendix E: Pre-interview Survey Questions for full survey).

The definition of data professional was not provided in the survey document because the purpose was to access the personal assessment by the interviewees. Therefore, during the preparatory pre-interview stage respondents determined their own definition. Based on their own understanding of this term respondents provided their answer in a free-text section of the survey document, deciding whether they viewed themselves as a data professional in their local government work. Answers given ranged from a simple *"no"* or *"yes"*, to variations of *"no, but…"* or *"yes, maybe, because / if…"*, thereby covering a range and richness of responses more detailed than a binary yes versus no. As well as qualified yes or no responses, some respondents gave pedantic replies, clarifying that to be precise, they are, e.g., information professionals, data practitioners (rather than professionals), that they manage a data team, or are GIS specialists.

Job titles ranged from 'Business Insight Analyst' to 'Engineering Officer', with almost every job title being unique. The full list is available in the Appendix A: Respondents – (Select) Information from Pre-interview Survey. It is relevant to highlight again the sample technique and call back to details provided in Chapters Four (Methodology) and Five (Context for the research and the findings): interviewees were chosen due to their role in working with the organisation becoming more data-driven, smart and their having work

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[72] Meaning: competence, expertise, proficiency
[73] One respondent was interviewed three times, another was interviewed twice in two different roles / locations (they changed job and moved council employer).

tasks linked to progressing the transformation of public service delivery via the use of data. According, all respondents have a requirement to work with data in their day-to-day work, and this was conveyed. This data work was observed as occurring in a range of capacities, whether more linked to Functions 1 or 2, or - most commonly - covering both functions.

Most respondents held an operational level public service delivery role, due to sampling decisions for this study, but some were employed at a managerial or strategic level or were specifically in ICT technical support roles.[74] Regardless, all respondents spoke about their own work in relation to data and its use both in their own day-to-day activities and how they saw it as being relevant at the organisational level. The full list of respondents, showing their job titles and their stated response in the survey to whether or not they identify themselves as being a data professional is shown in Appendix A: Respondents – (Select) Information from Pre-interview Survey.

7.3.2 Exploring Data Professionalism During Interviews

During the interviews, the concept of being a data professional (or not) was revisited. This was appropriate due to the *"complex and subtle phenomena"* being explored (Denscombe, 2017:173). In every interview the topic was broached towards the end of the interview unless the respondent themselves queried it from the outset.[75] Several respondents expressed surprise that the interview was not more technically focused and told me that they had trepidation beforehand since they were not confident of being the correct people for a research project about local government data work related to public service delivery transformation. On frequent occasions, respondents would diminish the professional significance of their own data use work and point to colleagues as being the *"real"* (see various – D3, O3, T3, S3, C3 - referring to E3), *"true"* (descriptor used by R4 for K4) or *"proper"* (Ll8 referring to N8) data professionals in their local authority. On multiple occasions respondents pointed back to colleagues who unbeknownst to them had already branded them as being a (or even 'the') data professional (e.g., see C3 identifying E3 as an example of a proper Location Blue data professional, where E3 had previously named C3 of being the same; also, K4 resisting categorisation, stated by multiple others, and showcasing K4's own view of data science roles in Location Yellow).

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[74] Only one in the primary locations, namely Zza-3.

[75] For instance, in a couple of interviews the survey was completed on the day itself at the start of the interview slot and not returned via email in the weeks prior, when the interview slot was being confirmed.

In numeric terms, the number of interviewees self-identifying as a data professional straightforwardly (with no qualification statements) was 11. For those who unequivocally – with a simple 'no' - did not view themselves as data professionals, the number was 28 (see Figures 7-1 and 7-2 below). The total number of unique respondents across the six locations was 55. Therefore, over half of those who were selected for interview did not see themselves as having a significant role in linkage to data and data use. The finding here is that there is a weak tendency to view one's local government work as directly linking to data and data use. This was especially apparent for those undertaking data use via reporting work, and who were afforded less scope to explore or determine intelligence insights.

In the subsection below, two visualisations are presented to show the pre-interview survey results to this question in quantitative terms.

Bar graphs: do you identify as a Data Professional?

Figure 7-1 (All Locations) Do you identify as a Data Professional?
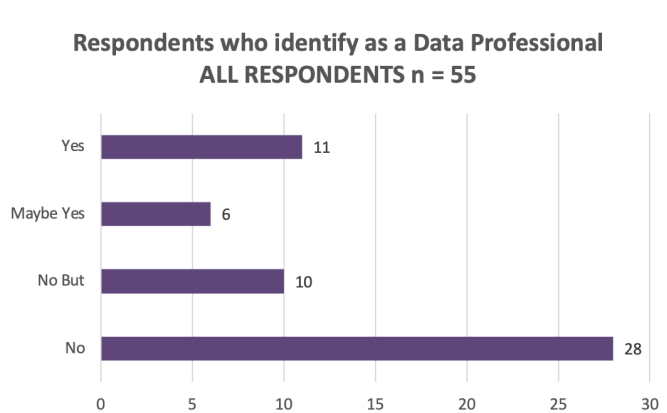
Figure 7-2 (Primary Locations) Do you identify as a Data Professional?
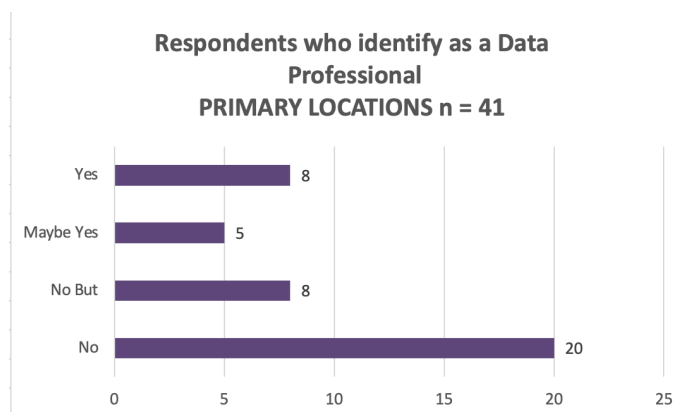
For both views, the full sample and Primary Locations only (Edinburgh, Glasgow and North Lanarkshire), the split between the outright 'no' and collated 'no, but' and 'maybe yes' responses are now highlighted. In the full sample 28 state 'no' and 16 offer a qualified answer; for the Primary Locations it is 20 stating 'no' and 13 with caveated responses. This points to uncertainty in almost as high a proportion as certainty about not being a data professional. Also, when excluding the outright, direct 'no' responses, 27 of 55 respondents in the full sample, and 21 of 41 within the primary locations only, i.e., close to half in both cases, might be some sort of definition of a data professional. There is a lack of clarity and confidence. Another finding here is that when interrogating the semantic and latent themes in the survey responses in linkage to in-depth interviews, many of both 'yes' and 'no' answers held deep nuance.

There is a further finding related to the idea of being a data professional. During the semi-structured interviews, several respondents changed their minds about who does data work. Based on the interview discussion covering what 'data' meant to respondents, or their work team (or wider local government) colleagues and employer organisation itself (the councils), and how different types of and purposes for data features in their public service delivery work, a small proportion of respondents adjusted their initial response to the question about their role in conjunction with data. This was done sometimes with amusement, and comment about needing to update their CVs or job description.

The finding that there are only a small number of respondents who from the outset see the work they do assuredly aligned to an open definition of data professionalism is significant. Furthermore, it is a pertinent finding that in each of the primary locations frequently the same one or two colleagues were stated as being the 'key data people', whilst most respondents diminished their own role. It can be seen how a minority hold core roles, as (or perceived as) essential links in the chain for data work. Oftentimes these respondents do not recognise the vital nature of their own roles in advancing data-driven or transformational public service delivery aims of the council organisation.

7.4 Two Data Use Personas

This chapter focuses on local government data professionals, and their role/s in data use. The previous section introduced the data professional concept by presenting research data

primarily derived from the project's pre-interview survey, and now two data use Personas are presented. I use this technique to illustrate the countervailing trends as a way of bringing together and clearly communicating the themes identified. Through the Personas, I am able to bring together different strands and highlight how they intersect and thereby to address the objective of the research, what supports (or limits) data use for PSDT.

The following Personas have been constructed to illustrate how requirement to serve either data use Function 1 or 2 means the professional worker affords variably a supported-supporting or a limited-limiting contribution to the overall culture of data work in local government. Accordingly, and linked to the Factors set out in section 7.2 the two (fictional) local government staff members have similar same high levels of data skills, understood as digital and data literacy, alongside high levels of professional curiosity and in-work interest from the result from their work towards a goal of public services delivery transformation. The construction of the personas in this way, with shared strength in certain attributes, enables communication of significance in particular Factors, specifically 'Time' and how agency and permission shapes capability in actioning 'Professional Curiosity'. This shows how Factors' levels and their interplay matter, further explored in Chapter Eight (Discussion).

Now the two personas are set out. To reiterate, in relation to the salient Factors both profiles intentionally have strong technical data capabilities, as skills to work with digital data sources, plus access to the necessary technology (work equipment). The 'Data and Technological Possibility' factor is even for each, with both Persona having their (material) data and technology needs met for their data use function.

7.4.1 Jane – Enabled Data Analyst

Assigned to single public service delivery task at a time, Jane is project based, generating intelligence or insight. Her working arrangements entail close relationships to service specialists with a clearly set problem area or issue to address. Jane is based in the service area, at a divisional or departmental level, although not a thematic public service specialist. Jane is building up thematic experience, with increasing abilities in the range of topics pertaining to the specific service area. This increasing ability 'banks' greater professional experience to strengthen subjective assessment of utility for admissible data in data use activities for the issue and general topic at hand.

Considering the probable length of time that Jane has been working in local government, she is likely to be newer into the council, relative to Jim. If she has been a local government staff member for a long time (10+ years), it is likely she has passed through recent (digital) data science training and does not identify as a thematic public service specialist. If a more recent entrant, then she may well hold a 'Data Scientist' job title.

This profile sits at the confident side of the spectrum, with a positive outlook and disposition in data use work. Profiles grouped closer to Jane likely have increased levels of job satisfaction. The overall sentiment of this profile is one of positivity and optimism. A reason for the optimism is the effectiveness of the data use work in advancing improvements in public service delivery since the central activities are around generation of intelligence insights.

High levels of trust are afforded to Jane by her managers and her colleagues, with her skillsets respected and her professional judgement permitted and encouraged. Part of the reason for the trust is that Jane is viewed as a colleague within the service area and not as an external corporate actor (external fully as an ICT consultant, or internal to the council, since being out of the divisional silo bestows perceived external status). The tension from service specialists being supported by someone deemed external is that an external actors may not be sensitive to the needs of the service area. Worse would to be a fully external actor (such as a private sector consultant) who again may either misunderstand the subtleties of, or undermine, the service in the department (or both)[76].

Although Jane does data use work viewed at times as objectively revelatory of answers and truth, in substance she undertakes subjective evaluation of the applicability of certain data sources to the topic at hand. In a sense, her skillsets that enable ability or capacity to work with data in 'new ways'[77] obscures the subjective work she does in support of her own data work tasks.

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[76] Respondent Ww-4 in location Yellow highlights that it whilst sometimes consultants are able to do creative data work that core staff cannot (for whatsoever reasons, skills, time, permission), those insights are infrequently unactionable *"reports become shelf-ware"* due to lack of tie-in to service delivery specifics.

[77] Development of the old vs new ways dichotomy comes in Chapter Eight, including therein new ways encapsulating access to truth and answers objectively from data, and old ways as permitting more professional judgement (which may relate to older status-quo with less formal and certainly less digital data available).

In relation to thematic mandate as delivery of public service/s, Jane is not responsible for determining if any democratic mandate or statutory imperative is being sufficiently met. Jane does no formal reporting function; the only 'reports' she makes are to her line manager as updates on her job activities, or in closure of a project to handover her findings and insights in a written-up manner for the core service delivery team to take forward.

7.4.2 Jim – Data Reporter

Jim is working primarily at operational levels and does not hold a managerial or strategic role. Due to Jim's competence in technical data science abilities, he was extracted (internally redeployed) from his service area, where he built up a great deal of professional experience. Accordingly, Jim has diminished job satisfaction seeing the gap left in his previous role, since he is now unable to progress data use work for insight generation and improvements to public service delivery, as linked to the parameters of his role and what the employer seeks he prioritise and deliver.

Considering the probable length of time that Jim has been working in local government, it is a fairly or very long time (10 or more, likely 20+ years). Jim has developed a lot of thematic service specialism as well as experiences in general acts of public service as a member of a council entity, being a public servant for so long.

Due to trends and pressures amounting to an imperative to do more and be better with data (broadly) in public service delivery, Jim has been relocated to a centralised council data team function. He is now primarily called upon to process data for reporting requirements covering various council areas of activity. The overall sentiment of this profile is one of discouragement, likely with lower job satisfaction, especially as related to the previous-held role.

As regards data usefulness and achieving potential from data, Jim feels stifled. He may see an opportunity from the work handling data for reporting function and activities (linked to the theme of his prior public service delivery role focus), but has no time afforded for exploration and creativity as regards how particular datasets might be applied in relation to a public service delivery challenge or issue. Due to focus on accounting for work as opposed to advancing service-linked interpretative data usage activities, Jim has minimal scope to himself directly facilitate public service delivery transformative work.

During an organisational-wide (council corporate level) audit of data workers, an initiative that intended to surface the human resource / staff members who spend a significant quantity of their time working with data, and having the abilities to do so, Jim responded that over 50% of his work was spent on activities directly interfacing with data. This time covered database work in data entry or cleansing - what the thesis refers to as parameters for data work, in preparation for substantive data uses (instance of data use) – and visualising data for documents used to report. Reporting serves both internal and external requirements. Jim also progresses other preparatory data work, such as in evaluation of data sources that could be applied for public service delivery intelligence insights. Jim may regret not marking this percentage amount lower since his employer council determined to allocate all those progressing at least one-third of their work time to data work to a central team. If had not been relocated, then he would still be able to progress data use, including as Function 2 work, in relation to his public service delivery area. The mainstay of his data use work now is progressing reporting activities that seek to show data as used within the council and measure the advances or slippages in the public service activity. For Jim, there is little to no scope to work in applying data to public services in a substantive (non-reporting) way. In his data use work, Jim undertakes little to no intelligence, insight producing function.

A significant part of the pain for Jim is his Professional Curiosity, and Skill (two of the factors). He has the abilities and personal-professional capacity, however these are thwarted and blocked: there is weak organisational enablement. The problem is not that Jim has low data or digital maturity or capability, but more that the role for Jim limits scope to undertake meaningful – useful - data use work for public service delivery transformation.

7.4.3 Summary of Personas

The personas are created as an analytical tool, illustrating the ways and extent that staff doing data work make a supportive contribution to data use work, tying back to the overall thesis aim and objectives. Through the data use categorisation greater PSDT usefulness and value is evident in correspondence with Function 2 work, intelligence for public service delivery support and intended transformation. Relating the Personas to the Factors, as the main themes from the analysis, Function 2 type of work requires data users with scope (i.e., permission, time, skills) to interpret and translate the data they use; or make and then use. Of the four factors, the 'data and technology' factor is of least significance but gets

greatest emphasis as the core feature of transformation and solution. Data - and associated technology - is but one part; one factor, as it were. To bring usefulness and value from data requires use work. The thesis shows how this data use work varies and is of varied significance depending on the ways it is undertaken. Closer, explicit linkage to those public services it seeks to transform is vital, in connection with PSD operations and (staff) actors.

From the research sample, types of data user that cluster closer to Jane's side of the spectrum are those whose levels across the salient factors are higher, especially on 'time' and 'creativity', plus preparatory time in problem definition, i.e., substantial effort spent exploring the issue in focus, for which the data is getting – or is sought to be – used; parameter-setting and decisions about what approaches or methodologies and what specific data might help. More Jane-like data users enjoy high levels of trust, independence, enjoying both agency and pre-approved permission to explore, to pursue their professional curiosity. Additionally, there is advance buy-in / interest organisationally, from either senior levels or from horizontal levels as patron colleagues to the results from their data use work.

The types of data user that clump closer to Jim's side of the spectrum are those who have been shifted due to organisational level opportunism from them having technical data skills, and from flexibility in job role and title. The council incentive to reorganise staff is associated with the perceived need at an organisational level to evidence that the council is doing good data work, is addressing data gaps and quality issues, and is progressing towards being more data-driven.

There is a lot of ability and deep, thematically linked (public service area specific) expertise sitting at the lowest levels of operational activity. This expertise was demonstrated in Chapter Six, for example in Location Red's Housing Team who were able to interpret their reporting data for public service insights – although they were not then able to action their insights. Similarly, in Location Yellow's Grass-cutting example, perhaps understanding of a bigger picture was missed by the centralised, corporate data team offering their insight to the land work service-specialist team (maybe it was simply resistance to changes). This thematic ability is apparent from the interviews as being vital to provide contextual setting for data use, by determining the data's admissibility, credibility, and relevance to public service delivery activity. Whether or not these individuals are the ones working directly with the data, they might rather be part of the wider local government data science effort, playing key roles in determining data

usefulness via their subjective evaluation of utility for the specific public service delivery context.

7.5 Qualitative Usefulness Scale

In the penultimate section of this Chapter, the personas are used to construct an indicative scale, showing how they alternatively support or limit data use for public service delivery transformation.

7.5.1 Deconstructing the Research Questions: Holistic Measurement Pairs

The thesis identifies characteristics of the culture of data and its use in public service/s delivery transformation in Scottish local government.

Main Research Question (RQ)

- What characterises Scottish local government data use culture?

Sub-RQ (a)

- o What (i) supports and (ii) limits data use for public service delivery transformation within Scottish local government?

Sub-RQ (b)

- o How does data use (i) support and (ii) limit public service delivery transformation within Scottish local government?

By drawing the two sub-questions together, it is possible to focus on the commonalities: What // supports or limits // data use for public service delivery transformation? What data use // supports or limits // public service delivery transformation?

Highlighting supports and limits aids presentation of data use worker personas in this chapter. The analaysis process has resulted in creation of a PSDT usefulness evaluation, associated with the two Functions.

Sub-RQ (a) concerns the enabling or hindering influences for actual acts of data use. Put another way, if the aim is to use data, what are the elements – at organisational, work-team or individual staff level – that serve to make that data use more achieveable, or oppositely serve to impede data use? Here the answer is the factors.

Sub-RQ (b) follows the first, insomuch that it focues on the specific data use that either supports or limits the end goal of public service/s delivery transformation. Here the answer is Function 2 data use.

The comon element in both questions is 'support' and 'limitation'. Therefore pairings have been constructed:

- Supported-Supporting
- Limited-Limiting

These pairings have contributed to the development of two archetype 'extremes' as personas, who are located at different sides of a scale showing data uses in local government data work, see Figure 7-3. The personas are built from by drawing from the analystical insights gained across the various research data sources in my study, especially the interviews, pre-interview survey and evaluation of job descriptions, read in conjunction with strategic and policy outputs from the councils.

Now, after description of the at-work characters of the two personas (section 7.4 above), Table 7-1 (Jane) and Table 7-2 (Jim) below show mapping of the extent to which the expectations might be able to be realised. This helps convey how certain factors influence realisation of the six expectations. These factors were clarified at the start of the Chapter. However, it is important to highlight the fluidity, opportunism, and informality in local government roles: real interviewee staff members interviewed did not present, in all their work, constant alignment with one persona to the exclusion of the other. Across the sample, staff have some leaning towards attributes of both personas at different points in their work, depending on which type of data use they are progressing (covering their in-work motivation as purpose, and how this informs their data work acts).

Whether interviewed local government staff give more positive or negative assessment of the usefulness and value of their data work – and how they feel about it, as job satisfaction - is influenced by interplay of the Factors introduced at section 7.2 and staff's own personal professional working environments.

7.5.2 Visualising Personas: Supported-Supporting to Limited-Limiting Scale

Two personas: supports or limits on data use

In the visual below, there is a link to sub-RQ (a) at the top and bottom, 'supported' and 'limited'; then a link to sub-RQ (b) at either side, left / right, 'supporting' and 'limiting'. In relation to goals of PSDT, the persona of Jane sits at the Supported-supporting side of the spectrum: she is supported both by colleagues and the organisation to do data work that progresses towards possible transformation of public service delivery; supporting production of PSDT insights. However, Jim is closer to the Limited-limiting side. Note he is not fully limited or limiting, and thereby not a mirror opposite to Jane in the bottom right corner, to her top left corner, since such a persona would likely not retain a key role in data use for the organisation.

The persona of Jane has been created to sit as far to the top-left corner. Hence, she is more supported in data use within the organisation, and in turn is also more supporting in progressing data use for PSDT in the organisation. The persona of Jim is not Jane's direct opposite. Therefore, Jim has been placed at slightly away from the fully Limited-Limiting bottom-right corner.

Figure 7-3 Mapping data worker archetypes
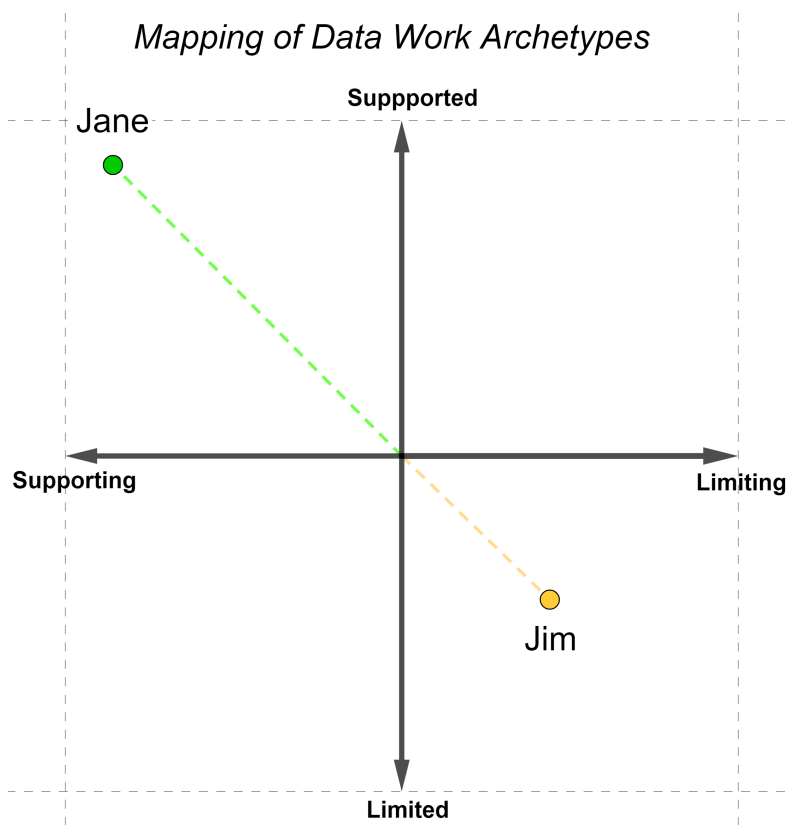
This visual denotes where on the spectrum (or scale) of Supported-Supporting and Limited-Limiting the two constructed personas, presented below, are located.

Above at section 7.2 four Factors derived from staff experiences and perspectives of data work were presented. These operate to either support or limit the Expectations (data promise) identified in Chapter Six. Local government staff accounts of their pursuit of data work surfaces data use experiences that are more or less enabled during their work, and also more or less useful for goals of transformation. This covers staff's data work as day-to-day activities, for reporting or for operational decision-making, alongside efforts at data use in more aspirational, transformative ways.

Jane is supported-supporting on F2 work, which is of greater value and usefulness for PSDT. Jim's F1 work is of value, and useful, in the provision of reports, but of less certain contribution to the accomplishment of insights that will be actioned for PSDT. Jane has her professional curiosity enabled, is creative, has the data (or can get it / make it), has the tech tools. For example, unlike F-4's colleagues, Jane can have the supercomputer and the ARCGIS account. Jim has his professional curiosity disabled, is creative but not permitted to do innovative work, has data but is doing a defined role with it in a reporting / broadcast manner, also he may have the technology equipment access but is restricted on its usage.

From the interviews, it is interesting to share details from N-8, holding a key role in improving Metrics and Business Intelligence functionality at Location Red. Respondent N-8 described in the interview how Location Red service area staff were excited about the soon-to-be launched technology and functionality for organising data sources centrally to enable clarity about the named datasets, their availability and access, and opportunities to apply these to public service delivery. However, N-8 spoke of how her council colleagues appeared to think that this new technology and governance would actually do the intelligence work as well and provide answers to the service teams. N-8 noted that the team delivering the new technology consisted of only three full-time-equivalents, and that interpretative work to generate the intelligence insights needed to occur – as had always been – in the services themselves. This was also echoed in Location Blue by C-3 (see Chapter Six section 6.2.4), who described how her centralised, service agnostic Data Team had push-back from service staff who sought certain data 'answers' when they lacked time to generate these themselves.

7.5.3 Expectations Mapped Per Persona

The lack of realisation of the expectations in relation to the profiles below applies both organisationally and individually.

Table 7-1 Jane and the data promise

Expectation	Realised?	Reasoning
1	YES	*Data solves public service delivery problems, by addressing inefficiencies and ineffectiveness.* Since Jane has been assigned a clearly defined public service delivery problem, she is able to determine ways that this activity or policy is inefficient or ineffective by bringing together data that she and the broader team deem admissible and relevant.
2	?	*Data will allow staff time to be better directed, by freeing staff from mundane reporting tasks to focus on more creative data use activities.* Jane has not been freed from mundane reporting since her role does not serve this function. The extent of Jane's reporting work is to her own line manager and as a wrapping up summary report output produced at the end of the project, as a handover to the public service area contacts (be those at operational or at a managerial or strategic level, or – most likely – a full 'permanent' public service area that includes a mix of roles).
3	?	*Technological advances for data enable better support of local government in delivery of its mandate.* Jane is not focused on the democratic pressures of the local government mandate because she is serving a more practical data use role (in ways mechanical and technical, but she does use her subjective expertise to speak for the data, in conjunction with the wider team with whom she is working). As regards the matter of local government mandate and delivery thereof, this responsibility sits elsewhere in the team she is working with, so Jane can focus her attention on being creative with data, guided as to the context and parameters by other staff colleagues.
4	YES	*Data 'troves' held across local government hold innate / inherent value to transform public service delivery.* As below, in relation to data being an organisation-wide asset (expectation 6) and on the matter of clear problem definition to establish inefficiencies and ineffectiveness (expectation 1). Through the setting of a demarcated use space for data work, Jane is empowered to determine – or support determination of – value from data use in a highly context-specific setting.

5	YES	*Increased understanding of public service delivery problems comes from more and better data (use).* When Jane does her work, she is acting in a clearly demarcated use space. Alongside the other members of the project team, increased understanding is possible from the data use, in turn supporting the potential to achieve improvements in public service delivery. It is notable that this stage, actioning the insight, is not Jane's role. She is likely moved along to a new project before the changes are introduced (so problems in implementation and making the insight actionable fall with others, perhaps those in the permanent service delivery area at the operational level).
6	YES	*Data is a valuable organisational asset or resource and should be treated as such.* Alongside the wider project team, Jane draws on data from multiple sources after determining its applicability / admissibility to the matter at hand.

Table 7-2 Jim and the data promise

Expectation	Realised?	Reasoning
1	NO	*Data solves public service delivery problems, by addressing inefficiencies and ineffectiveness.* Jim doesn't work with solving public service delivery problems. The work he does to report may eventually assist in making the public services and their delivery more efficient and effective, but that is not the focus of Jim's usage of data. Since much of the reporting goes up and out, and little (if anything) comes back down to him again – apart from as national statistics - Jim has low sense of job satisfaction that the effort he expends ultimately contributes to the improvement of the public service for the public his council employer serves.
2	NO	*Data will allow staff time to be better directed, by freeing staff from mundane reporting tasks to focus on more creative data use activities.* Jim has been moved specifically into a reporting role, in service of data and is not able to progress creative data use activities. His feelings of positivity about his job and his data skills are undermined by the fact he was removed from a more creative function in relation to public service, for the very reason that he can do data work (he has skills desired by the organisation that can enable a function to be discharged).
3	?	*Technological advances for data enable better support of local government in delivery of its mandate.*

		Jim's interaction with the local government mandate sits predominately with the function to account for what has been done; it is backwards-looking. Jim works more with (i) reporting for accountability than (ii) delivery of public services. Data's role applies in a direct transactional manner for (i), which is where Jim focuses his work. For (ii) data is used more dynamically, with results from data use (potentially) able to support decision-making for improvements leading to better public services and their delivery. Data use to improve, in substantial operational and outcome-focused terms in the public service is not where Jim's attention is during his work, regardless of technological advances. Jim uses the suite of new technological tools available (such as Power BI for dashboard creation and visualisations of indicators) to produce slicker-looking reports for dissemination beyond the operational work team. Jim himself plays no part in application of the business intelligence insights, even where he can see scope to explore a possibility due to his thematic understanding of the public service area.
4	NO	*Data 'troves' held across local government hold innate / inherent value to transform public service delivery.* As with expectation 4 above, for Jim there is no focus on extracting value from data 'troves' beyond the value to the organisation or work team in reporting their activities.
5	?	*Increased understanding of public service delivery problems comes from more and better data (use).* At a remove, this may be enabled from Jim's reporting work. However, Jim is a public service area specialist and therefore could be positioned to use his experientially-based rich understanding to increase understandings of the public service delivery area in focus. However, that is not enabled at the organisational level since somehow the availability of the data, reported, is conflated with its meaningful use (serving F1 rather than F2).
6	NO	*Data is a valuable organisational asset or resource and should be treated as such.* Jim has skills in statistical analysis, data handling to produce new statistical insights, data visualisation and more, however he has restricted scope to engage with the data that exists across the organisation, in any explorations that link to the service delivery area he is experienced in and has worked with for multiple years. Here the expectation is not realised partly because the organisation views data as a way of evidencing their activities rather than to go deep for an increased understanding of the issues.

7.6 Conclusion: Arbitration of Meaningful Data and its Use

The findings here build on the foundations from Chapters Five, providing context, and Six, with the Expectations. This Chapter gave categorisation of data work types, to articulate the data promise, and lay basis for the Factors that alternatively support or limit data work for PSDT). By setting out the data professional concept from both the pre-interview survey data and creation of the personas, identified salient Factors have been explored. In accounting for how these factors effect staff experiences and perception of the data professional role, the thesis builds understanding of the complex landscape of data use work in Scottish local government and what that work achieves. The two main types of data use work, corresponding to the Functions of data use for a local government organisation, serve distinct aims of reporting or of intelligence. The next chapter progresses discussion of the unique setting of data work undertaken in an institution that is politically accountable and committed to serving the public good, showing how that has a particular bearing on shaping the culture therein. The form of the council organisation is markedly different to other sectors – and even unique within the public and government sector (operating at the street level as opposed to national level government), even though many organisations advance reporting and intelligence functions in their work of data.

In the personas presented, it is important to caveat that for the real respondents, experiences accounted fluctuate between the two extremes, owing partly to the fluidity and opportunism in local government staff resource roles. Generally, there are multiple obligations upon local government staff in their day-to-day work, in service of both data use Function 1 (reporting) and 2 (intelligence). Location council's organisational materials and training, where such exist, tend not to define data and its use type in a clear manner – or at all beyond mandate to take decisions from stronger evidence bases and general efforts at improving quality of data that local government has and uses. It has been highlighted that quality determination for public service delivery transformation, where this is understood as meaning to get better and achieve improvement, necessitates a subjective assessment of utility and value. Staff at the lower levels of operational activity and specialism hold an important role in drawing upon their service-specific thematic expertise to arbitrate.

Data use professionalism necessitates more 'data use' actors than only conventional, popularised data scientists: rather there are a multiplicity of roles that contribute to data science for public service delivery, including intended transformation thereof. In the local

government context, since being a data professional tends to be viewed narrowly, shown in the findings through this chapter, it can be argued that there is a conflicted, inconsistent data work culture, shaped by opportunism and informality. Furthermore, it is arguably disrupted or even thwarted at the organisational level, with unintended consequences from seeking to improve data work by redeploying data staff 'talent' away from their public service thematic specialism. This chapter presented this by marking the split between those who are supported and supporting in data use and results from data use, and those who are limited and limiting in that regard. The culture of data use in linkage to data use being of increased value could be strengthened by a broader perspective – at the organisational level – on what it means to be a data professional, supporting a wider range of service support roles.

There is a vital role for interpretative work by local government staff in giving voice to whichsoever data, as well as to creating that data in relation to specific public service activities. This work requires thematic specialism, from public service area specialists. However, it is apparent that there is diminishing support at the organisational level afforded to this translative aspect of data professionalism in data use for public service.

The analysis of the project's empirical data suggests it is of central importance to avoid conflating the existence of data with the meaningful use of that data in linkage to public service delivery activities and intended improvements under the auspices of achieving transformation. Preparatory work to ready data for usage is again not of the same transformational quality as substantive data use (for whichever of the two Functions). Assessed in relation to PSDT, only actioned insights – as a form of operationally aligned intelligence - are those which (may) catalyse the transformation sought. The intelligence insights can stem from solely F2 activities, or from F1 that becomes F2, i.e. reporting advancing to constitute intelligence.

From the analysis of the interview data, it is shown that reporting is perceived as affording less value to the operational public service delivery staff actors, particularly where the data goes out and does not come back. In Location Red, respondent Ll-8 points to the Scottish Government as a main interface for requiring the submission of data, and refers to their *"thirst for data and information"*, further remarking with new reporting demands *"you'll be in this cycle of change and flux, where you're not giving things enough time to bed in to do a kind of proper assessment of the value of what you were doing. Or the direction of*

travel. It is a very, almost disposable type thing 'we've got the data today, right, we don't need that, move on to something tomorrow'."

Furthermore, data use for Function 2 as intelligence insights includes the application of wider base sources of knowledge which connects to the concept of tacit knowledge, and the way that not all knowingness overtly ties to discrete, tangible datapoints. Making sense from data requires capability to draw on multiple informational sources and abilities (skills) to translate and interpret data in relation to a particular problem, or issue. This concept was well-encapsulated by respondent W-2, Business Intelligence Officer at a secondary council location, who, whilst being well-qualified in digital data and ICT skills (a trained computer scientist), referred to listening to the radio and reading local newspapers to better understand the council area as related to the service area in focus.

Beyond staff's own skills and capacities, there is critical importance in there being enabling environment to facilitate capabilities. Rather than viewing data detachedly as an asset to an organisation, as per Expectation 6, a more helpful perspective is that data use is an asset, or an organisational capability (Piening, 2013). In the local government setting, since councils are political organisations, the data user has a complex role to support how the organisation's political actors set the trajectory to balance competing needs, wants and preferences. There is unavoidable - and arguably - desirable subjectivity in acts of determining the utility of data sources in specific use contexts.

Overarching understandings from the project show that to have a supported-supporting leaning, is imperative that local government enable – or be enabled, by other entities / organisations, to establish - scope to be creative with data. This scope to be creative may benefit from progressing alongside a formalised role for service area expertise, i.e., expertise derived from experience and vocationally accumulated knowledge of the local government public service delivery professional. Enabling space to use data supports exploration within councils of how best to meet public needs (i.e., deliver vital services) by drawing on a range of information sources, which in part entail leveraging data resources and involved interpretation of these via a multitude of contributory sources spanning far beyond the solely tangible.

Chapter 8: Fulfilling the Data Promise

Building on the previous chapters, this chapter further discusses 'data use', focusing on varied, granular uses to reveal the cultural characteristics of data work at the Scottish local government level. This allows the study to address the central research aim. The chapter starts with a summary of the findings from Chapters Six and Seven and offers a reminder of the framing first presented in Chapter Three. This framing covers the two primary functions of data use – reporting and intelligence – and highlights differences in data usefulness alternatively for preparatory or substantive work acts, both of which entail decision-making about applicable data, with conceptualisation of data work as a sociomaterial occurrence.

Thereafter, the chapter discusses data and data use usefulness as linked to specific motivations (purposes and associated acts) from data work, proposing that tensions between old and new ways of working with data are significant contributors to shortcomings in PSDT via data.

8.1 Findings and Framing – Summary

Chapter Six described accounts of data workers seeking to derive value from data during their work in public service delivery. Through these data work practices, the promise of data as related to transformation (and improvement) was found to be made up of six expectations. These are listed in Chapter Six, and again in Chapter Seven. Fulfilment of the data promise through the expectations is shown as inconsistently achievable within local government. The expectations are also arguably based on foundations that privilege data as a material thing – or noun – over data work as an action, entailing work 'doing' (verb) in instances of usage, where data, its making and its use are a sociomaterial phenomenon inextricably entangled with the human side (i.e., the socio-element). Decisions around determining work purposes, and assumptions setting the framing for data, cover both data's creation and its application, made – as this chapter highlights – in the process of use.

In Chapter Seven, the profile(s) of data workers were analysed in greater detail via fictional archetype 'personas' that represent common attributes and circumstances within local government data work. Through these personas, the thesis highlighted four salient factors that apply in levels to contribute to making the data 'promise' realisable.

Table 8-1 Salient factors in data work

Factor	Details
Data and Technology	Data of broad forms, not only structured or digital, plus technologies to support it, including available and accessible suitable work equipment as hardware and software.
Time	Including permission to expend workhours, scope to self-train or attend training, as well as technological support covering time availability from others. Also, longitudinal passage of time for policy implementation, evaluation, and revision.
Creativity	Creative ability, including (but not limited to), digital skills, new qualifications, data literacy, and critical thinking for problem formulation / solving. Note digital skills are important but good data work is possible in analogue, offline ways.
Professional Curiosity	At individual level, linked to agency and permission to experiment and apply one's tacit knowledge and critical thinking.

8.1.1 What Characterises Scottish Local Government Data Work Culture?

The ten points below are an overview of findings in the preceding chapters, conveying the findings' significance. Following these, this subsection highlights the core issues that characterise the data work culture.

1. Whilst there are increased, and increasing, claims about what data can do, there is no fully neutral approach to data. This true of both organic (human) or inorganic (machine) entities.

2. Data 'does' nothing by itself; data use is the critical element.

3. The study's findings suggest there is an incoherence and inconsistency about what 'data' is within local government and for operational public services staff: data can be many things and come in many forms.[78]

4. Data itself may be gaining a superiority over information,[79] since the latter is mired in undesirable determinism and subjectivity.

5. Against a backdrop of immense budget cuts with associated financial pressures for local government, alongside the imperative for public spend to be justifiable, it is highly attractive to embrace the idea of answers (found; extracted from) in data. This is especially attractive if data already exists and has merely not yet been successfully leveraged.

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[78] In the interviews respondents at times referred to data as datasets or as databases, or sometimes *"the data"* is an anomaly datapoint that invited further reflection. Sometimes data was talked about as overarching statistics, or a statistic itself as a data point. Relatedly, data is conflated with its digital state or (conversely) as equal to information and even intelligence itself (the data is the 'intel').

[79] Information may be defined as 'raw data' interpreted, placed in context for a purpose; but the detached 'data' aspect gets marketed as a salve for all that ails or as a source of (any) solution.

6. There are not often simple answers available when dealing with complex public service delivery and working normatively with value-laden organisations, such as governments.[80]

7. Data and its use rarely overtly provide true 'answers': instead, data and data use more often provide opportunities to better formulate questions, to better understand an issue, circumstance or situation.

8. Joining up data, as datasets or databases, in the absence of co-ordinated data use efforts may have limited effect if public services as thematic areas are not co-ordinated in delivery.

9. Data use is at times shown as itself to be the value, since 'using data' is itself a clear strategic and policy imperative within digital transformation.

10. Value from data use, pertaining to public service delivery, is realised both formally and informally.[81]

Three fundamental issues

For local government staff delivering public services operationally, the need to act fast is a constant driver. Workers often seek the answer as an immediate upshot or key take-away to guide their immediate delivery work. Delving into data to better understand problems does occur, but in limited ways and often by select groups of people, as explored in Chapter Seven. As a wide-spread culture, immersion in data to explore issues and possible courses of action as solutions is not standard. Whilst some individuals and work teams are facilitated to increase their data use in meaningful ways, leveraging data towards insights which go on to be actioned, many more are not afforded that opportunity. Additionally, data work teams being at a remove from service delivery specialists reduces the contextual understanding and subsequent applicability of the leveraged (used) data.

The findings lead to three core issues, making disparity and variance in achieving the data promise understandable:

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[80] Even in the case of services as literal as pavements and streetlights there are socio-political nuances that local governments are not able to disregard, such as requirements to accommodate all users in their varied needs, not only the majority (e.g., people who push prams, those who are blind or partially sighted, wheelchair users, children, etc.).

[81] **Formal value** from data to staff in the local government workplace setting is often achieved in use to meet reporting requirements. **Informal value** derives from the ways that the 'substance' of data as pre-information enables actors to determine courses of action in a fluid, responsive manner.

ISSUE ONE: ORGANISATIONAL / INSTITUTIONAL ARRANGEMENTS

Staffing structures across the councils do not reflect the data-use elevated intentions – wanting to gain more from data, to leverage it and unlock value - thereby undermining the strategic intentions. This connects inversely to expectations of being more data-driven, whereby the more the council seeks to be led by data, the more it hollows-out the service specialist staff base that makes being led possible via effective data use. Since local government organisations in my study indicate benefit financially from role fluidity, Human Resource teams decline requests to clarify the types of data use work in job descriptions, particularly at operational levels, and data scientist roles in evidence appear to be temporary contracts or un-standard arrangements. In addition, changes to job descriptions would trigger entitlement for a 're-grading' of roles, which, given the market on data science, may result in staff demanding increased pay. This would not support the overarching pressures of reducing budgets through transformation. Also, local government pay scales and criteria for promoted posts mean that people with marketable data skills might seek employment elsewhere rather than in local government. A lack of transparency about job types and contracts, alongside norms of being assigned to varied activities, hides both scale and varieties of data work that occur. Considerable effort is being made in all research locations to reveal the way individual staff members do or can progress data work, and emphasis on new approaches may be obscuring a clear view of nuances in data use that include traditional data methods.

ISSUE TWO: POSITIVISTIC VIEWS OF DATA

Impressions that data holds answers mis-serves public servants who by their role are concerned with ensuring public service delivery. These specialists necessarily apply their service-specific or public servant expertise to achieve public good / interest / benefit (for the public as a collective, requiring balancing of competing needs). The predominance of a material view of data as a discrete and tangible artefact underplays of interpretative acts in data, thereby diminishing scope to bolster these. In the absence of focus on data use, it is easy to overlook the users and direct scarce resources to improving data, a popular institutional activity – at multiple levels, departments, councils, national governments, and various supportive public sector entities – given the widespread support to becoming data-driven, smart, and digitally transformed by unlocking the innate value from data. Over-attendance to provision of data is also observed, making the data theoretically available for

use, but not giving as much regard to the actual data that is used (or not) and its usefulness in operational activity.

ISSUE THREE: FINANCIAL PRESSURES FOR QUICKLY WON SAVINGS (SHORT-TERMISM)

Decreased staff levels thwarts options to gain time to act with or from data and data-derived insights, as staff are asked to cover other functions since there is a flexibility in local government job functions. Opportunism is common, both in job roles and what staff can / must do – this can have positive and negative results. Even where positive, and Function 2 (intelligence-deriving) data work occurs, this is not reliably methodical and intentional, such as might strengthen the data work culture. Enabling useful data work *"by stealth"*, said to have occurred in Location Yellow, to increase new approaches in data usage perpetuates an erratic, inconsistent approach. Where proven success of the technique is required immediately, innovation and experimentation happen in secret, revealed / showcased only once it has been confirmed as effective. This does not help the organisation to mainstream 'trial and error', more creative, experimental approaches. To fail fast to learn is at the core of innovation and digital transformation, which appears to be under-enabled, likely associated with the risk averse culture of (local) governments.

Arguably, the issues stem from the predominant business outlook across councils. This view was stated unequivocally by senior director respondent Xx-8 at Location Red, explaining the council's role as similar to a business, but making savings not profit:

> *The culture now very much is that its customer driven, and we have to operate in a much more business environment. And now, the attitudes and the approach of the people who work in the public sector now, coming into the public sector and our business areas, we probably find it is not that much different from the private sector. Other than, rather than making a profit, we try to cut our costs. It's all the overheads and costs, so we do that.* (Xx-8)

Reducing government to a business logic is problematic, as is seeking to relentlessly cut costs where inherently the role of the government is to spend (public) money, meeting the public's agreed fundamental needs, and to strengthen the broad economic outlook. To associate back to the original e-Government *"better government"* definition (OECD, 2003), where the internet and technology afford opportunities to be more efficient and effective, it is important to recognise that these terms are distinct. Efficiency and effectiveness do not always go hand-in-hand, and selected metrics to evaluate success have a significant bearing. This links again to the point about interrogating in a granular hyper-

micro way, 'what data, why?': there is always someone somewhere determining weightings, normatively, about what counts and what matters. Concepts like the 'public good' are notoriously hard to pin down, not least because they are value-based, so shift depending on norms and values of the time. Something deemed normal and appropriate in 1980 will not necessarily viewed the same way in 2030. Trusted translators of data within 'public service' value-based frameworks play a crucial role. More discussion of these issues and their impact on data-workers comes in section 8.2 below.

8.1.2 Data Work: A Use Process

Functions

In Chapter Three, two categories of data use were offered, built from literature alongside law and policy. Whilst there are more nuanced ways to classify data use – and this study goes some way towards doing that – as a high-level starting place, viewing data in local government as serving the requirements of what this thesis terms 'Function 1: reporting' and 'Function 2: intelligence' offers a robust foundation.

The use process for data work entails purposes and associated acts within an institutional and cultural context. This is shown below in Table 8-2. This means that the 'data use-enactor' (see Chapter Three, and footnote 27) plays a central role every time. In local government, the use-enactor is frequently a human staff member, albeit it could be automated (and is often sought to be due to the reporting pressures across local government). This chapter unpicks the ways that data seems to provide innate value and usefulness, describing how Function 1 data use can underpin Function 2 since it is through the latter (intelligence) where PSDT ultimately occurs. However, whilst on the surface reporting could be viewed as core enabler for intelligence, these functions are distinct, as was shown in the Findings Chapters.

Data publication and / or data for service support

Along with the functions of use, the thesis' conceptual framework described two perspectives pertaining to data's role in local government work. The first is data publication as a precursor to use during work, which was highlighted as arguably outdated as a pre-digital metaphor. The second perspective emphasises data's role in service support, befitting given the centrality of services provision within local governments. These perspectives can be viewed as 'parameters for' and 'instances of' use (see Chapter Three visual). However, whilst data publication can be a preparatory act towards future (varied)

data uses, including multiple actors in a 'digital era governance / DEG' and smart cities multi-partner manner, it can also be the (substantive) purpose itself, aligned to goals of transparency and reporting. The data work practices described as the study's findings can be categorised in these ways, although the classification is not black and white, with examples of where the activities blur together in unspecific calls to do 'better' with data in relation to public services and their delivery.

Data publication focuses on the 'thing' of data, as an artefact, with an inbuilt assumption of innate value where use will inevitably, logically follow. The second perspective, service support, emphasises the use of the data from the start. Thereby, a perspective of service support immediately associates data with the purpose and associated acts of its use to establish value and usefulness. Accordingly, for PSDT through data work, a 'service support' outlook for data use is more useful. This requires greater attendance to the granular particularities of the work, operationally, and benefits from service specialists' input.

8.2 Valuing Data > Data Use

The overarching thesis finding is the prevalence of valuing data itself, rather than specific value and usefulness of data in use. By analysing the project data and interpreting results, the thesis shows varied (and limited) scope by data workers to do the sought-after creative, experimental, and explorative work with data that council organisations seek to catalyse. A major reason for the shortcomings is the data-extolling trend, with oversimplified views of data as inherently good and valuable. Data work is viewed at the organisational level as a linear occurrence, to be corporately facilitated, rather than as dynamic, interactive, and even messy (not able to be reliably streamlined) – it is necessarily undertaken in multiple, distinct working teams or at individual level. Furthermore, different parts of the organisation are sometimes at cross-purposes, undermining progress. Above I highlighted the core issues, which are further discussed in section 8.3 as related to progression from 'old' to 'new' ways.

8.2.1 Data Workers: Staff Capability as Professional Curiosity

This section discusses the central role and experiences of staff within local government data work. The data work most useful in public service delivery action best matches

Function 2 data use, as intelligence, generating insights. This occurs through a balance of enabling factors concerning the data worker, presented in Chapter Seven (and repeated at section 8.1 above). The four factors impact realisation of the expectations constituting the overall data promise.

The promise of data has been explored in linkage to data use practices. Data's promise is not accomplished in a one-off manner: it is an ongoing process, consistently seeking to better understand issues and make ongoing improvements. To move away from the rhetoric (data is great) and tautology (data is valuable because … data is valuable), the particularities and specificity of data work as instances of use must be laid bare every time. Put another way, great and valuable data is made that way in use every time. Context is of utmost relevance in data work to give weight to usage acts and purposes. Furthermore, the data use-enactor's tacit knowledge and judgement pertaining to their service area (as use context) is highly relevant to determine data's admissibility and relevance of the task at hand. This lies in the socio / human element (Dawes, 2009), with staff needing adequate digitalisation capabilities to translate data (Hu, 2021) in seeking to meet – or balance – at times complex and perhaps opposed public needs.

Where value and usefulness are assumed to (inevitably) follow from efforts to collect and better manage data, there will continue to be inadequate support to data workers and a shortfall in understanding what is needed to foster a strong enabling environment to support PSDT via data. This study has found that elevation of data is the predominant characteristic of data culture, more so than managing data's use in various, defined work tasks. To nurture data work requires a deeper appreciation of the breadth of data use within the myriad of work roles present in councils. The Digital, Data and Technology (DDaT) Profession Capability Framework first appeared in 2017 (UK Government, 2017) and is viewed as a core pillar to public sector reform and modernisation.[82] The trend and prominence of increasing DDaT roles suggests an over-emphasis and service to 'data' detachedly, and whilst it is intended to increase data work it may risk hollowing out ways of making service-applicable realisable value for the organisation. The elevation of data, with assumed innate value and usefulness detached from use, is diminishing scope to realise data's value and usefulness in public service delivery work.

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[82] Also see 'DDaT Playbook', launched by the UK Government in June 2023.

A starting point of data abundance is inadequate to foster a strong culture of data work for PSDT.[83] This point about data itself is true even if this resource has been meticulously organised and is overtly available for access, since access covers more than literal availability; it requires various skills and broad digital capabilities (Mittal, 2020). In relation to capability for data work pertaining to the identified factors that influence realisation of the data promise, I argue that 'Professional Curiosity' is of the greatest significance. Whilst the factors interrelate, without professional curiosity – also known as interest in one's job – the potential for gaining insights from data are reduced. A positive, enabling working environment is at the heart of a culture that works effectively with data to derive insights and action those for public service delivery transformation.

Against the backdrop of funding pressures, ICT specialist staff member at Location Blue ZZa-3 explained how many times posts are not filled when colleagues leave. Closely tied up with time to perform a job, diminished professional curiosity may follow the removal of 'full time equivalent' (FTE) roles, done to help teams and departments balance their books, achieve budget targets, and demonstrate new ways of working entailing more automation (of reporting, Function 1 use). In this way, the vital parts of data are delivered i.e., the reporting needed for transparency and accountability. And it can seem as if there is scope for Function 2 data use for gaining data-derived insights, since there is an (increasing) abundance of data. However, where streamlining of processes and internal organisational restructuring results in staff reduction, will there be the service specialist staff to use (leverage) data and generate intelligence? As highlighted as a core issue above, the research shows organisational resistance to changing staff job titles due to re-grading requests that would follow and entitlement to increased salaries undoing sought savings from the data and digital technologies. This presents a conundrum at the organisational level, where unwillingness to officially recognise data work undermines the scope to strengthen the data work culture.

Most local government staff – within the study sample and more broadly – are not in secured, dedicated data work teams, such as have emerged across local government (often in a centralised 'corporate' location). Instead, service specialists tell of roles removed and merged by management decision-makers, with frequent accounts of reduced job satisfaction. Whilst in many instances being professionally curious is a nebulous attribute,

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[83] Transformation can also be interpreted to mean potential insidious fundamental changes in the nature of government and their role as guardian of the public (benefit, good, interest).

there are ways the organisation can nurture or reject it. Reducing spaces for use of discretion and judgement, as the service specific expertise developed by the workers, is not a way to encourage the trait of curiosity in professional endeavours.

8.2.2 Speaking for or With Data

Core to the thesis is that 'data is spoken for' by which I mean that data needs to be interpreted and applied to the issue or topic at hand. This involves a key translating role of those doing the interpretation, and as shown earlier in the thesis, there is a fundamental component in bringing to bear experiential elements in progressing 'data' through the layers of significance (in the DIWK hierarchy). These data-translators, in my study being the operational public service delivery staff, draw on their tacit knowledge, discretion, and judgement. Additionally, workers speak with data, where there are increased requirements to point to evidence bases for public service delivery decisions. This is slightly distinct, where the data itself may detachedly be the proof, rather than the interpretation of that data.

In this quote, Location Yellow's senior business intelligence strategist K-4 highlights the significance of those who can tell the story from the data:

> *We need storytellers and the art of storytelling using data is a very specific tool and skillset. We're becoming more aware that's maybe not something that you just tack on to one of the technology specialists.* (K-4)

Arguably, gaining the best from data is most accurate when story-telling draws on nuances conveyed by – or comes directly from – the 'street-level' public service specialists. Related to the identified factors that influence realisation of expectations (the data promise), creativity and professional curiosity (with associated agency or permission to be curious) and time play a critical role. Having the data and the technologies to handle it, such as analytical tools for digital data in large amounts, is certainly relevant; however, it is necessary but insufficient. This is because building up meaning from data is how knowledge-making occurs, and having space to think, explore, and experiment is fundamental to increasing knowledge linked to the topic in focus. Ultimately, speaking for data needs trust. Empowered actors have permission (and platform) to present their interpretation or translation of data.

The exploration in this thesis does not apply rigid, constricted division between the terms data and information. The methodology permits sensitivity to ways data was talked about in both documentation and interviews. The range of perspectives conveyed during the empirical stage enriched the evaluation of the culture. That said, the concept of insights has a closer tie to conventional definitions of information, understood as "*meaning given by humans to collected data or selected subsets of data, typically accompanied by a presumption of truth or fact*" (Van Meter, 2020:73). In recent work on the Data-Information-Knowledge-Wisdom hierarchy in the Big Data age, Van Meter (2020) espouses that whilst interrogated data may convert to information, whether the data and subsequent information is useful or valuable entirely depends on the manner of interrogation and the accuracy of the underlying data. The concept of insights in this thesis conveys information from data made theoretically / potentially useful, determined by those in positions to confirm. However, in public service work (successful) delivery is what ultimately matters: potential insights are insufficient, in the end the actioning of insights is the significant element.[84]

As regards scale of data now possible, obtaining valid and useful information using statistical methods and data science is always a *"trial and error process"* (Van Meter, 2020:74). This sentiment is shared by the UK Government Central Digital and Data Office, which argues that at the core of a digital culture is the need to *"fail fast and learn so we can innovate"* (UK Government, 2022), where data is a tool that users can deploy to inform judgements about whether something is working or to identify priorities. It is not clear whether public bodies are allowed to pursue approaches of trial and error within operations, nor to ever fail. In the case of public funds, there is pressure to get it right straight-off. The data age is permitting distraction since in the data, insights are deemed to lie. The issue is further affected by pressures to be open. Not all experimentation should be done in the open but should be done by trustworthy actors. The actors seem to be less trusted than the data itself that they might leverage for its insights. There is no known study on whether in the computer age, vast scales as zettabytes of digital data collected are more or less accurate than pre-computer data collection methods (Van Meter, 2020) – and data requires progression to relevance, turned to information and knowledge, to be useful for public services.

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[84] Similarly, a policy may be impeccable but without implementation it is of scant worth.

From respondent accounts of successes in data work, my study finds that multiple data professionals (self-identifying or otherwise) participate in usage processes, aligning to the data 'ecosystem' idea (Oliveira et al., 2019). Additionally, in agreement with observations by Redman (2013), ICT staff are not optimal actors to enable data quality, given their remove from contextual usage. For ICT staff, their key role concerns infrastructures enabling parameters for use – more akin to what the study describes as preparatory work. For service providers internally, data and information work processes must tie directly to work tasks and outputs, since information systems (which home data) will not be supported by those who see no utility in them (Brown, 1999). In instances of use, data work culture is strengthened by a recognition of multiple roles in data science, beyond centralised corporate data staff.

Work roles are changing, becoming increasingly in service to data with diminishing, inadequate and at times incoherent organisationally enabled data use spaces. Many data use spaces are pushed to centralised function, severing the link to service areas and deep contextual knowledge (i.e., tacit knowledge / TK). My study shows some examples of where individuals and teams do have permission for experimental, creative data work, such as in the Gulley Maintenance example from Location Yellow or in Poverty Alleviation (same location), presented in Chapter Six. Therefore, the landscape broadly across Scottish local government is inconsistent and uneven. The experiences of data workers as use-enactors are varied and changeable, highly dependent on micro-level activities undertaken as well as the hyper-local context of their work. Centralised approaches have limited success, suggesting a more decentralised approach to data work would be beneficial across and within local government. This aligns to arguments about data being local (Loukissas, 2019) and the need to be context aware and embrace complexity for digital transformation in local government (Castelnovo and Sorrentino, 2018, 2024). There is also a connection to literature on decentralised data governance (e.g., Micheli, et al, 2020).

Taking a data-led view, i.e., data itself first before particularities of data use as specific purposes and acts, places intrinsic value on data and helps push forward the tautology of data as being in and of itself good. But not all data is good: even by objective evaluation there is data of higher or lower quality. Bad data, objectively, is false, incomplete, biased, or not available. Absent data is bad, by a timeliness appraisal. We see how there are many layers: data materially as good, bad, lower, or higher quality; or, in the use process/es, data as useful in service of the purpose for which it is intended. Going further, and at the crux of the argument in this thesis, data's high quality is necessarily determined by a user related to

how they deem the data to be useful for the purpose and in the acts of use they seek to undertake.

Multiple, interplaying layers of data-use

In my thesis, the exploration of local government data work culture shows that the potential for some data-derived transformation to occur is not the same as its occurrence. Transformation from data can be understood by identifying supports and limits, first to data use itself (e.g., did the use happen, what form), and next how data use (of whichever variety) may in turn advance the transformation goal in public service delivery. To do this, the thesis argues that attention to data use types is necessary. In relation to a council organisation 'data use' may – or is sought to – occur at macro, mezzo, and micro levels of inquiry (see Table 8-2 below). This corresponds to the organisation as a whole council; the department delivering public service; the team where the public service is delivered (operationally); and individuals embroiled in the matter of doing the work that brings the public service into being (devising it as policy, delivering it as operations).

Table 8-2 Data uses by workplace level

Who / what Ownership to entity and data	Data acts and purposes	Level	Function of data work (1 = reporting 2 = intelligence)
Individual worker, staff member "I"; "my"	data (use etc) to make sense of tasks, also to satisfy needs in work at hand; work with the team, to explain 'thought' process; data for communication operationally	Micro	1 & 2
Team "we"	data to develop ideas; or, to satisfy high-up reporting, quality & performance needs (inc. targets)	Micro / Mezzo	1 & 2
Department "we"; "the"	budget concerns; relationships in public service/s delivery with other actors, as shared provision effort; targets	Mezzo / Macro	1 2 as strategic not operational
Council "the" ("we" as management; "we" corporately; "we" collective with public; "we" as city / geographic place…)	Budgets, performance related to targets (operational and strategic) as reports on these; satisfaction in org by national gov and by public, interlinkages to other entities? Service to public	Macro	1 2 as strategic not operational

The key points in classifying these usage nuances are set out now. Function 1 data work can support Function 2; but reporting (Function 1) can be the end of the use. Intelligence (Function 2) can arise without reporting (Function 1) first. Intelligence (Function 2) can stop at the stage of constituting potential (actionable) insight, not progressing to be actioned (for PSDT). An insight may not be actionable due to limitations on activities in public service/s delivery that stem from (Function 1) reporting-related requirements e.g., must report in a set manner covering predetermined categories as datapoints mandated in law, meaning the public service/s delivery 'system' needs this, not that (possibly more subjectively, qualitatively useful), data to come forth. Ideas of altering the 'system' for public service/s delivery may not be admissible depending on who has them and where they surface from, impacted by hierarchical structures and in service to established KPIs and metrics.

Ultimately, there is a no inevitability that data use as reporting (Function 1) develops to intelligence (Function 2) for PSDT. This link in the chain is not present without efforts from public service delivery actors – normally local government staff (although it could be non-organic) - to both bring forth the insights and actions that are needed for transformation of the (specific, operational) public service delivery.

The organisational whole, as a distinct entity, plays a key role in establishing (or not) an enabling, supportive environment for data work of the use types of highest usefulness and value in relation to public service delivery transformation. In answering the sub research questions, the thesis has identified that intelligence is the form of data use that support (or limits) PSDT, and that four salient factors alternatively support or limit data use of the transformational type sought in fulfilment of the expectations of / from data as The Promise. Three of these factors – time, creativity, professional curiosity – apply directly to the socio elements of data work, but the dominance and emphasis is given to one factor: data and technological possibility. Data is certainly a key feature of data work culture but there is a vital role for the human side: the socio part (Dawes, 2009). Under-articulation of data use, of varied types, for different motivations and purposes leaves the culture of data work across Scottish local government weakened.

8.2.3 One Source of The Truth

During the empirical and analytical stages of this study, the rapid need for answers in local government arose as a central theme and runs through the expectations making up the data promise. In this subsection, the thesis unpacks ways – and shortcomings – in expectancy of finding 'truth', including in misplaced assumptions of apoliticality in data science applications, including in government. The work of Green (2021) about social justice as a central topic for (all, any) data science, with persistent illusions of detachment from the political, is pertinent here, in the ways that all data work has a political and value basis. Big data and digitalisation researchers O'Neil (2017) and Perez (2019) both address the ways that data can perpetuate inequalities and bias through data or algorithm inadequacies, adding further academic basis from recent 'critical data' research to these arguments.

This thesis supports arguments on the limitations of materiality in technology and data (Orlikowski, 2007, 2010; Orlikowski and Scott, 2008; Leonardi, 2012), and the way that social shaping occurs in technology and – by extension – digital data usage (Mackenzie and Wajcman, 1999). This refers to the relationships between technology and society broadly, including the way that work with technology changes the substance of both: the latter is not a neutral influence on the former. The key point is that if data is a resource, the real asset are data workers who handle the data artefact. Work of data is sociomaterial every time. Since data is not only a material entity, the old-new dichotomy, set out in section 8.3, is a useful framing showing where conventional data meets new forms for data becoming prevalent in the agenda of open science, covering data as software, code, and self-learning AI (on big data and its linkage to what it purports to represent, see Couldry and Mejias, 2019). These are all increasingly applicable in a world of large language models (such as ChatGPT, OpenAI and other related software applications). Data use is a sociomaterial occurrence and an enabling environment for data work by use-enactors is vital. Below the motivations of getting at facts and truth are set out.

Respondent Xx-8, a Location Red senior director-level respondent with oversight of council strategy stated:

> *...Introducing [Location VIII's intelligence technology] is about us trying to get a single source of the truth. They have a single source of data that services can access with all the correct controls in place**, they get access to the data that's required** to provide the best possible service. Digital is all about the use of data in a digital format. We now have the tools to use that data. What we have to do is make sure we collect, collate and make that **data available in the right way**.*
> [emphasis added] (Xx-8)

This excerpt shows how 'the' data is viewed as needing to itself be steadier and more reliable. In other words, data is seen as a more reliable source, factual and unchallengeable, a thing in itself rather than the outcome of a process of selection, gathering, processing and interpretation, all of which involve judgements – many of which may be open to questioning. The goal is to have broad data workers across the council using the same source, often the same numbers as statistical measures, but it could be the same qualitative material or code too. The respondent highlights what is expected from 'the' data, materially: providing the best possible service. The data is "*required*" and must be "*available in the right way*".

Accessibility and capability matter. This covers accessible data, literally available, and where potential data users have the means to access available data, covering skills and equipment. Skills may pertain to data handling, and they may be methodological, to determine the limitations of appropriate use. Capability, broader than ability, means that the actor is enabled to act: that they both 'can' and they 'do', needing a strong enabling environment at the organisational and other (work-team) levels. These elements are connected to the agency of staff to offer up insights, process-linked actionability potential (as well as other barriers for actioning), and subsequent scope to be actioned. Sometimes from where the insights come is highly significant.[85] Transformation, as public service delivery improvement, happens through progressing theoretical insight offerings (proposed intelligence) to implementation that affects change for the better. Having data available steady and sure still won't solve the issue of a lack of time or permission – as a job remit – to delve into that data, nor support the admissibility of found insights.

The conception of 'right', which is used in the above excerpt in conjunction with the way to work with data, also getting termed with the suffix 'data', 'place' and 'time' (including by the UK Government's National Audit Office in the 'Challenges in Using Data Across Government report' 2019), is of significance. To determine rightness implies wrongness, and these are unavoidably judgments. How these judgments occur is important – and not reducing these to answer-extraction a-politically from 'raw' sources perceived as encasing the optimal decision or course of action, without recognition of the weightings that get attributed to various indicators and parameters.

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[85] There are many examples where insights are acceptable from consultants, see Ww-4 comments; but commissioned research and analysis often becomes *"shelf-ware"* and unactioned due to lack of tie-in to work processes.

Answer-seeking or evidence-building – *"Just tell me what it means"*

Partly due to pressures on staff to get the optimal outcomes, to accomplish the efficiencies and ideally also effectiveness sought in utilising ICTs to provide better public services (as is the central objective of e-Government) there is a clear theme of looking for solutions in data – as directly sourced from the material fact of data. If untainted, from a data source, the solution derives from 'truth': as an answer, the fact is sought, found, lifted out and applied. In this way, answers can be viewed in discrete, material ways, detached from (public service) questions. However, if the perspective is shifted slightly to that of evidence, it is clear how this must be associated with a reason: evidence of, or for, what? What evidence is admissible in these circumstances, on this particular occasion? Evidence-building entails data usage for intelligence creation. By contrast, answers to be extracted from data are a flatter, singular result – and better match to Function 1, where the answer is the report. This connects to the goal from the usage of the data; something that is not well articulated in concrete, operationally-linked terms, above broad calls to leverage data and thereby achieve better results.

As shown in Chapter Seven, some data workers are permitted time to explore and experiment with data in local government. Many staff are not enabled to use data to increase understanding. Multiple respondents referred to their operational public service delivery work as *"fire-fighting"*, reactive to immediate needs. Staff secured permitted time to work with data are those who do not have pressing or even urgent demands on their time to get (public service delivery) tasks done. Sometimes would-be data professionals with statistical and other data science training are thwarted from data use since the immediate result of their time is at too far a remove from the day-to-day priorities, and not deemed vital for the operational activity at hand. This short-termism, plus a need to demonstrate the benefits to a proposed action in a business case, primarily in financial terms (needing a basis in data), means that unless framed as a clear 'answer' to an immediate, pressing problem / issue at hand, or as sought by elected members reactively, data-derived evidence is dismissed. That is, if it even gets the chance to be created, such as reflected upon by J-3 on the need for business cases to justify spend – and spend on technology being easier than other areas, such as more staff.

For respondent Ll-8, an operational service delivery manager at employer council Location Red for over thirty years:

I think about the meaning behind things. You've got the data, but it is the meaning behind it. That's a subjective thing in many ways, there's a people element to it. Because we can have artificial intelligence that will gather information – more data you make accessible – you can gather it, they [AI] can analyse it, they can make judgments, you can come out with a figure at the end, whatever that may be. But the meaning behind that and the proper service assessment or understanding of that data and what it really means and how it impacts, it's the people thing that's getting lost. (Ll-8)

The point about what the data means, and – critically – how it impacts the public who local government is mandated to provide for, is central. Data is only ever an indicator, a preliminary component: the significance is brought out in translation by those who serve. The same respondent, Ll-8, mentioned at another point the importance of going deeper at first contact with the public and the dis-service of trying to group or categorise people. He describes how often if there is a complexity in understanding nuances in an individual member of the public's needs, and that having a more sensitive interaction immediately would be more effective, to determine the unique circumstances and react to these. This is a prime instance of the ongoing significance of street-level bureaucracy. Data gives some useful information but it has to be considered and analysed alongside other sources of information, by people with the experience and knowledge to understand its uses in hyper-local contexts.

8.2.4 Different Types of Value: Automating Reports for Better Data Work?

Across all the research locations, the need to do better data work to achieve sought-after transformation of public service delivery is a major driver. Frequently, staff point to wasted time and data work practices that do little to facilitate service improvements needed.

Connected to the opening up and sharing of service-related data, Nn-8, who leads a performance and improvement team in Location Red, remarked that:

…there's loads of different things that we would like to look at that we just don't have the time to do just now. (Nn-8)

There is an underlying element here that the service specialists want to work more creatively with their data, and pursue their professional curiosity, but lack time. The agenda of increasing data infrastructure and placing more emphasis on data posits that after freeing staff from less useful data work, they can progress data work in more useful ways. However, preparing data for publication, openly or for sharing and reuse internally only,

takes a lot of time. One of the named data scientists in the sample estimated they spend 60% of their time in data-use preparation – and this is a dedicated data science staff member with no immediate, day-to-day public service delivery pressures from being within a specific service team.

Additionally, on the topic of tacit knowledge as service-sensitised translative capability, the same respondent linked the factor of time (and the pressures thereof) with hoped-for benefits from digital transformation enabled use of data for new staff starting:

> *[Our team], we know that just from experience. But if I get a new member of staff, I'm not going to have to spend the same time training them because they'll be able to see the trends from the data hopefully* (Nn-8)

In the quote above the respondent is looking to data itself to do the work that greater time might enable. The intention is that by sitting with the data resource, new starters at the council can learn about their service area without person-to-person training. This appears to move tacit knowledge and increasing experience directly to data. This is an intriguing perspective and proposition, that may not succeed given the substance differences between 'data', 'information' and types of knowledge. Data is not a substitute for knowledge, which is required to process data.[86]

Function 1 automation is deemed to be a gateway to greater Function 2 capability, but the progression to the generation of insights is where the transformational potential lies. In this following statement, respondent digital transformation lead N-8 is referring to methods the organisation is progressing in seeking to increase availability of data. Data required for Function 1 (reporting) may be automated, and free up staff time:

> *…the whole purpose of the [location specific data system] is to automate as far as possible a lot of data management and collection … it is about freeing up people's time. I think too much of their time is spent doing the basics. … some of the discussions we've been having is to say to people, this is the way that you have always done this, these are the reports you have always run. What other questions would you want answered?* (N-8)

Getting more from data is the goal, although that effort is not achieved by the technology without staff setting 'problem' framing. Over-expectations of technology and under-emphasising the worker roles may inadvertently weaken data use capabilities. Relatedly,

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[86] Although limited knowledge may be sufficient to enable someone to process data, if not critically interact with it in intentional sociomaterial action.

longstanding respondents, most in local government for 20-plus years (respondents X-2, Ll-8, Xxc-4 who all hold physical infrastructure provision roles, care service specialist T-3, education specialist B-3, and smart city officer Yyb-6) remarked that the arrival of mass digitisation has not necessarily improved data and information management.[87] The older style has evolved to new ways in the context of digital, but there is still a prevailing challenge of time availability as well as purpose for granularity. The value is not necessarily to service delivery staff and more, expanded data for its own sake or broad (aggregated national) insights, which is not helpful for the stripped-back operational teams on the ground delivering services, for instance operational manager Ll-8:

> *We had Ledger's, for example, to enter new cases or new submissions. The data that was in there was quite clean and straightforward. It was basically, applicant address, when we received, when we responded, what the outcomes were. That type of thing. Whereas now there's a significant volume, number of returns that we make, for example, to Scottish Government. And the datasets, they're huge. The analysis, that the data gathered, to the minute detail, to produce statistics and analysis, that's really the value in it – maybe there's value in it to Scottish Government, who certainly are obsessed with the statistics. But from a service point of view, you don't really need that kind of granulation for an operational use of data.* (Ll-8)

With this comment, the respondent was making a bigger point about the need for the data, identifying how data collection is occurring for its own sake, at a remove from operational public service delivery. The point being made is that from an operational stance, in terms of public service delivery requirements, the level of detail and granularity in the data is not adding value for the council. Data may help accountability but often the data requirements for reporting purposes are not used by anyone to investigate or scrutinise anything: this is akin to counting for counting's sake and arguably un-useful reporting, at least for PSDT. The respondent noted that perhaps such data is of value to the Scottish Government, but the question remains whether that burden should lie on local government against a backdrop of them having to deliver various public services in the here-and-now. It seems almost as if the abstract and general 'value of data' is being pushed on local government staff, without clear recognition that the value may not be real for them in the immediate service delivery context, and it may not be appropriate for these staff or organisations to cover that cost – in a financial and a time sense.

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[87] Van Meter (2020) offers a useful visual showing how there is more (digital) data nowadays but the same level of information, life experiences and education to achieve applied intelligence: 'Figure 3' page 78.

Whilst it is appropriate to move away from hunches, impressions, and possible prejudices in public service delivery decisions (at the operational level), the veneration of dashboards using data to inform decision-making by council staff is problematic. This connects to the inappropriateness of reducing all relevant parts of an issue to a demarcated 'data' format, alongside an oversimplification of policy implementation via assignment of all aspects to (tidy) data points, a topic well discussed by Söderström et al. (2020) and Purandare (2021). Also, it invites the question of whether dashboards exist to guide decision-making or rather to give the answers outright, as in, to offer more automation. Additionally, this point invites consideration of the 'black box' nature of many data analysis tools and biases in algorithmic design (Pasquale, 2015).

8.3 Old and New: Unreconciled Tensions

In this section, I argue that inconsistent and contradictory data work in practice stems from, and perpetuates, tensions between 'old' versus 'new' ways of data use, further defined and elaborated below. Whilst not a cleanly binary classification (and arguably data work is imbued with messiness), the framing helps to understand the central thesis findings of data work culture as a phenomenon underway, with in-work negotiations of acts and purposes for data's varied local government, public service delivery usage. The old-new tension is due to a dominance of a material view of data, inadequate regard to the practicalities of use practice with vital socio components to bring forth value and usefulness, and the view that improvement (transformation) is linear from bad, old ways to good, new ways. Due to the cultural characteristics and associated core issues identified, the data promise is being thwarted.

The phenomena explored through this thesis is data work in flux, amid changes. Across Scottish local government, the distinction between data and data use gains depth through a categorisation into 'old' or 'new' ways of working. Newness equates to approaches permitting a realisation of data expectations, achieving the promise. Drawing on the prior articulated functions of data use, purported new ways of working with data align to Function 2, where data is effectively leveraged to provide insights about public services and their delivery, as intelligence. For all public bodies, reporting (Function 1) is an unavoidable statutory requirement. Local governments, who provide sensitive services (for instance in child protection, health and social care, poverty support), are mandated to

account for how they spend public money. Reports are intended to evaluate if spend on service provision successfully meets public needs.

8.3.1 Accounting for 'Old Ways' and 'New Ways' of Data Work

On the surface, the 'old' approach is invariably viewed as inadequate, although underlying sentiments show contradiction and paradox. Old ways retain relevance for the actors, and new ways are also sometimes inadequate. In critique by the organisation at corporate and management (macro) level, the old conceptualisation leaves data under-used due to failing to elevate its value. That failure stems from data or data use weakness at multiple levels, including as lying with individual data users; at organisational level as the councils' culture; somewhere in between, across departments and service area teams; or, across all strata. The 'new' conceptualisation presents how with a greater appreciation of the untapped power of data, the benefits – defined as the expectations and overall promise of data – can be achieved. Actors working in old ways are accused of not seeing opportunities from data. Or, if seen, not having the aptitude to derive these opportunities, which under the new ways view are termed organisational, council resources. As addressed above, the abilities of users in a literal sense to handle digital data is frequently highlighted as a key element and missing piece, to re- or upskill (categorised in this thesis as the 'creativity' factor).

Data work is often referred to in a dichotomy of old and new; or from old towards new, with oldness associated with shortcomings and lack of leverage of the data asset and newness conflated with progress. New data is invariably digital and deemed a nonrival asset (Jones and Tonetti, 2020), with scope for abundant usage without degradation – a limitless resource. Old data was (or is) in paper ledgers, limiting use, sharing or re-use, such as remarked by N-8 on how Microsoft's 'Power BI' permitted asking new questions of the visualised data whereas old data forms limited that dynamism. However, respondent Ll-8 made comments about better management of their data, with it being *"clean and straightforward"* when it was in folders and filing cabinets, alongside others who noted usage of ad-hoc documents and data retention (a major feature of the interview with Q-2 in a secondary 'Green' location). This demonstrates deficient data management in the digital transition, arguably also due to the lack of connection to substantive, service supporting 'instances of' data usage work within the council, and more in service to reporting (e.g., to Scottish government, for Ll-8 *"obsessed with statistics"*) and bookkeeping for accountability or transparency reasons.

The old versus new form is shown in how data is referred to by local government workers, and at the organisational level. Data is presented as able to be leveraged through new ways of getting at or making data, such as via sensors, against that which is termed as *"stuck in Excels"* across the council organisation. This lack of available, mobilised data is noted by multiple respondents; particularly flagged by those in data scientist roles as an issue for getting hold of (material, tangible) data. There is also paper-based data (old) and data products such as algorithms, code, and models (new). The old approaches are beset with shortcomings, with multiple examples of inadequacy in data work. Respondents referred to not having the data they want – also termed information needed – in a timely way. This maps to the dominant 'data publication' outlook – just get the data and the value will follow - presented in the thesis framework in Chapter Three. It entails an oldness in tie to the pre-digital age with a view that data is a material entity, and lacks accommodation of the relational perspective where all data is associated with the acts of its creation, as preparatory and substantive activities.

Working in old ways is backwards looking and out of date, with respondents pointing out how by the time they receive collated data to analyse for their service area often several months had passed and sometimes more than a year. Sustainability development specialist Uu-4 told of how with current systems, even 10 years from the target date (interviewed in 2020) it is known that there will be lack of clarity regarding whether the council's NetZero targets were met by 2030 until 2031, or later, when the data is available. This makes responsive management of services impossible since problems cannot be officially known promptly due to data processes. However, where operational actors' accounts of intimate personal-professional knowledge about their day-to-day experiences are admissible as pre-information, as a knowledge-making component (individual TK) that supports the translation of data, there may be scope for service insights to be surfaced more rapidly.

Another attribute of old ways is where the data, or the data use, is analogue. However, respondents told of organised ledgers, tidy files in pre-digitalisation public service delivery, in opposition to bad habits in digital management, such as using email inboxes for file management – a personal repository almost. The point is to not conflate data with digital. There is more data now due to digitalisation (and digitisation) but there may not be more data use, particularly of the Function 2 leveraged data type. There is an excitement at the prospect of a 'free', valuable resource in data abundance, such as in government given their vast administrative data, but data does nothing itself. It is inert. It requires use.

Reporting, as a backwards-looking snapshot, gets denoted as old way of doing things; newness for reporting is that which enables reactivity and dynamic public service delivery, where Functions 1 and 2 connect. New data use is more for Function 2 purposes of generating insights applicable to public services delivery transformation. Many respondents and documents refer to proactive, reactive, bespoke, and predictive public services delivery. Old ways of working with data are too slow and not joined up to other departments, services, and teams. Old data is duplicated. New data embodies *"one source of the truth"* (as above). New ways of working with data leverage the digital real-time resource and permit reactive / responsive decision-making for public service delivery, as well as claims about faster and better policymaking and more targeted service provision. The linkage between reporting and discussions of what reports show is not reliably bound together and may not include sufficient scope for operational level workers to contribute to addressing the issues, or conceiving of alternative (new, innovative) approaches.

Data work of new types is also evident where data is sought to be interoperable, linked, and better joined-up across the organisation and other public service delivery entities, which may be partners from other sectors (third, private, etc.), aligning to the view of Digital Era Governance and many collaborating partners to address societal issues. Here, data work is forward-looking and predictive, permitting horizon-scanning and pattern spotting, mapping trends, and making the necessary analysis to discover what these patterns mean. For some respondents, reference was made to getting to know *"what the numbers are telling us"* (stated by both T-3 and Jj-8), as if data speaks for itself, and seeing a *"more complete picture"* (stated by both V-4 and D-3). Again, deference to the data itself is observable, diminishing the creative acts of making the picture using a range of sources, including data and experiential elements (tacit knowledge).

Also relevant for new ways of working for data are data science and digital capacities (including DDaT roles), including in 'STEM' and abilities to code and work with technologies that compute data. Furthermore, the skills for an intelligence function need an expansion on the usual (old) ways of working with data. Whilst recognition of service expertise and specialists' knowledge is important, such does not dismiss the inadequacy of slow data availability for operational staff. The requirements of formal reporting, with stringent processes for statutorily mandated reports to constitute the official government position on the service (or topic), is an under-appreciated component. Data gets collected and sent away and often does not come back, and if it does it may be in an aggregated form

(as a summary, overarching statistic) with reduced relevance for the geographic context of the council delivering its services on the ground level. This is not removed by moving to new ways of collecting data, or tools for its handling, since reporting will still be required. It is unclear if reporting requirements will adapt to the new technological possibilities since there will be political elements in play. This is apparent in Uu-4 comments regarding NetZero and general sustainability targets for the council and the geographic area it governs, comments about a *"double edged sword"* of real-time data where policy interventions do not work as intended or hoped; faster and more openly available data as the facts of the matter become a stick with which to beat the underperforming service provider, or council as a whole. Here is an example of how 'publication' perspectives where data is severed from service support in a direct, operational way undermines scope for data to enable PSDT.

Strategic data intelligence manager N-8, a dedicated full-time digital transformation employee based in Location Red, reflected on the sought-for new ways in data work intended to support the council in improving public services provision:

> *We are starting to think about the possibility of being able to predict what a service would look like moving forward and where there are likely to be blockages or issues. But that demands a different type of role, it's not just a 'putting numbers into a system', it's not just a 'reporting with hindsight', it is much more of a data intelligence function, and forecasting function which we don't currently have within the skillset. (…) data intelligence is a skill which involves not just looking at the numbers, but having the ability to research information, research background, to be able to go and horizon scan, look outside the organisation, look for comparators.*
> (N-8)

Alongside skills, and creative ability, from N-8's account, nurtured professional curiosity of the staff that constitute the data intelligence function is what will make the new system a success. This is evident in the comments about going off and researching, looking for comparators and in other comments when N-8 remarks about enquiring why numbers are so different across other councils, and not dismissing it as an anomaly but seeking to understand why. The problem is that there is scant time and often not the permission in the day job to do that sort of additional (not immediate public services delivery) work.

For those pressurised in their daily workloads, data and technology are referred to as being themselves the intelligence. There is an under-appreciation, by both public service delivery staff themselves and within human resource management, of the necessary activities in working with data to create the intelligence. In this way, the 'new' category is a conundrum

or paradox: data will guide the future, but only via use and the use space is conflated with the digital systems that will hold data and permit access or analysis tools.

8.3.2 Translating and Interpreting Data: Value, Quality, and Goodness

To achieve value, it is vital to move beyond detached markers and objective attributes of quality in data. The highest order of good data work is as usefulness to achieve actioned insights. It is advisable to unpack the concept of access to surface the necessary components for access – beyond the literal – and to scrutinise the limits of data availability. This will show the fallacy of the predominant publication worldview and repository preoccupation, including dashboards for managing public service delivery, and granting a public window to these. Seeking to strengthen data availability via publication distracts from the catalyst for transformation from data, i.e., meaningful use. This is also linked to seeking smart techniques for more streamlined, reactive management. It must be highlighted that certain societal problems, addressed by local governments and assuaged via public services provision, are vastly complex. A view of answers held in data is rife with limitations where what is 'good' requires normative framing and parameters to evaluate and confirm the goodness. In politics, there are balancing acts. It is necessary to be mindful and astute to who – or what – does the balancing, and how.

Sources for the creation of intelligence insights include a data user's work-related tacit knowledge and experience. This also occurs during instances of use for reporting, e.g., in creating a narrative about whichsoever data is in focus. However, the role for translation may be more restrictive for reporting if the datapoints, as specific KPIs and approved / required metrics, are mandated. Tacit knowledge and experience also contribute during preparatory phases, to determine what are the appropriate metrics. However, in some cases this comes down from 'above' (macro level), with weaker channels for operational level workers to influence or suggest more fitting or pertinent metrics that better represent what is happening at the street level. Greater alignment to micro-level use work increases scope for insights to be relevant, as actionable, and which may then be actioned.

The council organisation still seeks traditional work of local government service area (thematic) departments, teams, or individuals, drawing on whatsoever data and information sources might exist. Staff look 'in' reporting, or other applicable information sources, to improve public services provision. For instance, in poverty persistence, public servants

may explore accounts of poverty as lived experience (as their own sanctioned research exercise or via other credible partner organisations); or maybe delve into statistics on diet and lifestyle factors. Both sources are applied to broaden understanding and refine components of a poverty-alleviating policy or public service activity. These types of data use at work, aligning to Function 2, are necessary to continue the historical best practice of local government public service delivery work.

Assumptions are often made (whether explicit or implicit) by councils at the strategic and policy levels, then repeated by local government staff, that within data there lies pure, objectively true answers. This is misleading. Removal of data translators and interpreters is undesirable, unethical, and probably impossible. Whilst there has not overtly been removal of those who translate data through use acts, workers' low confidence in the contribution of the data work they do is a problem. Arguably, lack of attention at the organisational (macro level) to use types and variations (especially at the micro level) is perpetuating an undervaluation of data users' work. Thereby a muddled and uncertain data culture across Scottish local government prevails, which is inconsistent with varied data worker capability (covering more than data skills, influenced heavily by working environment).

8.3.3 Best Data Use

The ways new digital data and technologies catalyse intelligence work is only a part of, and adjunct to, how work is carried out. New opportunities from digital data and technologies do not nullify the need to construct insights destined for application in public services decision-making (both as policies and operational, delivery actions). Insights are the main value.

A key finding from my thesis is that most data workers in local government do not view themselves as data professionals. Data workers inconsistently, falteringly assign relevance and significance to their own data use in the workplace. Limited forms are seen as constituting data use types that satisfy the council and can achieve the transformational promise of data. In this way, expectations remain unachievable. Translative, interpretative data use work being frequently overlooked as a core part in bringing forth usefulness from data, used towards accomplishing actioned insights. An insight must necessarily be actionable – capable of actioning – as a precursor to being actioned, with 'potential to be actioned' requiring input from those who know the practice-based reality of micro-level operational activity. Public service operational staff delivering public services play a vital

yet under-acknowledged role highlighting granularity to allow insights to be made and assessed through the lens of use classification in public service delivery, and aspirational transformation.

Data does have a key role to provide evidence bases of good decision-making: a public service decision is good where it builds on a foundation in data, and the decision-maker collates that foundation by bringing relevant elements together, showing how this was done. Thereby, the decision is approved and trusted (even if some other decision was possible), and the trustworthiness of the use-enactor in handling the data that makes up the evidence is another key role – again, highlighting how data work is sociomaterial. Within the Sottish local government context, coinciding with broad data-embracing there is an apparent narrowness: data use that 'counts' (matters) is that which matches (only) the sort of new interactions and approaches with data in the digital age. Admissible data, sources, forms and handling or treatment, is changing – data work is a phenomenon in flux, with new ways needing to be reconciled with old. Presently, tension is observed.

8.4 Conclusion: Action Making Data Useful

This chapter unpacked the concepts of data and data use, building from the preceding chapters. This thesis argues there is inadequate regard to particular, varied uses of data, inadequately accommodating granularity, with related underappreciation for the socio 'human' element of work of gaining the usefulness from data. To address this, the thesis argues for greater attendance to and an emphasis on data uses within local government work. Before making decisions driven by data, many decisions are made about what data is admissible, i.e., relevant and applicable for the proposed application, or how to create new data for the topic at hand, and to translate data in relation to intentions from its usage. To repeat: data use includes decisive acts, by data use-enactors, determining the admissibility of specific data – named datasets or tangible data sources – for usage reasons directly pertaining to the tasks at hand. There is an integral role for subjective determination of utility by use-enactors in public service delivery work, necessitating space (as places and permission) for discretion and judgement during data use.

In the sections above, data and its use were discussed in linkage to factors found to influence realisation of six overarching data expectations that make up the promise of, and in, data. Interplay across the factors was described, exploring data and data use nuances.

From discussion of the factors, three issues shaping the data work culture are clear, which were presented at the start of the chapter in section 8.1.1. Interview excerpts throughout were offered to develop the discussion points and aid understanding.

Data is not a monolithic category, and neither is its use. This thesis highlights a quandary: varied – at times low – data worker confidence, in conjunction with an over-confidence in inert data. A narrow concept of newer data use is elevated above others, that of getting at / deriving insights from statistical data via new technology tools and computation available in innovative analytical techniques, recently popularised (especially in other sectors). In addition, there are goals of offering greater transparency from openly published datasets (promoted in open data and open government agendas and initiatives), leading to literally more available data but also shortcomings in tying these into public service delivery and potential transformation (improvement) of provision.

At the micro worker level, it has been shown how data as forms of use is made up of actors' data work practices to meet the requirements of the council. These requirements include broad demand for, with varied facilitation of, more data use at work. The concern lies in overlooking the types of data use being facilitated, and whether these inform and contribute to intentional, coherent public service delivery improvement efforts. How data is used in work does not necessarily match demands, not (only) because of a lack of data, inadequate skills, or a data-averse culture. Those shortcomings may exist; however, a blanket mandate on data in public service delivery work fails to draw out the multiple, varied ways that data is used in work processes, for divergent, and often unlinked, purposes of reporting and intelligence. This leads to data work that rather than being supportive, may undermine the achievement of transformational usefulness for public service/s delivery. Overall, there is variance in data worker confidence, and an over-confidence in data.

Chapter 9: Data Used, Usefully – Empowering Interpretative Communities

The thesis presents how the promise of data collides with data work practices. This chapter clarifies how my thesis addresses the central research aim: exploring Scottish local government data work culture, identifying key characteristics, and offering new knowledge for digital government. Below it is also clarified how the project addresses two intertwined sub-research questions, highlighting the supports and limits of transformational data use linked to public service delivery work.

A reminder is provided of the literature the study connects with and builds upon to advance knowledge in the chosen area of focus. There is a clear statement of the thesis's original contribution. Strengths, limitations, and future directions for the research are set out. Finally, a recommendation is offered on implications for data work policy at the local government level and data's role in public service delivery transformation (PSDT).

9.1 Summary of the Study

The concept of data use central to the study was developed from Redman's (2013) work on data quality management and builds on concepts from service-dominant logic. It evaluates value-in-use, moving away from the product perspective (Osborne et al., 2022; Lusch and Nambisan, 2015). Determination of value and usefulness as part of how work gets done sit at the crux of aspirational transformational data work. This transformation is what the thesis terms the data 'promise'.

Local government mandates to leverage data assets and achieve transformation muddle existing roles for acts in public service interpreting and translating data. Data is not knowledge or wisdom; it is a component thereof. There is both seen and unseen data use work. Councils may support certain forms of data work while under-enabling others in their public service delivery activities. Good data work and a strong culture of data use require more than data scientists or narrowly conceived Digital, Data, and Technology (DDaT) roles. However, prioritising transformation via data means certain forms of work may be viewed as better and more important.

The study highlights qualitative variance in the usefulness of data used in distinct ways. For instance, data can be used as material for a report or to defend a political stance. These two use types may be closely linked – a report can be a vehicle to make a political position – but they are not synonymous. For the public services delivery actors interviewed, their data usage varies depending on work requests they seek to fulfil with 'data use', that is, to make good on reporting attributes (often numeric amounts or measures), to better understand a public service issue, to refine delivery by some weighting of allocated operational parameters (often public satisfaction and cost), or to make a here-and-now decision. The difference is relevant since data use may be accomplished initially by gathering or making data and passing it along to senior staff national governments (Scotland or U.K.) and its agencies as reports. However, oftentimes, more useful data use permits greater intelligence in situ, derived from data's use pertaining to a question, problem, or theme for which the interpretation and 'use' can apply.

To evaluate the prevalent data work culture of Scottish local government, six councils in the Scottish central belt were selected as research locations (see Chapter Five for map). These were split into primary and secondary locations. In total, 41 respondents were drawn from the primary locations, covering three of the four biggest Scottish councils by population served. In total, 58 interviews were conducted with 55 respondents, totalling more than 62 hours of audio. These interviews form the bulk of the empirical data for the project, complemented by other sources, including a short survey and relevant policy documents and job descriptions, all of which were analysed to inform the exploration (see Table 4-4, Chapter Four, for data sources).

Specific service areas were not in focus. Instead, the emphasis was on how data is considered by respondents as available and relevant in their local government work environment and how data work is actioned via use in day-to-day public service delivery activity. Therefore, the study cast a wide exploratory net to then examine deeply the ways data work occurs across service areas. The project sought to handle the complex topic of data at a high level of conceptualisation and abstraction through a focus on practical data work at the level of public service delivery, rather than policies or strategies. This wholly new approach seeks to illuminate the rhetoric-reality gap by producing a new empirical basis to evaluate and understand the culture of data work.

The argument that over-attendance to data and under-attendance to the manner of its use has far-reaching applications in the digital age of data superabundance. There is a

persistent perspective that data is a core component of good decision-making. Data is a core component, but as this thesis has argued and shown, it is not the only part of decision-making: decisions entail choices and decision-makers. The public servants who handle data at the operational level are – alongside higher-level policymakers, legislators, advisers, and myriad political actors – a vital part of the interpretative communities for data used, usefully.

9.1.1 Exploring Data Work Within Digitalisation

In Chapter Two, an e-Government gap was identified pertaining to operational data work at local government level. The thesis advances knowledge by beginning to address that gap, by exploring data work culture within a broad landscape of (ongoing) public sector reform. Given the wide-ranging ways data is presented as the key to unlock value and accomplish wide public benefit, focusing on experiences of data workers is timely and important. The thesis describes data work culture through exploration of data work and data workers doing that work.

Public service delivery activities extend beyond a product conceptualisation of delivery of services to the public as unitary items, following scholarship on service logic and value co-creation (Lusch and Nambisan, 2015). Service science, applicable to local government study, should take the perspective of value co-creation and exchange beyond the market by providing a systems orientation that takes the issues out of the economic arena (Vargo and Lusch, 2008). The thesis has shown how perpetual 'business' framing contributes to the confusion identified in the operational local government workers as they seek to progress their public service delivery work, and what transformation means in the unique context of local government (which is not a business).

Review of e-Government literature identified a 'blind spot' in the nuances of operational data work at the local government level. This thesis advances knowledge by addressing this gap through an analysis of how local government data workers navigate transformation via digitalisation within ongoing public sector reform, still influenced by New Public Management (Osborne, Radnor, and Nasi 2013) and views of Digital Era Governance that seek to enable multiple actors to collaborate in meeting public needs. Given the portrayal of data as the key to unlocking value and achieving public benefit at the local government level (Malomo and Sena, 2016), focusing on the experiences of data workers is timely and important.

The e-Government literature also highlights a gap in broad digital literacy and capabilities of public sector staff concerning digital transformation and data usage, partly derived from the work of scholars Dawes (2009) and Hu (2021). This gap aligns with recent claims about the use of data for public service delivery transformation (Symons, 2016). Scholars like McBride and Draheim (2020) suggest that e-Government studies can benefit from viewing systems as complex and adaptive. This study places greater focus on the 'people' part, which Dawes calls *"human elements"* (2009), referring to government workers as service providers rather than the highly researched public (citizens) as service beneficiaries.

In addition to e-Government literature, the thesis draws on newer fields, such as Critical Data Studies (boyd and Crawford, 2012; Kitchin, 2014, 2021). Since the argument unpacks the role of discretion and knowledge in data translation and interpretation at the street level, the study connects to the work of Lipsky (1980). The topic of bureaucracy in the digital age merits more attention than this study could provide. Digital transformation is far-reaching, affecting government and all aspects of our lives. The topic is ripe for further consideration. More reflections on future research avenues are in section 9.2.3.

9.1.2 Addressing the Research Aim

The aim of the study was two-fold: first, to determine what characterises Scottish local government data culture; second, to investigate data work by identifying supportive or limiting elements pertaining to data use for public service delivery transformation (PSDT). The two similarly phrased sub-RQs allow for a holistic view (Meadows, 2008). Data use may be supported or limited as a mechanism for PSDT (e.g., organisationally or within a work team; catalysing data work). In turn, data use itself can be supportive or limiting. The intention is to avoid a linear, overly transactional approach to better investigate whether and how data work enables digital government transformation. Systems thinking accommodates interrelations and feedback loops. The same aspects can be supportive or limiting depending on their form and application. The organisation, here the local government council, operates to establish an environment within which data work occurs. The nuance between the sub-RQs is key to fulfilling the overall thesis aim of determining what characterises the culture of data work in Scottish local government. As shown in the problem statement in Chapter One and contextual Chapter Five, the goal of public service

delivery transformation is a major motivation for organisation-level data work in all councils. Therefore, PSDT was the context of data usage explored.

Chapter Six defined the data promise, highlighting six expectations of data related to improving the status quo. Chapter Seven explores the role of workers in different types of data use corresponding to a reporting or intelligence function. Chapter Eight discusses the core issues from the expectancy and pressure to increase *"better"* data work (following the *"better government"* goal of e-Government, OECD 2003), which resulted in tensions. 'Old' ways remain relevant in government institutions, given their role as protectors and enablers of public good. Furthermore, so-called 'old' ways that emphasise attention to data usage methodology and epistemology in knowledge-making (insight generating) processes – not only lauding 'the' data as a material artefact – will remain relevant in good (data) science.

Four factors: supporting data use

The cultural exploration sought to understand what supported or limited data work efforts. Supporting or limiting data use is a precursor to determining what data use might be most valuable in PSDT. Analysis of the project data revealed factors impacting the realisation of expectations at the heart of PSDT data work culture. The four salient factors identified either support or limit public service delivery transformation via data use in local government work. These are not simply a 'tick box' to construct an enabling environment for effective data work. The factors inter-relate, exist, and influence at varied levels in each unique instance. Their presence and manifestation in efforts to use data for PSDT further emphasises the necessity of paying close attention to the micro level of data work and workers to best support potentially transformational data use in public service delivery.

The study shows that precisely how data use may lead to transformation and improvements (or not) in public service delivery is under-considered. While Data and Technology constitute a salient factor in data use and achieving the expectations of the data promise, this alone is insufficient. At the individual staff level, factors such as Time (or lack thereof), Professional Curiosity (nurtured, encouraged, tolerated, disincentivised, absent), and Creativity (including data and digital skills) alternatively support or limit data use for PSDT across local government in Scotland. Together, these factors make up the capability for transformational data use in public service delivery.

Vague demands for data work are inadequate. Organisationally, at a strategic level, or from senior managers, there is a broad expectancy that operational-level public service workers build from and leverage data in their activities. There needs to be a specific understanding of what the work entails operationally and at what points in the process data can be drawn in and utilised. Another critical point is that data does not flatly provide answers, solutions, or courses of action without being interpreted by the actor. Data sources are chosen as admissible and evaluated concerning a problem or question, with the results (and possible courses of action) weighed and selected. These acts occur in the workforce, or, if coded algorithmically into an automated system, staff actions, individually or in teams, are necessary for this type of programming.

Data intelligence

Alongside identifying factors that support or limit data use in PSDT, the study sought to understand what type of data use supports PSDT. The finding is that data use for insights, or intelligence, is the most useful and supportive.

The thesis does not argue that data used for reporting purposes is not useful. Governments have a legislated requirement to undertake reporting. However, assuming data's existence ensures its use for transformational purposes is overly optimistic and simplistic. For example, putting data on an open data portal does not guarantee its usefulness for onward applications (Tetley-Brown and Klein, 2021). It is good practice to be open and transparent within government, but this is not always possible when handling vast personal data or data with security implications. Here, correlations exist with the 'open and reproducible science' agenda, which has progressed from an *"open by default"* mantra to *"as open as possible, as closed as necessary"*, to accommodate the necessity of keeping some data, both as sources and usage processes, more secure whilst protecting democratic ideals.

Governments hold a unique responsibility for the public good. Trust is the start and the end of satisfying the public and meeting their varied needs, often with opposed ideological preferences. This study has shown that pressure to be a better government, a foundational preoccupation in e-Government, has accompanied a preference for the quantifiable as a 'true' evidence base. Truth, as all philosophers know, is an elusive concept. If not 'true,' the public at least seeks to be provided for in a manner that authentically seeks the best outcomes. However, what is 'best' is shaped by values, requiring many decisions to be made at multiple levels within government as an organisation.

Below is a table showing the six objectives set and the conclusions of the study:

Table 9-1 Meeting objectives: conclusions of the study

#	Objective	Conclusion
1	Examine how data work occurs by determining the varied types of data use	Preparatory or Substantive, 'parameters for' or 'instances of' data use
2	Analyse the ways public service delivery work purpose/s influence/s the activities of data use within that work	Reporting versus Intelligence; also, as 'Publication' or as 'Service Support'
3	Identify the factors that support or limit data use (sub-RQ 1)	Six expectations constitute the data "promise" and then four practice-based factors operate in interplay to influence the accomplishment of that promise
4	Analyse the ways that different data uses link to public service delivery transformation (sub-RQ 2)	Function 2 (INTELLIGENCE) supports PSDT. Function 1 (REPORTING) merely supports the narrow goal of reporting. Reporting data use can be built upon and progress to become public-service relevant insights. Also, PSDT follows actionable and actioned insights.
5	Investigate the role of data workers as they undertake (varied) data use	Data workers are more in service of data and a data availability perspective; data 'supply' rather than demand at the internal/intra-organisational level (data supply may address external demand)
6	Explore commonalities in data work, through data use, to show key characteristics of local government data work culture	Uncertainty in what can be done and by whom, unevenness in worker experience, contradiction, paradox

Regarding objective six, which aligns with the overall thesis aim, the pressures of facilitating multi-partner contributions in digital-era governance to address societal challenges and contribute to public services provision corresponds with the 'publication' data-sharing view. A commonality across all research locations is the expectation of answers from leveraging data and the underappreciation of the socio-human element in doing so. Pressures to show proof and data-based evidence of 'right', optimal, correct public service choices elevate the role of data and may obfuscate the interpretative efforts of data workers.

9.2 Original Contribution

The main original contribution of the thesis is the exploration of the promise of data use, defined as six expectations, evaluated in relation to on-the-ground practices by local government staff. The study places the data use concept in relation to data (as an artefact) and undertakes a sociomaterial exploration. Using a conceptual framework of data use, acknowledging that data work is bound up in the contexts of its uses, the study offers the beginnings of a data use classification system sensitised to data's in-use value for public service delivery transformation. This transformation is understood as an improvement in the provision of services to the public – a foundational duty of local government.

The data artefact was addressed both materially and abstractly, covering various ways data is referred to by those immersed in data work across the research locations. The role data plays in enabling something to be known by a data user is at the heart of the thesis; in a sense, this is about the 'epistemology of data'.

The study sought to explore a liminal, transition space in data work: starting with 'data' and aiming for 'transformation' of public service delivery. What happens in between? Who does what, how - and why?

Figure 9-1 Data (use) towards PSDT
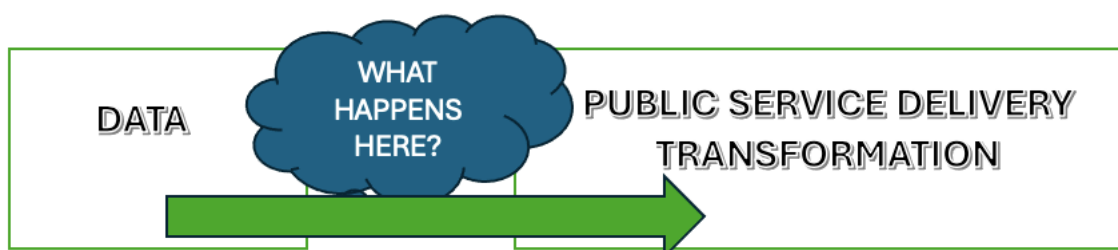
The thesis questions the perspective that smartness and being – or seeking to be – data-driven inevitably or linearly enables the improvement of public service delivery to accomplish sought-after transformation (as improvement, for better government) at the local level. Local government council organisations authorise and obligate data usage in varied ways, resulting in varied usefulness of data. Certain fundamental imperatives compel the organisation to pursue types of data use, which can be simplified to either a reporting or an intelligence function.

There are ways a reporting function can feed back to constitute an intelligence function, but the study found that these functions are predominately separate. While the same actors

(staff) may progress the two functions, data use within these functions is not reliably interconnected. Data use that occurs in acts of reporting links to the conceptual framework of data for 'Publication' with a more detached view of data as a discrete, material entity. Alternatively, data use occurring as acts of operational public service delivery via data used for 'Service Support' entails a subjective assessment of utility in an operational context. The former has a more detached, objective view of data, including its existence and usage; the latter holds space for subjectivity in context-sensitive determination of utility (or usefulness) as meaningful, valuable use in substantive quality-related measures of improvement in public service delivery, that is, transformation.

Overemphasis on data and under-attention to the use of data have resulted in an uneven culture of data work. While there are pockets of interesting and fruitful activity, there is also confusion and under-confidence across the workforce. Reconciliation of old data work approaches with new opportunities and expectations is needed to better understand practices and advance data work in a more methodical, reliable manner. Most significantly, the workforce should be better empowered to undertake work with data that allows them to pursue professional curiosity and contribute their public service specialism, both thematically in service areas and as public servants, in leveraging value from data. Where professional curiosity is absent, efforts should be made to understand why and how to improve job satisfaction, building a stronger, more capable workforce. This was highlighted via the two personas that showed how data work can be of varied usefulness and value related to goals of transformation (understood as improvement) of public service delivery.

9.2.1 Limitations

While public service delivery provides parameters for the research, the study was not designed to comment on whether transformation has occurred by specific metrics. Instead, the analysis addresses staff's practice-based experiences in data work within their organisations. The inclusion of many different services in the research allows for a broad view of local government data work and its characteristics but negates the possibility of evaluating specific services. This approach means the research is wide in its view of data work as a phenomenon, then narrow and deep in conceptualising 'data' through the lens of its uses in the local government setting.

In each primary research location, there are 11, 14, and 16 respondents, respectively. However, the numbers from each service are low, meaning that respondents' comments related to their thematic area have a small sample size. This was accommodated by ensuring that the analysis remained at the level of data work broadly, avoiding any verdict on thematic services themselves.

Since the main finding of the thesis is that sensitivity to micro-level work and specific contexts is imperative, the study may be critiqued for not doing that. In response, future research building on these findings should explore the classification system in depth within thematic service parameters. The study indicates that there may be distinct perspectives of data across thematic areas. For example, staff from Education seemed more flexible and pragmatic about advancing their data work, often seeking to do that work 'offline' in more analogue ways, not conflating data's value with digital forms.

Another limitation is that this thesis does not provide an exhaustive account of participants' experiences: many insights could not be included. The study does not attend to linkages to other data workers beyond internal local government staff, especially in public-private partnerships highlighted in contextual Chapter Five. Also, the pre-interview survey elicited details about respondents' length of time in local government and their work histories in other sectors. Time and research choices precluded further exploration of how these aspects connected to perspectives of data use and usefulness, which would be good avenues for future research.

The thesis has only scratched the surface of the vast types of data use occurring across the multitude of public services, given the breadth of activity progressed – and statutorily mandated – at the local government level. The study's articulation of preparatory versus substantive data work, the two data use functions, and the six expectations that constitute the overall data promise alongside the factors that influence their realisation, are helpful in continuing research about data work culture within governments and beyond.

A final, somehow 'meta' limitation of this thesis relates to it being a data-driven, inductive project. Although inductivism, being data-driven and hypothesis-less using big data in science, has weaknesses (Fricke, 2015), the inductive approach is more common in Sociology (Gorski, 2004) and is needed to explore the 'data' topic (Kitchin, 2014).

9.2.2 Strengths

A major strength of the study is its focus on how local government staff experience calls to increase or change their data use in day-to-day activities at the operational level in public service delivery. As emphasised from the outset in Chapter Two, e-Government research has largely focused on how service recipients experience public provision. Additionally, in academic outputs about smart cities, topics such as governance are popular, attending to inter-relations between multiple partners or stakeholders. Internal intra-relations within local governments and experiences at the 'back office' that go beyond procedural aspects to examine how work occurs in practice are under-researched areas. Therefore, the thesis makes a significant empirical contribution to e-Government or the 'digital government transformation' topic.

To date, more attention has been paid to data than to the subtleties and particularities of specific uses, such as typologies of use. This can be viewed as a transactional and shallow perspective of data and its value, seeming to stem from the 'material' artefact itself with underappreciation of the 'sociomaterial' acts of making usefulness and value in, from, or with data for particular purposes. The study's attention to the socio-dimension of data in use is another strength. Scope to take a deeper view of data and associated value in local government work practices comes from the interdisciplinarity of the research. The research was intentional about drawing from several academic fields of knowledge, such as IS and PA alongside Urban Studies for the 'smart cities' topic, and STS with Critical Data Studies too. Additionally, I gave close attention to the pragmatic aspects of government as a 'live', evolving genre with significant real-world application. The interdisciplinary nature of the research is itself an important original contribution, befitting the core literature of e-Gov with its own inherent interdisciplinarity. Drawing on multiple disciplines enabled the research to offer significant new insights on the data work topic, since I ensured the necessary academic rigour and addressed the problem area creatively. The research's interdisciplinarity gives a strong foundation, to build upon vast knowledge from thinkers and researchers in varied, apposite, areas of focus across academic and practice.

The study's focus on operational activities rather than policies is also significant. There is less research at the operational level, especially that which is not primarily concerned with technical considerations in literal (practical) service delivery, but rather on conceptual topics that encase practical, operational work. Future research could tie into policy research and explore how policymaking, implementation, evaluation, and improvement cycles

interface with the operational activities of staff whose primary role is in public service delivery.

While the project looked at Scottish local governments, the findings are likely to resonate in other geographic settings, certainly within the wider U.K. and beyond. The specifics of public service data work and the nuances of the public services delivered vary in different countries and governmental settings. However, the need for micro-level insight about what is being sought from data regarding goals of improvement for public services and their delivery will apply universally. Additionally, the differentiation between preparatory and substantive data work, alongside the two data use type functions – reporting and intelligence – transcends geography and perhaps even sector.

9.2.3 Future Research

The following subsection describes avenues for continuing the research to strengthen findings from the study by connecting to other pertinent areas of research.
The genesis of the research was the pursuit of better government, a core concern of e-Government, through the emergence of the internet and its more recent components, with digitalisation and digital transformation expansion in the age of datafication. Many literature areas could shed light on the topic. For example, the local government data work culture topic would benefit from connections to decision-making science literature and that on knowledge management.

Further development of the data use classification and the concept of data epistemologies would be a ripe area for research. Future work could start this in conjunction with the usefulness scale (supported-supporting/limited-limiting, in Chapter Seven) and closely examine granular data use acts. Connecting this to the personal-professional (training, qualification, work) histories of data workers as use-enactors would be interesting and allow some threads of the study to continue. This research could be linked to studies on knowledge economies and older, seminal work on the information society (Castells, 1997).

Related to the data worker theme, further research on linkage to DDaT roles with plans to re- and up-skill the civil service (and all public servants) while retaining linkage to the 'Seven Principles of Public Life' (also known as the Nolan Principles[88]), is important as

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[88] The Nolan Principles: https://www.gov.uk/government/publications/the-7-principles-of-public-life/the-7-principles-of-public-life--2

government navigates the disruptions from digitalisation while maintaining the social contract (see: Hobbes, Locke, and Rousseau). The foundational work of Max Weber could also be further explored in conjunction with data work in the context of digital transformation goals and data superabundance.

The study explicitly focused on operational activities and did not delve into policy research (though it did analyse policies). Future work could examine the policy dimension and explore 'policy capacity'. For instance, it could examine different employee categories, such as pragmatists, formalists (those who stick to rules and regulations or past organisational practices about data), and integrators, among others. Employees could be categorised so that different training programs for each group could be recommended to enhance policy capacity[89] and implementation for public service delivery transformation.

9.2.4 Recommendations for Practice

The high-level recommendation from this research is to attend to the granularity of data uses, which will enable a better understanding of data work culture, particularly from the stance of workers. It is advised to start by asking why data is collected, investigate how specific data is used in literal, operational contexts, and determine its purpose. This approach will help advance data activities for public service delivery transformation. Elevating the role of public service experts, recognising their vital thematic specialism, in partnership with data scientists increases the likelihood that data work has a positive transformational impact, better meeting public needs. Further lessons and actions are now offered. These are addressed to all those working in and in relation to local government, and those tasked with setting national policies or strategic vision for the data use topic.

Three critical lessons for local government practitioners, including managerial staff

1. **Prioritise Contextualised, Purpose-Driven Data Use**

Data should be created and curated to then be used with clear understanding of its relevance to specific public service goals and intended transformation. Local government will benefit from a shift from accumulating data to instead focusing on ways to facilitate

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[89] Possible starting reference: Ansell, C. K., Comfort, L., Keller, A., LaPorte, T., & Schulman, P. (2021). The loss of capacity in public organizations: A public administration challenge. *Perspectives on Public Management and Governance*, *4*(1), 24-29.

meaningful, contextually-informed data uses that align with service delivery needs, enabling data to provide actionable (and actioned) insights tied to those specific activities.

2. **Invest in Staff Capability and Empowerment**

Effective data use requires not just technology (and data) but also skilled, empowered staff. Senior practitioner staff in management roles must build enabling environments where all service delivery staff have time, training, and support to engage creatively with data, applying their expertise to interpret data insights within varied local contexts for public services delivery. This includes revising job roles to formally recognise and incentivise the multitude of data-related tasks across the data work ecosystem.

3. **Adopt a Sociomaterial Approach to Data**

Recognition that data alone does not generate solutions is imperative; data must be actively interpreted to be made relevant by experienced staff as the interpretative communities for data's use/s. Practitioners should view data as part of a larger, dynamic process involving human judgment and local knowledge. This will help bridge gaps between data's potential and its practical impact on public service transformation within local government work.

Below, five practical actions are presented to help achieve the benefits and opportunities that accompany a stronger data work culture, through catalysing effective data use.

Five actions to strengthen the data work culture across the full ecosystem

(i) *Encourage Professional Curiosity and Critical Thinking:* Promote a culture of curiosity by giving staff flexibility to explore, interpret, and apply data insights. This includes providing space (and permission) for creative problem-solving, allowing a broad view of data workers and ways they apply their unique expertise to public service transformation tasks. This will elevate staff confidence in their data work professionalism.

(ii) *Focus on Practical Applications Over Data Abundance:* Move beyond increasing the literal availability of data. Instead, prioritise actionable insights that directly support public service delivery, focusing on data's utility for specific needs rather than data existence and volume alone. Applying data governance techniques, such as Master Data Management and clearer curation of data sources with their intended purposes will help.

(iii)   *Provide Time and Resources for Data Training and Skill Development*: Allow staff sufficient time and resources for training in data skills, data literacy (not only digital data literacy), and application of various digital tools. This will help employees leverage data effectively, build their confidence in varied data-related tasks, and increase in-work motivation. New data training should expand beyond dominant, narrow views of data science, to acknowledge and accommodate the multitude of roles needed. This will increase worker confidence and understanding in the many ways to be a data professional.

(iv)   *Prioritise Intelligence-Driven Data Uses Over Basic Reporting*: While reporting is necessary, it is important to prioritise the creation and use of data to generate the insights and intelligence that will inform actual decision-making. This can better support public service goals and help achieve positive transformation for public services. This connects to action (ii) above, where clearer data management will help, but also requires recognition of both formal and informal data sources and uses, where service specialists draw in their innate knowledge to gain value; to interpret and make data useful.

(v)   *Support Cross-Departmental Collaboration for Data Initiatives*: Collaboration between departments, as well as between operational and corporate teams, ensures data projects align with operational needs of different public services. This encourages shared understanding of data's role/s, better reflecting multiple interpretative communities for data use in council - and societal - outcomes, to enable more unified, joined-up approaches to public service transformation.

Implementing these recommendations will help empower local governments and workers therein, across the full public service delivery ecosystem, to build a robust, effective data work culture that aligns data practices with public service goals. Increased in-work confidence with data will follow mechanisms that grant greater agency and trust for staff whose public service specialisms enable data use to achieve transformation.

9.3 Conclusion: An Uneven and Uncertain Culture of Data Work

The thesis concludes by outlining key characteristics of the Scottish local government data work culture. It is a working environment in conflict and transition, with data skills of varied usefulness. The culture of data work shows prevalent under-attention to the nuances

and granularity of data use. Vague, unspecific purposes for data contribute to public service delivery actors being at cross purposes, such as those seeking more insights for better services (effectiveness) or fast monetary savings (efficiency). Since the promises of data are ill-aligned with the realities of data work practices, there are many accounts of confusion and contradiction. Imprecise definitions in policy and strategic documents, job descriptions, and general instructions received by operational staff contribute to a muddled data work environment.

To get value from data, there needs to be an effort to privilege value from data, not just privilege 'data' itself. As the thesis has shown, the value and usefulness of data in public service delivery work depend on the purposes for using the data. If the substantive instance of data use is to report, then that value is achieved when the report is made. The onward usage of data after the report is a qualitatively distinct act, serving the different purposes of generating intelligence and acting on insights. Local governments, being data-driven, need to leverage data (Symons, 2016; Malomo and Sena, 2016). Leveraged data occurs when data insights are applied in a 'problem' use-case context, with the necessary subjective determination of utility and subjective (normative) interpretations in translating 'the' data. This is best undertaken in specific, public service-linked ways, not abstractly, such as in strategic imperatives or as a policy for a better manner of working. Ultimately, the thesis shows how data use for public service delivery transformation is most useful pertaining to the generation of intelligence insights directly linked to Service Support.

My research has shown a tendency to conflate broad data-related efforts with data use, where the latter encompasses the capability to derive actionable insight from data and noting the difference between insight and action that follows from the insight. Value from data needs to be determined in use contexts, linked to the purposes and acts of data use. In the local government setting, data value is centrally related to public service delivery. These can be 'units' of service in a tangible way, such as waste management, democratic participation, health, and education, among others. Public service delivery can also refer to work in service to the public. In accounting for their work, local government staff convey a commitment to both aspects: the day-to-day tasks of particular services they help provide and the broader matter of meeting the public's needs. The usage of data is multi-layered and complex in this picture.

Even with pockets of good practice, the identified core issues (Chapter Eight) show how the worker teams within local government organisations are not coordinated. Where certain

special, opportunistically enabled few are permitted - and trusted - to do the 'new' type of sought-after (transformational) public service-linked data use, this may destabilise good work elsewhere. Paradoxically, good new ways of working with data, being progressed in small flurries of innovation occurring in secured spaces, may be unable to be mainstreamed as a novel, desirable status quo. This is especially true where resentment and exhaustion are rife due to inconsistency, overwork, and under-appreciation of specialist abilities. And where data is consistently the elevated element, the organisation undermines its scope for use across departments or teams of service specialists.

Being data-driven requires space for translating data into information that is pertinent and applicable in the use context. Among changing roles, there is inconsistency. Some are bolstered to greater data work usefulness, such as in teams assigned to explore clear 'problems' and offer solutions. The success of these efforts is greatest when the service area is well-engaged and involved as an equal partner. Insights from the process are both actionable and actioned, leading to potential improvements in public service delivery. However, many other staff are not afforded the nurturing of their specialism, particularly when answers are sought from data viewed materially, deemed to hold untapped innate value. There is still a need for use-enactors in data work to be trusted to apply their bureaucratic discretion to achieve usefulness and make data work meaningful in context.

Focusing on 'data' in a material sense, rather than on 'data use' – where data is translated and made useful sociomaterially – undermines the scope of derived value for public service delivery transformation by data workers in Scottish local government. Thus, the promise of data, understood as six overarching expectations of data, is thwarted.

9.4 Final Reflection

Data professionals need space – trust and permission – to work accountably, but not always fully in the open. The idea that judgement and discretion can be eliminated, whether through overt intention or societal trends towards the numeric and quantifiable, or the qualitative evaluated through the sanctity of technology, is greatly problematic. Public service will always occur at the street level and, in diverse, plural societies, will entail balancing acts in decision-making. Digitalisation and digital transformation must accommodate that reality.

The goal of digital transformation in government is complex. As an organisational entity, governments have a coordinating role in governance to enable multiple partners to cooperate in meeting societal needs. However, no matter how many partners or stakeholders collaborate to create a better society, only the government has the philosophical underpinning to serve the public and the mandate to enable a better society for all. This constitutes the 'social contract'. The thesis findings support other data work and digital government researchers in calls to embrace context and complexity (Loukissas, 2019; Castelnovo and Sorrentino, 2018, 2024), and the empowerment of interpretative communities is vital. The first step is closely attending to the operational work public servants do and providing them with more support.

As a final remark, recent calls by the United Nations University's Centre for Policy Research about needing a 'decade for data' (Porciuncula, 2023) resonate. In the near future, regard should be paid to concepts like 'data pollution', referring to wasteful data creation and usage; data of immediately degraded quality. Data of questionable worth will become more profuse as the usage of AI tools expands, also with significant environmental impacts through greater natural resource and energy usage. The thesis has argued that attendance to data is only one aspect and not all data is useful: interpretative communities for data use determine the value of data in context-specific applications. Actioning intelligence insights derived from data work needs potential applications to be operationally possible and within the capabilities of public service delivery actors; capabilities that extend beyond data skills to encompass public service skills too, all within an enabling organisational environment. Digital transformation is a human project, and better government is a qualitative, value-based matter. Taking an evidence-based approach is important, rather than a data-driven one. Thereby, accommodating subjectivity and normativity to determine the quality of selected indicators, to qualify and define what is measured, is imperative. In the end, data and digital technology are tools, and what matters is how these are used.

References

Abraham, R., Schneider, J., and Vom Brocke, J. (2019). Data governance: A conceptual framework, structured review, and research agenda. *International journal of information management, 49*, 424-438. https://doi.org/10.1016/j.ijinfomgt.2019.07.008

Aitken, M., Porteous, C., Creamer, E., and Cunningham-Burley, S. (2018). Who benefits and how? Public expectations of public benefits from data-intensive health research. *Big Data and Society, 5(2)*, 2053951718816724. https://doi.org/10.1177/2053951718816724

Albert, A., Balázs, B., Butkevičienė, E., Mayer, K., and Perelló, J. (2021). Citizen social science: New and established approaches to participation in social research. Chapter 7. In: Vohland K. et al.(Eds). 2021. The Science of Citizen Science. Springer. pp: 119-138. https://doi.org/10.1007/978-3-030-58278-4

Andrews, L. (2019). Public administration, public leadership and the construction of public value in the age of the algorithm and 'big data'. *Public administration, 97(2)*, 296-310. https://doi.org/10.1111/padm.12534

Arrieta, T. (2022). Austerity in the United Kingdom and its legacy: Lessons from the COVID-19 pandemic. *The economic and labour relations review, 33(2)*, 238-255. https://doi.org/10.1080/01900692.2016.1242619

Assaf, A., Troncy, R., and Senart, A. (2015). HDL - Towards a harmonized dataset model for open data portals. PROFILES 2015, 2nd International Workshop on Dataset Profiling and Federated Search for Linked Data, Main Conference ESWC15, 31 May-4 June 2015, Portoroz, Slovenia. http://www.eurecom.fr/publication/4543

Audit Scotland. (2021). 'Digital Progress in Local Government' https://audit.scot/uploads/docs/report/2021/nr_210114_digital_progress_lg.pdf [accessed 10-04-24]

Aurigi, A., and Odendaal, N. (2022). From "smart in the box" to "smart in the city": Rethinking the socially sustainable smart city in context. In *Sustainable Smart City Transitions* (pp. 53-68). Routledge. https://doi.org/10.1080/10630732.2019.1704203

Barad, K. (1998). Getting real: Technoscientific practices and the materialization of reality. *Differences: a journal of feminist cultural studies, 10(2)*, 87-91. https://doi.org/10.1215/10407391-10-2-87

Barad, K. (2003). Posthumanist performativity: Toward an understanding of how matter comes to matter. Signs: Journal of Women in Culture and Society. https://doi.org/10.1086/345321

Barad, K. (2007), Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning.

Bannister, F. (2015). Deep e-government: Beneath the carapace. In E-government: Information, technology, and transformation (pp. 49-67). Routledge.

Bannister, F. (2019). From Informatisation to e-Government and Beyond. In: Ongaro, E. (eds) Public Administration in Europe. Governance and Public Management. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-319-92856-2_11

Bannister, F., and Connolly, R. (2020). The future ain't what it used to be: Forecasting the impact of ICT on the public sphere. *Government Information Quarterly, 37(1)*. https://doi.org/10.1016/j.giq.2019.101410

Bannister, F., and Connolly, R. (2015). The great theory hunt: Does e-government really have a problem? *Government Information Quarterly, 32(1)*, 1-11. https://doi.org/10.1016/j.giq.2014.10.003

Barrutia, J. M., and Echebarria, C. (2021). Effect of the COVID-19 pandemic on public managers' attitudes toward digital transformation. *Technology in Society, 67*, 101776. https://doi.org/10.1016/j.techsoc.2021.101776

Bates, J., Lin, Y. W., and Goodale, P. (2016). Data journeys: Capturing the socio-material constitution of data objects and flows. *Big Data and Society, 3(2)*. https://doi.org/10.1177/2053951716654502

Baxter, J., and Eyles, J. (1997). Evaluating qualitative research in social geography: establishing 'rigour' in interview analysis. *Transactions of the Institute of British geographers, 22(4)*, 505-525. https://doi.org/10.1111/j.0020-2754.1997.00505.x

Berger, P., and Luckmann, T. (1966). The reality of everyday life. *The social construction of reality: A treatise in the sociology of knowledge*, 33-42.

Beer, D. (2016a). Metric power (Vol. 10). London: Palgrave Macmillan.

Beer, D. (2016b). How should we do the history of Big Data?. *Big Data and Society, 3(1)*, 2053951716646135. https://doi.org/10.1177/2053951716646135.

Bekkers, V. (2011). Is there a future of e-government: Looking beyond the explanatory emptiness of the e-government concept, Paper Presented at the European Group of Public Administration Conference, Bucharest, Romania

Belanger, F., and Hiller, J. S. (2006). A framework for e-government: privacy implications. *Business process management journal, 12(1)*, 48-60. https://doi.org/10.1108/14637150610643751

Bell, E., and Smith, K. (2022). Working within a system of administrative burden: How street-level bureaucrats' role perceptions shape access to the promise of higher education. *Administration and Society, 54(2)*, 167-211. https://doi.org/10.1177/00953997211027535

Bellamy, C., and Taylor, J. A. (1994). Introduction: Exploiting IT in Public Administration-Towards the Information Polity?. *Public Administration, 72(1)*, 1-13. https://doi.org/10.1111/j.1467-9299.1994.tb00996.x

Bertot, J. C., Gorham, U., Jaeger, P. T., Sarin, L. C., and Choi, H. (2014). Big data, open government and e-government: Issues, policies and recommendations. *Information polity, 19(1-2)*, 5-16. https://doi.org/10.3233/IP-140328

Beshi, T. D., and Kaur, R. (2020). Public trust in local government: Explaining the role of good governance practices. *Public Organization Review, 20*, 337-350. https://doi.org/10.1007/s11115-019-00444-6

Block, E. S., and Erskine, L. (2012). Interviewing by telephone: Specific considerations, opportunities, and challenges. *International journal of qualitative methods, 11(4)*, 428-445. https://doi.org/10.1177/160940691201100409

Borup, M., Brown, N., Konrad, K., and Van Lente, H. (2006). The sociology of expectations in science and technology. *Technology analysis and strategic management, 18(3-4)*, 285-298. https://doi.org/10.1080/09537320600777002

Borrás, S., and Edler, J. (2020). The roles of the state in the governance of socio-technical systems' transformation. *Research Policy, 49(5)*, 103971. https://doi.org/10.1016/j.respol.2020.103971

Bouvens, M., and S. Zouridis. (2002). From Street-Level to System-Level Bureaucracies: How Information and Communication Technology Is Transforming Administrative Discretion and Constitutional Control. *Public Administration Review 62(2)*: 174–84. https://doi.org/10.1111/0033-3352.00168

boyd, d., and Crawford, K. (2012). Critical questions for big data: Provocations for a cultural, technological, and scholarly phenomenon. *Information, communication and society, 15(5)*, 662-679. https://doi.org/10.1080/1369118X.2012.678878

Braun, V., and Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology, 3(2)*, 77-101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., Clarke, V., and Weate, P. (2016). Using thematic analysis in sport and exercise research. In *Routledge handbook of qualitative research in sport and exercise,* pp. 213-227. Routledge.

Brown, D. M. (1999). Information systems for improved performance management. Developing approaches in U.S. Public agencies. In Heeks 'Reinventing Government in the Information Age: International Practice in IT-Enabled Public Sector Reform'.

Brown, L., and Osborne, S. P. (2013). Risk and innovation: Towards a framework for risk governance in public services. *Public Management Review*, *15*(2), 186-208. https://doi.org/10.1080/14719037.2012.707681

Bryman, A. (1988) Introduction: 'Inside' accounts and social research in organisations. In Bryman, A. (ed.) Doing Research in Organisations. London: Routledge, pp.1-20

Bryman, A. (2012) Social Research Methods (Fourth Edition). Oxford: Oxford University Press

Bulmer, M. (1988). Some Reflections upon Research in Organizations, In Bryman, Alan (Ed.), 1988, pp. 151-161.

Burgess, R. (1984), In the Field, An Introduction to Field Research, London, Allen and Unwin. https://doi.org/10.4324/9780203418161

Castells, M. (1997). An introduction to the information age. *City, 2(7)*, 6-16. https://doi.org/10.1080/13604819708900050

Castells, M. (1996) The Information Age - Economy, Society and Culture, Oxford: Blackwell Publishers. Vol.I: The Rise of the Network Society. xvii + 556 pp. Vol.II: The Power of Identity (1997), xv + 461

Castelnovo, W., and Sorrentino, M. (2018). The digital government imperative: a context-aware perspective. *Public Management Review, 20(5)*, 709-725. https://doi.org/10.1080/14719037.2017.1305693

Castelnovo, W., and Sorrentino, M. (2024). Public sector reform trajectories: A complexity-embracing perspective. *Public Money and Management*, *44*(2), 165-173. https://doi.org/10.1080/09540962.2022.2117894

Cain, P. (2001). Automating personnel records for improved management of human resources. Reinventing government in the information age, pp. 135-155. Routledge.

Cecez-Kecmanovic, D., Galliers, R. D., Henfridsson, O., Newell, S., and Vidgen, R. (2014). The sociomateriality of information systems. *MIS quarterly, 38(3)*, 809-830. https://doi.org/10.25300/MISQ/2014/38:3.3

Chadwick, A. (2009). Web 2.0: New challenges for the study of e-democracy in an era of informational exuberance. *I/S: a Journal of Law and Policy for the Information Society, 5(1)*, 9-41.

Chadwick, A., and May, C. (2003). Interaction between States and Citizens in the Age of the Internet: "e-Government" in the United States, Britain, and the European Union. *Governance*, *16*(2), 271-300.

Chafe, W. (1995). Adequacy, user-friendliness, and practicality in transcribing. In G. Leech, G. Myers, and J. Thomas (Eds.), Spoken English on computer: Transcription, mark-up, and application (pp. 54—61). Harlow, England: Longman.

Chandler, J. A. (2008). Liberal justifications for local government in Britain: The triumph of expediency over ethics. *Political studies, 56(2)*, 355-373. https://doi.org/10.1111/j.1467-9248.2007.00700.x

Chang, A., and Brewer, G. A. (2023). Street-Level bureaucracy in public administration: A systematic literature review. *Public management review, 25(11)*, 2191-2211. https://doi.org/10.1080/14719037.2022.2065517

Christensen, T., and Lægreid, P. (2022). Taking stock: New Public Management (NPM) and post-NPM reforms-trends and challenges. *Handbook on the politics of public administration*, 38-49.

City of Edinburgh Council. (2014). 'Strategy for Open Data'. https://www.edinburgh.gov.uk/downloads/file/26245/strategy-for-open-data [accessed 12-06-24]

Clark, D. (1996). Open Government in Britain: discourse and practice. *Public Money and Management, 16(1)*, 23-30. https://doi.org/10.1080/09540969609387905

Clarke, V., and Braun, V. (2017). Thematic analysis. T*he Journal of Positive Psychology, 12(3)*, 297–298. https://doi.org/10.1080/17439760.2016.1262613

Cleary, M., Horsfall, J., and Hayter, M. (2014). Qualitative research: quality results?. *Journal of advanced nursing*, 711-713. https://doi.org/10.1111/jan.12172

Couldry, N., and Mejias, U. A. (2019). Data colonialism: Rethinking big data's relation to the contemporary subject. *Television and New Media, 20(4)*, 336-349. https://doi.org/10.1177/1527476418796632

Coursey, D. and Norris, D. F. (2008). Models of E-Government: Are They Correct? An Empirical Assessment. *Public Administration Review 68(3)*: 523-536. https://doi.org/10.1111/j.1540-6210.2008.00888.x

Cresswell, M. J. (1994). *Language in the world: a philosophical enquiry*. Cambridge: Cambridge University Press.

Crouch, M., and McKenzie, H. (2006). The logic of small samples in interview-based qualitative research. *Social science information, 45(4)*, 483-499. https://doi.org/10.1177/0539018406069584

Cullen, R. (2010). Defining the Transformation of Government. *Advances of Management Information Systems, 17*, 52.

Data Driven Innovation. (no date). https://ddi.ac.uk [webpages] [Accessed 30-06-24].

Dawes, S. S. (2009). Governance in the digital age: A research and action framework for an uncertain future. *Government Information Quarterly, 26(2)*, 257-264. https://doi.org/10.1016/j.giq.2008.12.003

Deakin, M. (2014). Smart cities: the state-of-the-art and governance challenge. *Triple Helix, 1(1)*, 1-16. https://doi.org/10.1186/s40604-014-0007-9

Denscombe, M. (2017). EBOOK: The good research guide: For small-scale social research projects. McGraw-Hill Education (UK).

Denzin, N. and Lincoln, Y. (eds) (1994) Handbook of Qualitative Research. Thousand Oaks, CA, Sage.

Deleuze, G. and Guattari, F. (1994), What is Philosophy? Trans. Hugh Tomlinson and Graham Burchell. Columbia University Press, New York. https://doi.org/10.2307/431089

Dreyfus, H. L. (2007). Why Heideggerian AI failed and how fixing it would require making it more Heideggerian. *Artificial Intelligence, 171(18)*, 1137–1160. https://doi.org/10.1016/j.artint.2007.10.012

Dundee City Council. (2017). 'Council Plan 2017-2022'. https://www.dundeeandanguschamber.co.uk/news/article/4906/council-plan-2017-2022 [Accessed 12-06-24]

Dundee City Council. (2018). 'Changing for the Future'. https://www.dundeecity.gov.uk/reports/reports/223-2018.pdf [Accessed 12-06-24]

Dunleavy, P., Margetts, H., Bastow, S., and Tinkler, J. (2006). New public management is dead—long live digital-era governance. J*ournal of public administration research and theory, 16(3)*, 467-494. https://doi.org/10.1093/jopart/mui057

Eagle, R., Jones, A., and Greig, A. (2017). Localism and the environment: A critical review of UK Government localism strategy 2010–2015. *Local Economy, 32(1)*, 55-72. https://doi.org/10.1177/0269094216687710

Edwards, R., and Holland, J. (2013). What is qualitative interviewing? (p. 128). Bloomsbury Academic. https://doi.org/10.5040/9781472545244

Eom, S. J., and Lee, J. (2022). Digital government transformation in turbulent times: Responses, challenges, and future direction. *Government Information Quarterly, 39(2)*. https://doi.org/10.1016/j.giq.2022.101690

Erasmus, E. (2014). The use of street-level bureaucracy theory in health policy analysis in low-and middle-income countries: a meta-ethnographic synthesis. *Health policy and planning, 29*(suppl_3), iii70-iii78. https://doi.org/10.1093/heapol/czu112

Evans, M., Marsh, D., and Stoker, G. (2013). Understanding localism. *Policy studies, 34(4)*, 401-407. https://doi.org/10.1080/01442872.2013.822699

Facione, P. (1990). Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction (The Delphi Report). California Academic Press, California, USA.

Feller, J., Parhankangas, A., Smeds, R., and Jaatinen, M. (2013). How companies learn to collaborate: Emergence of improved inter-organizational processes in R&D alliances. *Organization Studies, 34(3)*, 313–343. https://doi.org/10.1177/0170840612464758

Ferry, L., Eckersley, P., and Zakaria, Z. (2015). Accountability and transparency in English local government: moving from 'matching parts' to 'awkward couple'?. *Financial Accountability and Management, 31(3)*, 345-361. https://doi.org/10.1111/faam.12060

Flyvbjerg, B. (2011). Case study. *The Sage handbook of qualitative research, 4*, 301-316.

Fine, G. A., and Abramson, C. M., (2020). Ethnography in the time of Covid-19. Vectors and the vulnerable. *Etnografia e ricerca qualitativa (2)*: 165–174. https://doi.org/10.3240/97802

Finlay, S., and Sandall, J. (2009). "Someone's rooting for you": continuity, advocacy and street-level bureaucracy in UK maternal healthcare. *Social science and medicine, 69(8)*, 1228-1235. https://doi.org/ 10.1016/j.socscimed.2009.07.029

Fitzgerald, M., Kruschwitz, N., Bonnet, D., Welch, M., (2014). Embracing digital technology: a new strategic imperative. *MIT Sloan Management Review 55 (2)*, 1.

Fountain, J. E. (2004). Building the virtual state: Information technology and institutional change. Rowman and Littlefield.

Fountain, J. E. (2019). The wicked nature of digital transformation: A policy perspective. *Dubai Policy Review, 1*, 40-44.

Fox, J. (2007). The uncertain relationship between transparency and accountability. *Development in practice, 17(4-5)*, 663-671.

Fox, M. L. (2010). Directgov 2010 and beyond: revolution not evolution. *letter to Francis Maude*, *14*. https://www.gov.uk/government/publications/directgov-2010-and-beyond-revolution-not-evolution-a-report-by-martha-lane-fox [Accessed 12-06-24]

Firebaugh, G. (2008). Seven rules for social research. Princeton University Press.

Floridi, L. (2015). The Onlife Manifesto. Being Human in a Hyperconnected Era, XIV. Springer, p. 7-13. https://doi.org/10.1007/978-3-319-04093-6_2

Frické, M. (2015). Big data and its epistemology. *Journal of the association for information science and technology, 66(4)*, 651-661. https://doi.org/10.1002/asi.23212

Fuller, C., and Geddes, M. (2008). Urban governance under neoliberalism: New Labour and the restructuring of state-space. Antipode, 40(2), 252-282. https://doi.org/10.1111/j.1467-8330.2008.00591.x

Gangneux, J., and Joss, S. (2022). Crisis as driver of digital transformation? Scottish local governments' response to COVID-19. *Data and Policy, 4*, e26. https://doi.org/10.1017/dap.2022.18

Garson, G. D. (2006). Public information technology and e-governance: Managing the virtual state. Jones and Bartlett Learning.

Geertz, C. (1973). The interpretation of cultures: Selected essays. New York: Basic Books.

Giffinger, R., Fertner, C., Kramar, H., and Meijers, E. (2007). City-ranking of European medium-sized cities. Cent. Reg. Sci. Vienna UT, 9(1), 1-12.

Giffinger, R., and Gudrun, H. (2010). Smart cities ranking: an effective instrument for the positioning of the cities?. *ACE: architecture, city and environment, 4(12)*, 7-26. https://doi.org/10.5821/ace.v4i12.2483

Gil-Garcia, J. R., Dawes, S. S., and Pardo, T. A. (2018). Digital government and public management research: finding the crossroads. *Public Management Review, 20(5)*, 633-646. https://doi.org/10.1080/14719037.2017.1327181

Gil-Garcia, J. R., and Flores-Zúñiga, M. (2020). Towards a comprehensive understanding of digital government success: Integrating implementation and adoption factors. *Government Information Quarterly, 37(4)*. https://doi.org/10.1016/j.giq.2020.101518

Gitelman, L. (Ed.). (2013). Raw data is an oxymoron. MIT press.

Glasgow City Council. (2017). 'Digital Glasgow Strategy 2018-2023'. [Superseded in 2024, no longer online; author's download available]

Glasgow City Council. (2019). 'Business Intelligence Strategy'. [No longer online; author's download available]

Goldkuhl, G. (2008). Citizen Roles in E-government: What does it mean to serve the citizen in e-services? - Towards a practical theory founded in socio-instrumental pragmatism. *International journal of public information systems 3* (3). https://doi.org/10.2200/IS070208.

Gorski, P. S. (2004). 1. The Poverty of Deductivism: A Constructive Realist Model of Sociological Explanation. *Sociological Methodology, 34(1)*, 1-33. https://doi.org/10.1111/j.0081-1750.2004.00144.x

Gray, J., Gerlitz, C., and Bounegru, L. (2018). Data infrastructure literacy. Big Data and Society, 5(2), 2053951718786316. https://doi.org/10.1177/2053951718786316

Green, B. (2019). The smart enough city: Putting technology in its place to reclaim our urban future. MIT Press. https://doi.org/10.7551/mitpress/11555.001.0001

Green, B. (2021). Data science as political action: Grounding data science in a politics of justice. *Journal of Social Computing, 2(3)*, 249-265. http://doi.org/10.23919/JSC.2021.0029

Greenfield, A. (2017). Radical technologies: The design of everyday life. Verso Books

Guler, G. (2019). Data literacy from theory to reality: How does it look?. Masters Dissertation. Vrije Universiteit Brussel, Brüssel. https://doi.org/10.13140/RG.2.2.27537.35680

Guenther, K. (2009) The politics of names: rethinking the methodological and ethical significance of naming people, organisations and places. *Qualitative Research, 9(4)*, pp.411-421. https://doi.org/10.1177/1468794109337872

Hacking, I. (1991). How should we do the history of statistics?. *The Foucault effect: Studies in governmentality*. https://doi.org/10.1177/2053951716646135

Hadjimichael, D., and Tsoukas, H. (2019). Toward a better understanding of tacit knowledge in organizations: Taking stock and moving forward. *Academy of Management Annals, 13(2)*, 672-703. https://doi.org/10.5465/annals.2017.0084

Hansen, H. T., Lundberg, K., and Syltevik, L. J. (2018). Digitalization, street-level bureaucracy and welfare users' experiences. *Social policy and administration, 52(1)*, 67-90. https://doi.org/10.1111/spol.12283

Hartley, J., Butler, M. J. R., and Benington, J. (2002). Local Government Modernization: UK and Comparative Analysis from an Organizational Perspective. *Public Management Review, 4(3)*, 387–404. https://doi.org/10.1080/14616670210151612

Hartong, S., and Förschler, A. (2019). Opening the black box of data-based school monitoring: Data infrastructures, flows and practices in state education agencies. *Big Data and Society, 6(1)*. https://doi.org/10.1177/2053951719853311

Haveri, A. (2006). Complexity in local government change: Limits to rational reforming. *Public Management Review, 8(1)*, 31-46. https://doi.org/10.1080/14719030500518667

Heeks, R. (2002). Reinventing Government in the Information Age: International Practice in IT-Enabled Public Sector Reform. Richard Heeks (Ed.). London: Routledge.

Heeks, R. (2006). Implementing and Managing Egovernment: An International Text. https://doi.org/10.4135/9781446220191

Heeks, R and Bailur, S. (2007). Analyzing e-government research: Perspectives, philosophies, theories, methods, and practice. *Government Information Quarterly 24(2)* 243-265. https://doi.org/10.1016/j.giq.2006.06.005

Homburg, V. (2018). ICT, e-government and e-governance: bits and bytes for public administration. *The Palgrave handbook of public administration and management in Europe*, 347-361. https://doi.org/10.1057/978-1-137-55269-3_18

Hollands, R. (2008) Will the real smart city stand up? *City 12(3)*, 302 – 320. https://doi.org/10.1080/13604810802479126

Hollway, W., and Jefferson, T. (2000). Doing qualitative research differently: Free association, narrative and the interview method. Sage. https://doi.org/10.1002/casp.603

Hood, C. (1991). A public management for all seasons? *Public Administration 69(1)*: 3-19. https://doi.org/10.1111/j.1467-9299.1991.tb00779.x

Hood, C. (2014). Accountability and transparency: Siamese twins, matching parts, awkward couple?. In *Accountability and European Governance* (pp. 61-81). Routledge. https://doi.org/10.1080/01402382.2010.486122

Hood, C., and Dixon, R. (2016). Not what it said on the tin? Reflections on three decades of UK public management reform. *Financial Accountability and Management*, *32*(4), 409-428. https://doi.org/10.1111/faam.12095

Hu, Q. (2018). Preparing public managers for the digital era: incorporating information management, use, and technology into public affairs graduate curricula. *Public Management Review, 20(5)*, 766-787. https://doi.org/10.1080/14719037.2017.1327180

Humes, W. (2023). Scottish Education: A Crisis of Confidence and Trust. In *Forum (Vol. 65, No. 1, pp. 19-29)*. Lawrence and Wishart. https://doi.org/10.3898/forum.2023.65.1.05

Hupe, P. (2022). Going viral: Public encounters and digitalization. In *The Politics of the Public Encounter* (pp. 211-234). Edward Elgar Publishing.

Hupe, P., and Hill, M. (2007). Street-Level bureaucracy and public accountability. *Public administration, 85(2)*, 279-299. https://doi.org/10.1111/j.1467-9299.2007.00650.x

Ingraham, P. W. (1996). Reinventing the American federal government: reform redux or real change?. *Public Administration, 74(3)*, 453-475. https://doi.org/10.1111/j.1467-9299.1996.tb00880.x

Introna, L. D. (2013). Epilogue: Performativity and the becoming of sociomaterial assemblages. In *Materiality and space: Organizations, artefacts and practices* (pp. 330-342). London: Palgrave Macmillan UK. https://doi.org/10.1057/9781137304094_17

Janowski, T. (2015). Digital government evolution: From transformation to contextualization. *Government Information Quarterly, 32(3)*, 221-236. https://doi.org/10.1016/j.giq.2015.07.001

Jansen, B. J., Jung, S-G., Nielsen, L., Guan, K. W. and Salminen, J. (2022). How to Create Personas: Three Persona Creation Methodologies with Implications for Practical Employment. *Pacific Asia Journal of the Association for Information Systems 14(3)*, 1. https://aisel.aisnet.org/pajais/vol14/iss3/1

Janssen, M., Charalabidis, Y., and Zuiderwijk, A. (2012). Benefits, adoption barriers and myths of open data and open government. *Information systems management, 29(4)*, 258-268. https://doi.org/10.1080/10580530.2012.716740

Janssen, M., Brous, P., Estevez, E., Barbosa, L. S., and Janowski, T. (2020). Data governance: Organizing data for trustworthy Artificial Intelligence. *Government Information Quarterly, 37(3)*, https://doi.org/10.1016/j.giq.2020.101493

Janssen, H., and Singh, J. (2022). The Data Intermediary. *Internet Policy Review 11*, 1. https://doi.org/10.14763/2022.1.1644

Johnston, E. W. (Ed.). (2015). Governance in the information era: Theory and practice of policy informatics. Routledge. https://doi.org/10.4324/9781315736211

Jones, C. I., and Tonetti, C. (2020). Nonrivalry and the Economics of Data. *American Economic Review, 110(9)*, 2819-2858. https://doi.org/10.1257/aer.20191330

Jupp, E. (2021). The time-spaces of austerity urbanism: Narratives of 'localism' and UK neighbourhood policy. *Urban Studies, 58(5)*, 977-992. https://doi.org/10.1177/0042098020929503

Juran, J. M., and Godfrey, A. M. (1999) Juran's quality handbook, 5th edn, McGraw-Hill, New York

Keller, S., Lancaster, V., and Shipp, S. (2017). Building capacity for data-driven governance: Creating a new foundation for democracy. *Statistics and public policy, 4(1)*, 1-11. https://doi.org/10.1080/2330443X.2017.1374897

Kemper, J., and Kolkman, D. (2019). Transparent to whom? No algorithmic accountability without a critical audience. *Information, Communication and Society, 22(14)*, 2081-2096. https://doi.org/10.1080/1369118X.2018.1477967

Kitchin, R. (2014). Big Data, new epistemologies and paradigm shifts. *Big data and society, 1(1)*, https://doi.org/10.1177/2053951714528481

Kitchin, R. (2015a). Making sense of smart cities: addressing present shortcomings. *Cambridge journal of regions, economy and society*, 8(1), 131-136. https://doi.org/10.1093/cjres/rsu027

Kitchin, R. (2015b). Data-driven, networked urbanism. The Programmable City Working Paper 14. Prepared for *Data and the City workshop*, 31 Aug-1st Sept 2015, Maynooth University. https://mural.maynoothuniversity.ie/7235/1/PC [accessed 12-06-24]

Kitchin, R. (2021). Data lives: How data are made and shape our world. Bristol University Press.

Kitchin, R. (2022) The Data Revolution: A Critical Approach to Big Data, Open Data, and Data Infrastructures. 2nd edition. Sage, London. https://doi.org/10.1111/jors.12293

Kitchin, R., and Lauriault, T. (2014). Towards Critical Data Studies: Charting and Unpacking Data Assemblages and Their Work The Programmable City Working Paper 2; pre-print version of chapter to be published in Eckert, J., Shears, A. and Thatcher, J. (eds) Geoweb and Big Data. University of Nebraska Press. Forthcoming, Available at SSRN: https://ssrn.com/abstract=2474112

Kitchin, R., and McArdle, G. (2017). Urban data and city dashboards: Six key issues. In *Data and the City* (pp. 111-126). Routledge.

Komljenovic, J. (2022). The future of value in digitalised higher education: why data privacy should not be our biggest concern. *Higher Education, 83(1)*, 119-135. https://doi.org/10.1007/s10734-020-00639-7

Kowal, S., and O'Connell, D. C. (2014). Transcription as a crucial step of data analysis. *The SAGE handbook of qualitative data analysis, 7(5)*, 64-79.

Kraemer, K. L., and King, J. L. (1976). Computers, power, and urban management: What every local executive should know (No. 31). Sage Publications.

Kromidha, E., and Cordoba-Pachon, J. R. (2014). Bridging the gaps between e-Government practice and research: A meta-study for policy development. *International Journal of Public Sector Management, 27(1)*, 66–84. https://doi.org/10.1108/IJPSM-05-2012-0064

Kshetri, N. (2014). The emerging role of Big Data in key development issues: Opportunities, challenges, and concerns. *Big Data and Society, 1(2)*, https://doi.org/10.1177/2053951714564227

Kvale, S., (1996) Interviews: An introduction to qualitative research interviewing, London, Sage Publications.

Ku, M., and Gil-Garcia, J. R. (2018). Ready for data analytics? Data collection and creation in local governments. In *Proceedings of the 19th annual international conference on digital government research: Governance in the data age* (pp. 1-10). https://doi.org/10.1145/3209281.3209381

Lapsley, I., and Miller, P. (2019). Transforming the public sector: 1998–2018. *Accounting, Auditing and Accountability Journal, 32(8)*, 2211-2252. https://doi.org/10.1108/AAAJ-06-2018-3511

Layne, K. and Lee, J. (2001). Developing fully functional E-government: A four stage model. *Government Information Quarterly 18(2)*: 122-136. https://doi.org/10.1016/S0740-624X(01)00066-1

Lazem, S., Giglitto, D., Nkwo, M. S., Mthoko, H., Upani, J., and Peters, A. (2021). Challenges and paradoxes in decolonising HCI: A critical discussion. *Computer Supported Cooperative Work (CSCW)*, 1-38.

Leavy, P. (Ed.). (2014). The Oxford handbook of qualitative research. Oxford University Press, USA.

Leleux, C., and Webster, W. (2018). Delivering smart governance in a future city: The case of Glasgow. *Media and Communication*, *6*(4), 163-174. https://doi.org/10.17645/mac.v6i4.1639

Leonardi, P. M. (2012). Materiality, sociomateriality, and socio-technical systems: What do these terms mean? How are they different? Do we need them. Materiality and organizing: *Social interaction in a technological world, 25(10)*, 10-1093.

Leonardi, P. M. (2013). Theoretical foundations for the study of sociomateriality. *Information and organization 23, no. 2*: 59-76. https://doi.org/10.1016/j.infoandorg.2013.02.002

Leydesdorff, L., and Deakin, M. (2013). The triple-helix model of smart cities: A neo-evolutionary perspective. In Creating Smart-er Cities (pp. 53-63). Routledge.

Löfgren, K., and Webster, C. W. R. (2020). The value of Big Data in government: The case of 'smart cities'. *Big Data and Society, 7(1)*, https://doi.org/10.1177/2053951720912775

Lips, A. M. B. (2017). Transforming Government Services over Time: Meanings, Impacts, and Implications for Citizen-Government Relationships. In *Routledge Handbook on Information Technology in Government* (pp. 31-46). Routledge.

Lips, A. M. B., and Schuppan, T. (2009). Transforming e-government knowledge through public management research. *Public Management Review, 11(6)*, 739-749.

Lipsky, M. (1980). Street level bureaucracy: Dilemmas of the individual in public service (30th Anniversary expanded edn in 2010). New York: Russell Sage Foundation. 10.7758/9781610447713

Littman, M. L., Ajunwa, I., Berger, G., Boutilier, C., Currie, M., Doshi-Velez, F., ... and Walsh, T. (2022). Gathering strength, gathering storms: The one hundred year study on artificial intelligence (AI100) 2021 study panel report. arXiv preprint arXiv:2210.15767.

Liva, G., Codagnone, C., Misuraca, G., Gineikyte, V., and Barcevicius, E. (2020, September). Exploring digital government transformation: A literature review. In *Proceedings of the 13th International Conference on Theory and Practice of Electronic Governance* (pp. 502-509).

Loukissas, Y. A. (2019). All data are local: Thinking critically in a data-driven society. MIT press. ISBN:978-0-262-03966-6

Luna-Reyes, L. F., and Gil-Garcia, J. R. (2014). Digital government transformation and internet portals: The co-evolution of technology, organizations, and institutions. *Government Information Quarterly, 31(4)*, 545-555. https://doi.org/10.1016/j.giq.2014.08.001

Lusch, R. F., and Nambisan, S. (2015) Service innovation. *MIS quarterly 39(1)*, 155-176. MISQ/2015/39.1.07"> https://doi.org/10.25300/MISQ/2015/39.1.07

Lycett, M. (2013). 'Datafication': Making sense of (big) data in a complex world. *European Journal of Information Systems, 22(4)*, 381-386. https://doi.org/10.1057/ejis.2013.10

Mabillard, V., and Zumofen, R. (2020). Debate: The transparency–accountability relationship depends on the context and the issues at stake. *Public Money and Management, 40(2)*, 89-90. https://doi.org/10.1080/09540962.2019.1665365

MacKenzie, D., and Wajcman, J. (1999). The social shaping of technology. Open university press. ISBN 9780335199136

Magalhaes, G., Roseira, C., and Strover, S. (2013) Open government data intermediaries: A terminology framework. In *Proceedings of the 7th International Conference on Theory and Practice of Electronic Governance*, pp. 330-333. http://dx.doi.org/10.1145/2591888.2591947

Magalhães, J. V. and Couldry, N. (2021). Giving by taking away: Big tech, data colonialism and the reconfiguration of social good. *International Journal of Communication, 15*, 343-362.

Malodia, S., Dhir, A., Mishra, M., and Bhatti, Z. A. (2021). Future of e-Government: An integrated conceptual framework. *Technological Forecasting and Social Change, 173*, https://doi.org/10.1016/j.techfore.2021.121102

Malomo, F. and Sena, V. (2016) Data Intelligence for Local Government? Assessing the Benefits and Barriers to Use of Big Data in the Public Sector. *Policy Internet, 9*, 7–27. https://doi.org/10.1002/poi3.141

Manoharan, A. P., and Ingrams, A. (2018). Conceptualizing e-government from local government perspectives. *State and Local Government Review, 50(1)*, 56-66. https://doi.org/10.1177/0160323X18763964

Margetts, H., and Dunleavy, P. (2013). The second wave of digital-era governance: a quasi-paradigm for government on the Web. *Philosophical transactions of the royal society A: mathematical, physical and engineering sciences, 371(1987)*, 20120382.

Marjanovic, O., and Cecez-Kecmanovic, D. (2020). Open government data platforms–A complex adaptive sociomaterial systems perspective. *Information and Organization, 30(4)*, https://doi.org/10.1016/j.infoandorg.2020.100323

Mason, J. (2002) Qualitative Researching (Second Edition). London: Sage

Mason, Hilary, and Patil, D. J. (2015). Data Driven: Creating a Data Culture. Sebastopol, CA: O'Reilly Media, Inc.

Mateos-Garcia, J., Windsor, G., and Rosevare, S. (2015). Analytic Britain: Securing the right skills for the data-driven economy. London: Nesta https://www.nesta.org.uk/report/analytic-britain-securing-the-right-skills-for-the-data-driven-economy/ [Accessed 12-06-24]

May, T., and Perry, B. (2014). Reflexivity and the practice of qualitative research. *The SAGE handbook of qualitative data analysis, 109,* 109-122.

Mayer-Schönberger, V., and Cukier, K. (2013). Big data: A revolution that will transform how we live, work, and think. Houghton Mifflin Harcourt.

Mayring, P. (2004). Qualitative content analysis. *A companion to qualitative research, 1(2)*, 159-176. ISSN 1438-5627.

McBride, K., and Draheim, D. (2020). On complex adaptive systems and electronic government: A proposed theoretical approach for electronic government studies. *Electronic Journal of e-Government, 18(1)*, pp. 43-53. https://10.34190/EJEG.18.1.004

McLoughlin, I., and Wilson, R. (2013). Digital government at work: a social informatics perspective. OUP Oxford. https://doi.org/10.1093/acprof:oso/9780199557721.001.0001

Meadows, D. H. (2008). Thinking in systems: A primer. chelsea green publishing.

Meijer, A., and Bekkers, V. (2015). A metatheory of e-government: Creating some order in a fragmented research field. *Government Information Quarterly, 32(3)*, 237-245. https://doi.org/10.1016/j.giq.2015.04.006

Meijer, A. (2018). Datapolis: A public governance perspective on "smart cities". *Perspectives on Public Management and Governance, 1(3)*, 195-206. https://doi.org/10.1093/ppmgov/gvx017

Meijer, A., and Bolívar, M. P. R. (2016). Governing the smart city: a review of the literature on smart urban governance. *International review of administrative sciences, 82(2)*, 392-408. https://doi.org/10.1177/0020852314564308

Meijer, A., Lorenz, L., and Wessels, M. (2021). Algorithmization of bureaucratic organizations: Using a practice lens to study how context shapes predictive policing systems. *Public Administration Review, 81(5)*, 837-846. https://doi.org/10.1111/puar.13391

Means, G., and Schneider, D. M. (2000). Metacapitalism: The e-business revolution and the design of 21st-century companies and markets. John Wiley and Sons, Inc.

Merriam, S. B., and Tisdell, E. J. (2015). Qualitative research: A guide to design and implementation. John Wiley and Sons.

Micheli, M., Ponti, M., Craglia, M., and Berti Suman, A. (2020). Emerging models of data governance in the age of datafication. *Big Data and Society, 7(2)*, https://doi.org/10.1177/2053951720948087

Miles, M. B., and Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* Sage.

Mill, J. S. (1975) 'Essay on Representative Government', in R. Wollheim (ed.), John Stuart Mill: Three Essays. Oxford: Oxford University Press, pp. 144–423.

Miller, C. A. (2005). New civic epistemologies of quantification: Making sense of indicators of local and global sustainability. *Science, Technology, and Human Values, 30(3)*, 403-432. https://doi.org/10.1177/0162243904273448

Morton, F. M. S., Crawford, G. S., Crémer, J., Dinielli, D., Fletcher, A., Heidhues, P., and Schnitzer, M. (2023). Equitable Interoperability: The "Supertool" of Digital Platform Governance. *Yale Journal on Regulation, 40*, 1013.

Mthuli, S. A., Ruffin, F., and Singh, N. (2022). 'Define, Explain, Justify, Apply'(DEJA): An analytic tool for guiding qualitative research sample size. *International Journal of Social Research Methodology, 25(6)*, 809-821.
https://doi.org/10.1080/13645579.2021.1941646

Muller, M., Lange, I., Wang, D., Piorkowski, D., Tsay, J., Liao, Q. V., ... and Erickson, T. (2019). How data science workers work with data: Discovery, capture, curation, design, creation. In *Proceedings of the 2019 CHI conference on human factors in computing systems* (pp. 1-15). https://doi.org/10.1145/3290605.3300356

Mueller, B., Renken, U., and van Den Heuvel, G. (2016). Get your act together: An alternative approach to understanding the impact of technology on individual and organizational behavior. *ACM SIGMIS Database: The DATABASE for Advances in Information Systems, 47(4)*, 67-83. https://doi.org/10.1145/3025099.3025107

Newman, D. T., Fast, N. J., and Harmon, D. J. (2020). When eliminating bias isn't fair: Algorithmic reductionism and procedural justice in human resource decisions. *Organizational Behavior and Human Decision Processes, 160*, 149-167. https://doi.org/10.1016/j.obhdp.2020.03.008

North Lanarkshire Council. (2017). 'Digital Vision: DigitalNL 2019 - 2023'. https://www.northlanarkshire.gov.uk/sites/default/files/2022-11/digital%20and%20IT%20strategy%202022%20annual%20refresh%20accessible.pdf

Normann, R., and Ramírez, R. (1993). From value chain to value constellation: designing interactive strategy. *Harvard Business Review, 71 (4)*, 65-77.

Normann, R. (2001). Reframing business: When the map changes the landscape. Chichester, New Sussex: Wiley.

Noy, C. (2008). Sampling knowledge: The hermeneutics of snowball sampling in qualitative research. *International Journal of social research methodology, 11(4)*, 327-344. https://doi.org/10.1080/13645570701401305

Odendaal, N. (2016). Smart City: Neoliberal Discourse or Urban Development Tool?. In: *Grugel, J., Hammett, D. (eds) The Palgrave Handbook of International Development.* Palgrave Macmillan, London. https://doi.org/10.1057/978-1-137-42724-3_34

Open Data Institute / ODI. (2017) 'Recommendations for Open Data Portals: from setup to sustainability'. Commissioned by European Data Porta, an initiative of the European Commission. Capgemini consultancy at al.
https://data.europa.eu/sites/default/files/edp_s3wp4_sustainability_recommendations.pdf
[accessed 12-06-24]

Oliveira, M. I. S., Barros Lima, G. D. F., and Farias Lóscio, B. (2019). Investigations into data ecosystems: a systematic mapping study. *Knowledge and Information Systems, 61*, 589-630. https://doi.org/10.1007/s10115-018-1323-6

Organisation for Economic Co-operation and Development / OECD (2003) 'The e-Government Imperative: Main Findings.' https://www.oecd-ilibrary.org/governance/the-e-government-imperative_9789264101197-en [Accessed 12-06-24]

OECD. (2013). 'Supporting Investment in Knowledge Capital, Growth and Innovation' https://www.oecd.org/sti/inno/newsourcesofgrowthknowledge-basedcapital.htm [Accessed 12-06-24]

OECD. (2014). 'Recommendation of the Council on Digital Government Strategies' https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0406. [Accessed 12-06-24]

OECD. (2015). 'Data-Driven Innovation: Big Data for Growth and Well-Being' https://www.oecd.org/sti/data-driven-innovation-9789264229358-en.htm [Accessed 12-06-24]

OECD. (2019). 'Working Papers on Public Governance: Digital Government Index' https://www.oecd-ilibrary.org/governance/oecd-digital-government-index-dgi_b00142a4-en [Accessed 12-06-24]

O'Neil, C. (2017). Weapons of math destruction: How big data increases inequality and threatens democracy. Crown.

Orlikowski, W. J. (1995). Action and artifact: the structuring of technologies-in-use.

Orlikowski, W. J. (1996). Improvising organizational transformation over time: A situated change perspective. *Information systems research 7 (1)*:63-92.

Orlikowski, W. J. (2007). Sociomaterial practices: Exploring technology at work. *Organization studies, 28(9)*, 1435-1448. https://doi.org/10.1177/0170840607081138

Orlikowski, W. J., and Scott, S. V. (2008). 10 sociomateriality: challenging the separation of technology, work and organization. *Academy of Management annals, 2(1)*, 433-474. http://dx.doi.org/10.1080/19416520802211644

Orlikowski, W. J. (2010). The sociomateriality of organisational life: considering technology in management research. *Cambridge journal of economics, 34(1)*, 125-141. http://dx.doi.org/10.1093/cje/bep058

Osborne, S. P. (2006). The New Public Governance? *Public Management Review, 8:3*, 377-387, https://doi.org/10.1080/14719030600853022

Osborne, S. P. (2018). From public service-dominant logic to public service logic: are public service organizations capable of co-production and value co-creation?. *Public management review, 20(2)*, 225-231. https://doi.org/10.1080/14719037.2017.1350461

Osborne, S. (2020). Public service logic: Creating value for public service users, citizens, and society through public service delivery. Routledge.

Osborne, D. and Gaebler, T. 1992. Reinventing Government. New York, NY

Osborne, S. P., Radnor, Z., and Nasi, G. (2013). A new theory for public service management? Toward a (public) service-dominant approach. *The American Review of Public Administration, 43(2)*, 135-158. https://doi.org/10.1177/0275074012466935

Osborne, S. P., Powell, M., Cui, T., and Strokosch, K. (2022). Value creation in the public service ecosystem: An integrative framework. *Public Administration Review, 82(4)*, 634-645. https://doi.org/10.1111/puar.13474

Parsons, M. A. and Fox, P. A. (2013). Is data publication the right metaphor?. *Data science journal, 12*, WDS32-WDS46. https://doi.org/10.2481/dsj.WDS-042

Pasquale, F. (2015). The black box society: The secret algorithms that control money and information. Harvard University Press.

Pedersen, K. (2016). eGovernment in local government: Challenges and capabilities. *Electronic Journal of E-government, 14(1)*, 99-116.

Persson, A., and Goldkuhl, G. (2010). Government value paradigms—Bureaucracy, new public management, and e-government. *Communications of the Association for Information Systems, 27(1)*, 4.

Perez, C. C. (2019). Invisible women: Data bias in a world designed for men. Abrams.

Pickering, A. (1993). The mangle of practice: Agency and emergence in the sociology of science. *American journal of sociology, 99(3)*, 559-589. https://www.jstor.org/stable/2781283

Piening, E. P. (2013). Dynamic capabilities in public organizations: A literature review and research agenda. *Public management review, 15(2)*, 209-245. https://doi.org/10.1080/14719037.2012.708358

Polanyi, M. (1958). Personal Knowledge: Towards a Post-Critical Philosophy. Chicago: University of Chicago Press.

Polanyi, M. (1966a). The Logic of Tacit Inference. *Philosophy: The Journal of the Royal Institute of Philosophy, 41(155)*, 1–18.

Polanyi, M. (1966b). The Tacit Dimension. Chicago and London: The University of Chicago Press.

Porciuncula, L. (2023). 'Why We Need an International Decade for Data'. Working Paper, UNU-CPR. https://unu.edu/sites/default/files/2023-11/Why%20we%20need%20an%20international%20decade%20for%20data.pdf [Accessed 12-06-24]

Porter, T. M., (1995) Trust in Numbers: The Pursuit of Objectivity in Science and Public Life (Princeton, NJ: Princeton University Press.

Porumbescu, G. A. (2015). Using transparency to enhance responsiveness and trust in local government: can it work?. *State and Local Government Review, 47(3)*, 205-213. https://doi.org/10.1177/0160323X15599427

Purandare, U. (2021). Who drives India's smart cities? Understanding the role of consulting firms in the smart cities mission. *Professional Service Firms and Politics in a Global Era: Public Policy, Private Expertise,* 79-96.

Puron-Cid, G., Gil-Garcia, J. R., and Luna-Reyes, L. F. (2012, June). IT-enabled policy analysis: new technologies, sophisticated analysis and open data for better government decisions. In *Proceedings of the 13th annual international conference on digital government research* (pp. 97-106).

Rapley, T. (2014). Sampling strategies in qualitative research. *The SAGE handbook of qualitative data analysis, 4*, 49-63.

Redman, T. C. (2013). Data Quality Management Past, Present, and Future: Towards a Management System for Data. In *Shazia Sadiq (Ed.), Handbook of Data Quality: Research and Practice* (pp. 15-40). https://doi.org/10.1007/978-3-642-36257-6_2.

Ribeiro, R. (2017). The Embodied versus Embedded Versions of Expertise: Revisiting the Dreyfus-Collins Debate. In *J. Sandberg, L. Rouleau, A. Langley, and H. Tsoukas (Eds.), Skillful Performance: Enacting Capabilities, Knowledge, Competence and Expertise in Organizations* (pp. 184–207). Oxford and New York: Oxford University Press.

Riemer, K., and Johnston, R. B. (2017). Clarifying ontological inseparability with Heidegger's analysis of equipment. *MIS Quarterly, 41(4)*, 1059-1082. https://www.jstor.org/stable/10.2307/26630285

Ritchie, S. (2020). Science fictions: Exposing fraud, bias, negligence and hype in science. Random House.

Robinson, D., Yu, H., Zeller, W. P., and Felten, E. W. (2008). Government data and the invisible hand. *Yale Journal of Law and Technolgy, 11*, 159.

Ryle, G. (1949). The Concept of Mind. London: Hutchinson.

Ryle, G. (1953). Ordinary language. The philosophical review, 62(2), 167-186.

Sadowski, J. (2019). When data is capital: Datafication, accumulation, and extraction. *Big data and society, 6(1)*, https://doi.org/10.1177/2053951718820549

Sadowski, J. (2020). Too smart: How digital capitalism is extracting data, controlling our lives, and taking over the world. MIT Press.

Sadowski, J. (2024). 'Anyway, the dashboard is dead': On trying to build urban informatics. *New Media and Society, 26(1)*, 313-328. https://doi.org/10.1177/14614448211058455

Saldaña, J. (2018). Researcher, analyze thyself. *International Journal of Qualitative Methods, 17(1)*, https://doi.org/10.1177/1609406918801717

Sætra, H. S. (2023). Technology and sustainable development: The promise and pitfalls of techno-solutionism.Taylor and Francis. https://doi.org/10.1201/9781003325086-19

Schaffers, H., Komninos, N., Pallot, M., Trousse, B., Nilsson, M., and Oliveira, A. (2011) Smart cities and the future Internet: towards cooperation frameworks for open innovation.

In: *Domingue J et al. (ed) Future internet assembly. LNCS, vol 6656*, pp 431–446. https://dopi.org/10.1007_978-3-642-20898-0

Scholta, H., Mertens, W., Kowalkiewicz, M., and Becker, J. (2019). From one-stop shop to no-stop shop: An e-government stage model. *Government Information Quarterly, 36(1)*, 11-26. https://doi.org/10.1016/j.giq.2018.11.010

Scholta, H., Halsbenning, S., and Becker, J. (2022). A public value based method to select services for a no-stop shop implementation. Proceedings of the 55th Hawaii International Conference on System Sciences.

Schreier, M. (2012). Qualitative content analysis in practice. SAGE Publications Ltd. 1-280.

Schrock, A., and Shaffer, G. (2017). Data ideologies of an interested public: A study of grassroots open government data intermediaries. *Big Data and Society, 4(1)*, https://doi.org/10.1177/2053951717690750

Scottish Government. (2011). 'Christie Commission Future Delivery of Public Services'. https://www.gov.scot/publications/commission-future-delivery-public-services/ [Accessed 12-06-24]

Scottish Government. (2012). 'Scotland's Digital Future: Delivery of Public Services'. https://www.gov.scot/publications/scotlands-digital-future-delivery-public-services/ [Accessed 12-06-24]

Scottish Government. (2015). 'Open Data Strategy'. https://www.gov.scot/publications/open-data-strategy/ [Accessed 12-06-24]

Scottish Government. (2017). 'Realising Scotland's Full Potential in a Digital World 2017'. https://www.gov.scot/publications/realising-scotlands-full-potential-digital-world-digital-strategy-scotland/ [Accessed 12-06-24]

Scottish Government. (2017). 'Scotland's Digital Strategy - Evidence Discussion Paper'. https://www.gov.scot/publications/scotlands-digital-strategy-evidence-discussion-paper/ [Accessed 12-06-24]

Scottish Government. (2021). 'Data transformation framework: data personas report'. UserVision and Effini. https://www.gov.scot/publications/data-personas-report-scottish-government/ [Accessed 12-06-24]

Scottish Government. (2020). 'Transforming Places Together: Scotland's Digital Strategy For Planning'. https://www.gov.scot/publications/transforming-places-together-scotlands-digital-strategy-planning/documents/

Scottish Government. (2022). 'Unlocking the Value of Data'. https://www.gov.scot/groups/unlocking-the-value-of-public-sector-data-for-public-benefit/ [Accessed 12-06-24]

Scottish Government. (n.d.). 'Digital, Data and Technology profession, skills and capability'. https://www.gov.scot/policies/digital/digital-data-technology-profession/ [Accessed 12-06-24]

Shotter, J., and Tsoukas, H. (2014). In Search of Phronesis: Leadership and the Art of Judgment. *Academy of Management Learning and Education, 13(2)*, 224–243. http://dx.doi.org/10.5465/amle.2013.0201

Silverman, D. (1973). Interview talk: Bringing off a research instrument. *Sociology, 7(1)*, 31-48.

Silverman, D. (1997) (ed.) Qualitative Research: Theory, Method and Practice. Sage, London.

Silverman, D. (2001) Interpreting qualitative data: Methods for analysing talk, text and interaction. London: Sage

Simione, L., Vagni, M., Gnagnarella, C., Bersani, G., and Pajardi, D. (2021). Mistrust and beliefs in conspiracy theories differently mediate the effects of psychological factors on propensity for COVID-19 vaccine. *Frontiers in psychology, 12*. https://doi.org/10.3389/fpsyg.2021.683684

Skinner, B., Leavey, G., and Rothi, D. (2021). Managerialism and teacher professional identity: Impact on well-being among teachers in the UK. *Educational review, 73(1)*, 1-16. https://doi.org/10.1080/00131911.2018.1556205

Slife, B. D. (2004). Taking practice seriously: Toward a relational ontology. *Journal of theoretical and philosophical psychology, 24(2)*, 157.

Snyder, L. G., and Snyder, M. J. (2008). Teaching critical thinking and problem solving skills. *The Journal of Research in Business Education, 50(2)*, 90.

Söderström, O., Paasche, T., and Klauser, F. (2020). Smart cities as corporate storytelling. In *The Routledge companion to smart cities* (pp. 283-300). Routledge.

Stemler, S. (2000). An overview of content analysis. *Practical assessment, research, and evaluation, 7(1)*.

Stirling Council. (2020). 'Open Data Phase 1 Project Initiation Document'. [Shared privately, available for confidential review].

Symons, T. (2016). Wise council: Insights from the cutting edge of data-driven local government. Local Government Association and Nesta. Retrieved from Nesta website: https://www.nesta.org.uk/report/wise-council-insights-from-the- cutting-edge-of-data-driven-local-government/ [Accessed 12-06-24].

Tett, G. (2015). The silo effect: The peril of expertise and the promise of breaking down barriers. Simon and Schuster.

Tsoukas, H. (2011). How Should We Understand Tacit Knowledge? A Phenomenological View. In M. Easterby-Smith and M. Lyles (Eds.), *Handbook of Organizational Learning and Knowledge Management (Second, pp. 453–476)*. Chichester: Wiley.

Twizeyimana, J. D., and Andersson, A. (2019). The public value of E-Government–A literature review. *Government Information Quarterly, 36(2)*, 167-178. https://doi.org/10.1016/j.giq.2019.01.001

University of Glasgow. (2014) Leverhulme Trust Collections Scholarships. [via the School of Law blog] https://www.uofgschooloflaw.com/blog/2016/12/16/the-leverhulme-trust-collections-scholarships [Accessed 12-06-24].

University of Glasgow. (2021). 'Scottish Local Government during COVID-19: Data Needs, Capabilities, and Uses.' https://www.ubdc.ac.uk/impact-story/scottish-local-government-during-covid-19-data-needs-capabilities-and-uses [Accessed 12-06-24].

UK Government. (1988). Local Government Finance Act 1988. https://www.legislation.gov.uk/ukpga/1988/41/contents [accessed 12-06-24].

UK Government. (2003). Local Government in Scotland Act 2003. https://www.legislation.gov.uk/asp/2003/1/2023-01-09 [Accessed 12-06-24].

UK Government. (2017). 'Digital Strategy'. Policy Paper. https://www.gov.uk/government/publications/uk-digital-strategy [Accessed 12-06-24].

UK Government. (2017), 'Digital, Data and Technology Profession Capability Framework' https://www.gov.uk/government/collections/digital-data-and-technology-profession-capability-framework [Accessed 12-06-24].

UK Government. (2019). 'Challenges Using Data Across Government'. National Audit Office. https://www.nao.org.uk/wp-content/uploads/2019/06/Challenges-in-using-data-across-government.pdf [Accessed 12-06-24].

UK Government. (2020). 'National Data Strategy'. https://www.gov.uk/government/publications/uk-national-data-strategy [Accessed 12-06-24].

UK Government. (2021). 'A Modern Civil Service' https://www.gov.uk/government/publications/a-modern-civil-service [Accessed 12-06-24].

UK Government. (2022). 'Transforming for a Digital Future'. https://www.gov.uk/government/publications/roadmap-for-digital-and-data-2022-to-2025/transforming-for-a-digital-future-2022-to-2025-roadmap-for-digital-and-data [Accessed 12-06-24].

UK Government. (2023). 'Digital Data and Technology (DDaT) Playbook' Guidance. https://www.gov.uk/government/publications/the-digital-data-and-technology-playbook [Accessed 12-06-24].

UKRI. (no date). 'Smart Data Research UK' [webpages] https://www.ukri.org/what-we-do/browse-our-areas-of-investment-and-support/smart-data-research-uk/ [Accessed 17-06-24].

Umbrich, J., Neumaier, S., and Polleres, A. (2015). Quality assessment and evolution of open data portals. *2015 3rd International Conference on Future Internet of Things and Cloud*, 404–411.

Van Dijck, J. (2014). Datafication, dataism and dataveillance: Big Data between scientific paradigm and ideology. *Surveillance and society, 12(2)*, 197-208.

Van Lente, H. (2012). Navigating foresight in a sea of expectations: lessons from the sociology of expectations. *Technology analysis and strategic management, 24(8)*, 769-782. https://doi.org/10.1080/09537325.2012.715478

Van Meter, H. J. (2020). Revising the DIKW pyramid and the real relationship between data, information, knowledge, and wisdom. *Law, Technology and Humans, 2(2)*, 69-80. https://doi.org/10.5204/lthj.1470

Vanolo, A. (2014). Smartmentality: The smart city as disciplinary strategy. *Urban studies, 51(5)*, 883-898. https://doi.org/10.1177/0042098013494427

Vargo, S. L., and Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of marketing, 68(1)*, 1-17. https://doi.org/10.1509/jmkg.68.1.1.24036

Vargo, S. L., and Lusch, R. F. (2008) Service-dominant logic: continuing the evolution. *Journal of the Academy of marketing Science 36(1)*, 1-10. https://doi.org/10.1007/s11747-007-0069-6

Varon, J., and Peña, P. (2021). Artificial intelligence and consent: A feminist anti-colonial critique. *Internet Policy Review, 10(4)*, 1-25. https://doi.org/10.14763/2021.4.1602

Venters, W., Oborn, E., and Barrett, M. (2014). A trichordal temporal approach to digital coordination. *MIS quarterly, 38(3)*, 927-A18. https://www.jstor.org/stable/10.2307/26635008

Wang, G., Xie, S., and Li, X. (2024). Artificial intelligence, types of decisions, and street-level bureaucrats: Evidence from a survey experiment. *Public Management Review, 26(1)*, 162-184. https://doi.org/10.1080/14719037.2022.2070243

Warner, K. S., and Wäger, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long range planning, 52(3)*, 326-349. https://doi.org/10.1016/j.lrp.2018.12.001

Weerakkody, V., and Dhillon, G. (2008). Moving from e-government to t-government: A study of process reengineering challenges in a UK local authority context. *International Journal of Electronic Government Research (IJEGR), 4(4)*, 1-16.

Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., and Blegind-Jensen, T. (2021). Unpacking the difference between digital transformation and IT-enabled organizational transformation. *Journal of the Association for information systems, 22(1)*, 102-129. https://doi.org/10.17705/1jais.00655

West, D. M. (2004). E-government and the transformation of service delivery and citizen attitudes. *Public Administration Review. 64(1)*: 15-27. https://doi.org/10.1111/j.1540-6210.2004.00343.x

Whyte, W. F. (1979). On making the most of participant observation. *The American Sociologist*, 56-66.

Yildiz, M. (2013). Big Questions of E-Government Research. *Information Polity 17*: 343–355. https://doi.org/10.1145/2479724.2479763

Yin, R. K. (2009). How to do better case studies. *The SAGE handbook of applied social research methods, 2,* 254-282.

Zhang, H., Xu, X., and Xiao, J. (2014). Diffusion of e-government: A literature review and directions for future directions. *Government Information Quarterly, 31(4)*, 631-636. https://doi.org/10.1016/j.giq.2013.10.013

Zhao, F., Fashola, O. I., Olarewaju, T. I., and Onwumere, I. (2021). Smart city research: A holistic and state-of-the-art literature review. *Cities, 119.* https://doi.org/10.1016/j.cities.2021.103406

Appendices

Appendix A: Respondents – (Select) Information from Pre-interview Survey

FULL SAMPLE n = 55.
Complimented by interview data for 'ANALYSED ANSWER' column.
Some alteration to job titles where likelihood of identifying the respondent deemed high.

#	ID	Job title*	Identifies as a Data Professional?	ANALYSED ANSWER
1	Z-7	Open Data Project Officer	No, I'm inclined to refer to myself as a data practitioner.	NO
2	Y-7	Data Architect	More a GIS geek	NO BUT
3	X-2	Parking and Sustainable Transport Team Leader	No	NO
4	W-2	Business Development Officer	Good question, I guess I could be described that way, but a software developer engineer would have been the job title before. I don't refer to myself as a data professional, maybe I should or maybe I could.	MAYBE YES
5	V-4	Data Scientist	Yes	YES
6	U-3	Principal Educational Psychologist	Yes	YES
7	T-3	Lead Officer, [Location] Child Protection Committee	No	NO
8	S-3	Quality Assurance and Compliance Manager	No	NO
9	R-4	Head of Transport Strategy	No	NO
10	Q-2	Data Project Manager	No	NO
11	P-4	Creative Design Lead	No	NO
12	O-3	Chief Digital Officer	No – although supporting colleagues in this is a significant part of my role and was previously responsible for the Information Governance function in another Local Authority.	NO BUT
13	N-8	Business Manager - Metrics	Yes probably, but need to know more about what the definition is of a 'data professional'	MAYBE YES
14	M-4	Principal Officer	No	NO
15	L-3	Quality Assurance Officer	No	NO
16	K-4	Head of Business Intelligence	No but during my career I have worked with data in both a technical	NO BUT

			and business context which I believe puts me in a good position to understand how data can support business and put this into practice.	
17	J-3	ICT Relationship Manager	Difficult one. Not typically, nor wholly, but technically I probably am, certainly part-time.	MAYBE YES
18	I-2	Transformation and Performance Manager	No	NO
19	H-6	Open Data Co-ordinator	Yes	YES
20	G-4	Data Scientist	Yes	YES
21	F-4	Connectivity Plan Manager	Not exactly but I would say I am experienced in data.	MAYBE YES
22	E-3	Senior Change and Delivery Officer [in Data, Performance and Business Planning]	I consider myself a professional with a significant focus on data, so I guess kind of	MAYBE YES
23	D-3	Senior Change and Delivery Officer	No	NO
24	C-3	Data, Performance and Business Planning Manager	No, I manage data & performance analysts	NO BUT
25	B-3	Senior Education Officer	I have some understanding – when I was a Headteacher, I enjoyed using data to help plan supports for pupils and to develop our school improvement plan. As a Quality Improvement Education Officer and in my current post, I regularly used data to support and challenge the work of schools.	MAYBE YES
26	A-4	Engineering Officer	No	NO
27	Zz-3	ICT Development Manager	No	NO
28	Yy-3	Senior Manager Practice Teams	Yes	YES
29	Xx-8	Executive Director Enterprise and Communities	No	NO
30	Ww-4	Assistant Manager	No	NO
31	Vv-4	Development Officer	No. Although I have always had a good understanding of the role data plays in decision making, only in the past five years that I have truly begun to realise the significance that it can have in gaining the real insight which not only helps to make	NO BUT

			decisions but also the story's that can be told around this.	
32	Uu-4	Sustainability Stakeholder Manager	No	NO
33	Tt-3	Information Governance and Strategic Complaints Manager Data Protection Officer [two roles]	No – Information Professional	NO BUT
34	Ss-4	Engineering Officer	No	NO
35	Rr-8	Head of Business Solutions	No. I am the Council's Senior Information Risk Owner so have responsibility for ensuring we have effective information governance arrangements. I am also the Head of Service leading the council's digital transformation, with data management and use a key component of that vision.	NO BUT
36	Qq-7	Public Transport and Sustainable Development Manager	No	NO
37	Pp-4	Transport Planning Manager	No	NO
38	Oo-8	Business Development Manager	No	NO
39	Nn-8	Performance and Improvement Manager	No	NO
40	Mm-8	Business Strategy Manager	Yes	YES
41	Ll-8	Built Environment Manager	No	NO
42	Kk-6	IT Team Leader - Data Services	Yes	YES
43	Jj-8	Head of Education	Yes, assuming I understand that definition	YES
44	Ii-8	Project Manager	No. I have knowledge from previous projects of data management, processing of data, data protection, sensitivity and security and the like. However, I wouldn't describe myself as a data professional.	NO BUT
45	Hh-8	Repairs and Maintenance Manager	No	NO
46	Gg-4	Group Manager - Roads Maintenance	No	NO

47	Ff-6	IT Team Leader – Business Change	Trick question – no I'm not a data professional	NO BUT
48	Ee-6	Estates and Commercial Investment Lead	No	NO
49	Dd-2	Lead – Strategic Projects and Digital, [City Development team]	No	NO
50	Cc-4	Business Insight Analyst	Yes	YES
51	Bb-8	Performance Analyst	Yes	YES
52	Aa-2	Senior Research and Information Officer	Yes	YES
53	Zza-3	Technical Architect	Data and infrastructure and software professional; a computing professional IT is everyone's responsibility and data is part of that. [*Note: form completed during interview]	NO BUT
54	Yyb-6	Smart [Location] Project Coordinator	No	NO
55	Xxc-4	Head of Waste and Recycling	No	NO

Appendix B: Ethical Approval

University of Glasgow

College of Social Sciences

08 July 2020

Dear Lucille Tetley-Brown

College of Social Sciences Research Ethics Committee

Project Title: Data Culture in Scottish Local Authorities: Staff perspectives of data use for digital transformation

Application No:

The College Research Ethics Committee has reviewed your application and has agreed that there is no objection on ethical grounds to the proposed study. It is happy therefore to approve the project, subject to the following conditions:

- Start date of ethical approval: 13/07/2020
- Project end date: 28/02/2022
- Any outstanding permissions needed from third parties in order to recruit research participants or to access facilities or venues for research purposes must be obtained in writing and submitted to the CoSS Research Ethics Administrator before research commences. Permissions you must provide are shown in the *College Ethics Review Feedback* document that has been sent to you as the Collated Comments Document in the online system.
- The data should be held securely for a period of ten years after the completion of the research project, or for longer if specified by the research funder or sponsor, in accordance with the University's Code of Good Practice in Research: (https://www.gla.ac.uk/media/media_490311_en.pdf)
- The research should be carried out only on the sites, and/or with the groups and using the methods defined in the application.
- Any proposed changes in the protocol should be submitted for reassessment as an amendment to the original application. The *Request for Amendments to an Approved Application* form should be used:
  https://www.gla.ac.uk/colleges/socialsciences/students/ethics/forms/staffandpostgraduateresearchstudents/

Yours sincerely,

Dr Muir Houston
College Ethics Officer

Appendix C: General Information About the Study

University of Glasgow

College of Social Sciences

Data Culture across Scottish Local Government

This project will research data culture across Scottish local government. In particular, I intend to explore staff perspectives of data use for digital transformation. Some of the over-arching research questions, for interest, are as follows:

- What is the linkage between staff and data use as regards the ability of a local government to be 'data-driven' for public service delivery?

- To what extent does achievement of 'public service delivery transformation' depend on the linkage between internal staff and data use within a Scottish local government stetting?

I anticipate looking closely at between three and five initiatives, ideally across different local authorities. The research will only progress with the official support of the intended local authority that is the 'owner' of the data-driven initiative. Once the locations and particular initiatives are chosen, my intention is to do a mix of:

(i)   analysis of strategic intentions,
(ii)   development of business process mapping showing public service delivery task structures,
(iii)   qualitative interviews with staff across a range of roles to identify the (potentially varied) perspectives of data, and what it could / should be used for in public service delivery.

My aim is to look at physical and technical infrastructure for data use, within its organisational context and set in relation to the real-people / human aspect of using data for digital transformation. Where there are strategic ambitions to improve – or indeed fundamentally alter – the manner in which certain public services are delivered, my research will add insight about the role of staff for the achievement of the goals.

Thank you

Lucille Tetley-Brown

Sociology, School of Social and Political Sciences

University of Glasgow

Appendix D: Plain Language Statement – Invitation to Interview

PARTICIPANT INFORMATION SHEET

You are being invited to take part in a research study. Before you decide to take part or not it is important for you to understand why the research is being conducted and what it will involve. Please take time to read the following information and discuss it with others if you wish. Please ask me if there is anything that is not clear or if you would like more information.

1. Research Project Title
Data Culture in Scottish Local Government: Staff perspectives of data use for digital transformation

2. About the study
In the past ten years, local government has been pursuing an agenda of 'digital transformation' and this study will analyse staff members' experiences of this phenomenon, especially looking at opinions relating to scope to use digital data in day-to-day work tasks. The aim is to explore perceptions of and perspectives on data and its use in various tasks that support the delivery of public services across local government in Scotland. The project will detail how up to five 'smart city' initiatives are being taken forward across several council organisations, focusing on the experience of staff working in an environment that claims to be pursuing digital transformation.

To add further detail: the majority of smart city definitions tend to emphasise the use of Information Communication Technologies (ICTs) and data as an effective way to solve the economic, social and environmental challenges of an urban area. This study will focus on exploring how the staff working within Scottish local government personally feel, or what they think, about their employer organisation's aims of digital transformation for public service delivery improvements.

3. Why have I been chosen?
This study is seeking to explore how staff within Scottish local authorities experience initiatives that purport to use data for public service delivery and digital transformation. You have been chosen because you are a member of staff within a Scottish local authority.

4. What does taking part in the study involve?

i. What will happen to me if I take part?

If you choose to take part in the study, you will take part in a telephone interview that will not exceed 45 minutes in length. The interview will be arranged, likely via email or text message / WhatsApp, or whichever is your preferred means of communication, at a time that suits you. The interview will be 'semi-structured' which means that there will be some questions I can use to guide the interview, but there is flexibility in what we would discuss during the allotted time.

ii. What do I have to do?

If you choose to take part in the study, you will retain a copy of this Participant Information Sheet, sign a Consent Form to be returned to me (digital signature is fine) and arrange a time at which it would be convenient to be interviewed. During the interview you would share your opinions and thoughts about digital transformation initiatives within your place of work, and offer views on the role of data in these activities. This will help myself as the researcher address what impact is had on those working at the frontline of public service delivery, where local government as an employer is pursuing digital transformation.

iii. What are the possible disadvantages and risks of taking part?

Participating in the research is not anticipated to cause you any disadvantages or discomfort. However, if any discomfort or distress occurs, you are able to cease participation immediately and are not required to give any explanation. All that is required is that you inform myself of your preference to be removed from the study. At this point any information already gathered will not be used, and will be fully discarded. Note that there is a time limit on withdrawal from the research after the interview has taken place, which is when the first formal draft of the full draft of the PhD thesis has been submitted. This is currently expected to be December 2021.

Note that given the size of Scotland and the inter-connectedness of local government activity, there is a risk of being identified as having taken part in the study. The way that the research is being organised takes preference for full participant anonymity but cannot offer a guarantee that where you participate you will remain anonymous. Only pseudo-names will be used in the final report, but someone familiar with the area of study i.e. digital transformation activities in Scottish local government, may be able to work out who was involved. Furthermore, whilst all participants will be asked to be discreet about their own involvement, this also cannot be guaranteed.

iv. What are the possible benefits of taking part?

There are no immediate personal benefits to you in taking part, beyond sharing your own views to aid the research. Broadly, the insights developed in the course of this PhD research project can hopefully be used to improve the working environment for staff affected by a digital transformation policy or strategy within local government.

v. What about the impact of Coronavirus?

This study will be conducted entirely remotely, with the interviews conducted over the telephone. There will be no direct contact. If you would like, prior to the interview we can 'meet' virtually via a video call or using teleconferencing tools, to put a face to the name. However, the interview itself will be carried out via the telephone just using audio.

If your personal circumstances change (including becoming unwell) between when we arranged the interview and when it is due to take place, and you become unable to attend this interview appointment, we can re-arrange or you can withdraw from the study, whichever you prefer.

5. Do I have to take part?

It is your own decision to take part or not in this study. Participation is completely voluntary and you are free to withdraw your contributions at any point during the research, up until the first full draft of the PhD thesis has been submitted. Due to participant confidentiality, withdrawing from the research will be treated entirely privately. During the interview, you can say as much or as little as you want about the subjects being discussed, and you do not have to answer any question you do not want to.

6. What will happen to my answers?

If you agree, interviews will be audio recorded and then written down on paper (typed onto a screen) exactly as they were spoken. The data generated and contributions will be anonymised as much as is feasible and kept confidential. Please note that confidentiality will be maintained as far as it possible, unless during our conversation I hear anything which makes me worried that someone might be in danger of harm. If so I might have to inform relevant agencies of this. No personal data details will be retained in the dataset created from the interview: identification will be withdrawn and data will be presented using pseudonyms in my PhD Thesis that will be submitted for examination and in future publications. The key for the anonymised data held by me only, for the purposes of enabling removal of contributions if consent is withdrawn, will be destroyed once the PhD has been awarded.

Results of this research will be published. You will not be personally identified in any report or publication. Your employer organisation will not be explicitly identified in any report or publication. However, it could be possible to deduce what council is being discussed.

If you wish to be given a copy of any reports resulting from the research, please ask to be added to my circulation list.

7. Will I be recorded and how will the recorded material be used?

The audio from interviews will be recorded if you give your permission for this to be done. The recording will be used to transcribe the content of the interview, i.e. your answers to questions or what you tell me about the themes we discuss. Once

the transcription is completed, the recorded audio material will not be used further in the analysis stages of the study. The audio material will be retained by me, encrypted and stored in a secure location until the PhD has been awarded. At this point I will dispose of my copies in entirety and irreversibly (both the original file and back-up file).

8. What happens to the data generated during the research project?

After the PhD has been awarded, the University of Glasgow will hold PhD associated data securely for 10 years, as is the standard policy. It is also the intention that some datasets will be made accessible on the U.K. Data Archive for re-use by other researchers. However, any openly available data will be fully anonymised: only datasets that have no component of personal information will be shared (i.e. no audio files or full transcripts). All personal data that is managed within the research will comply with the General Data Protection Regulations (GDPR) 2018 and the Freedom of Information (Scotland) Act 2002.

9. What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

During the interview I will ask you about your own opinions and experience of initiatives undertaken at your place of work to progress 'digital transformation'. The study seeks to discover your views on current or previous practices in relation to the use of digital data for supporting public service delivery tasks at your place of work. Your views and experience are just what the project is interested in exploring.

10. What if something goes wrong?

If you have any complaints about the project in the first instance you can contact any member of the research team, i.e. myself or one of the supervisors. If you feel your complaint has not been handled to your satisfaction you can contact the University of Glasgow's Ethics Committee to take your complaint further (see below).

11. Who is organising and funding the research?

This study is for fulfilment of my PhD requirements and it is organised by myself with guidance / support from my supervisory team based within the School of Social and Political Sciences in the College of Social Sciences at the University of Glasgow. My supervisors are: Professor Bridgette Wessels and Assistant Vice Principal Des McNulty. Funding for the PhD comes from The Leverhulme Trust.

12. Who has ethically approved the research?

This study has been approved by the College of Social Sciences Ethics Committee at the University of Glasgow.

13. Key contacts

For further information about the study please contact me by email on: l.tetley-brown.1@research.gla.ac.uk

Also you can contact my supervisors Professor Bridgette Wessels and Assistant Vice Principle Des McNulty, using the details below:

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If you have any concerns regarding the conduct of the study, you can also contact the College of Social Sciences Ethics Officer:

Dr Muir Houston
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Appendix E: Pre-interview Survey Questions

PRE-INTERVIEW SURVEY

Data Culture in Scottish Local Government: Staff perspectives of data use for digital transformation

Researcher: Lucille Tetley-Brown

1.	Name	
2.	Gender	
3.	Age bracket	☐ 18 – 24 ☐ 25 – 34 ☐ 35 – 44 ☐ 45 – 54 ☐ 55+
4.	Current job title	
5.	**Previous job title** (including if this was in another organisation)	
6.	**Length of time in years / months working in current organisation** (including time spent in previous roles for this employer)	
7.	**Please estimate the total length of time in years / months you have spent working in local government** (including any time spent previously employed by another council organisation)	

8.	Have you ever been employed to work in a private sector organisation? If yes, when and for how long?	
9.	Would you describe yourself as a data professional?	
10	What value does your employer organisation and / or work team ascribe to the data it holds? (e.g., low, medium, high; please add any comments you wish)	

Appendix F: Interview Guide

Interview Guide: Data Culture in Scottish local government
L Tetley-Brown. July 2020

Below the researcher has developed a few neutral and open-ended interview questions that align to emerging themes of interest from the literature review and research design work. These can be used to guide the semi-structured interviews that are intended as part of the PhD research design.

Firstly, here are the overarching **Research Questions***:

1. What is driving, enabling and / or preventing new ways of using data, including extracting and applying insights from its manipulation via data analytics, within local government?

2. What influence do internal staff have on the ability of local government to be 'data-driven', and does this contribute to public service delivery transformation?

3. (a) What is the linkage between 'staff' and 'data use' as regards the ability of a local government to be 'data-driven' for public service delivery?
(b) And, to what extent does achievement of 'public service delivery transformation' depend on the linkage between internal staff and data use within a Scottish local government setting?

   *UPDATED IN 2022

In addressing whether local government is 'data-driven' and how this relates to public service delivery transformation, the research will look at –

   i) staff perspectives and perception of data and its application / use in relation to their own work
   ii) infrastructure (physical / technical) for data and information use, re-use and sharing, which will be related to specific public service delivery task structures across the local authority, and whether these entail a role for data that accommodates the dynamisms of digital data
   iii) organisational structure or context, including norms and traditions

The purpose of the semi-structured interviews are first and foremost about gathering empirical data related to the aim listed at number one above. However, it is recognised that through analysis of the interview detail relating to the aims listed at numbers two and three may be found.

Qualitative Interview

Neutral initial question, applicable to all respondents:
   - Please help me better understand what digital transformation / X Initiative is at your place of work
   - What has working with digital transformation been like for you?

Other
   - What changes have you seen from previous ways of working?
   - Have you a vision of how your work will develop into the future?

- What is a typical day like for you?
- What has been not-so-helpful or a challenge to you?

If not addressed through the interview:
- What does 'digital transformation' and 'useful data' MEAN to you?
- What does public service delivery transformation mean to you? And to your employer organsiation?
- What else would you like to share with me about working within a digital transformation initiative relating to 'smart city' and data-driven strategic aims? *Particularly from an operational perspective (for Group A or C) a managerial / strategic perspective (for Group B)*

Additional guiding questions for those directly involved in the initative

General about 'data' and 'data use' at work
- What data and information do you use within your working day?
- What is it generally used for? Has this changed over the past few years?
- In X Initiative, of focus for OUR discussion, what data is
  - generated
  - collected
  - processed
  - applied
  - stored
  - shared
  - profiled *(e.g. used in reports or broadcasted via other means such as via official social media channels)*?

General about the public service the initiative refers to
- What is the public service this initiative improves delivery for? *To tease out extent of perspective on the service, e.g. with Intelligent Street Lighting is it 'light' or is it 'safety'?*
- Who including what groups delivers the public service that connects to this initiative?
- Who including what groups deliver manage the delivery of the public service?
- Who is working on the initiative, e.g. numbers of key people? *E.g. maybe the main public service = 100 people; initiative = 5 people.*

Becoming 'data-driven'
- How do your colleagues respond to discussions about the 'new way'?
- To what extent are live tasks being automated?
- What was manner in which the public service delivery was undertaken before; what happens now?

Digital Transformation
- What do you think about the changes linked to X Initiative? Is this a transformation?
- How do you feel about the changes?
- What observable changes have you experienced in your public service delivery task structures and reporting?
- Has the Council made investments into staff training for 'new ways' to use data?

Additional guiding questions staff that link to initiative (but not operationalising it)

General about 'data' and 'data use' at work
- What constitutes data within the context of your working day?
- Where does work related data get stored?
- What observable changes have you experienced in your public service delivery task structures and reporting as related to digitalisation or digital transformation?

The specific 'digital transformation' initiative
- Are you aware of X Initiative and the new data captured / used?
- Do you get access to that data?

- If yes – how did that come about? What does the data get used for in your own team / work?
- If no - will you in the foreseeable future? Could you think of uses of the data that would be helpful to you in your own work?
- In your opinion, is X Initiative an improvement to the delivery of the public service?

Council data and digital related strategies
- Think back to time before Council had policy or strategy Y relating to 'data', 'innovation' and 'smart' ambitions, how was the sharing of data (and information?) then?
- How is it now?
- Does your organisation "value data"? In other words, does the council see data as important, and does your team? If so, why / in what way (for what purpose)?

Education and training
- What training have you received in the use of data in your role: technical, legal, ethical? *E.g. note things like the GOLD course at Glasgow City Council that would cover GDPR etc.* and ask this question broadly for group C, and not in conjunction with the specific initiative
- Has the Council made investments into staff training for 'new ways' to use data?

Notes to myself as the researcher

Recall Patton's six possible foci for questions on any topic:
1. Experience / behaviour,
2. Opinions / values,
3. Feelings,
4. Sensory impressions,
5. Knowledge
6. Demographic data

Have a wariness of using term 'data' too soon because I am interested in the related concepts of information and knowledge. However, if it doesn't come up within 15 minutes then I will ask about whether the term 'data-driven' gets used.

Use of motivational probes or "conversation continuers" to:
(a) gain more detail,
(b) invite your participant to elaborate on something
(c) provide more clarity about an issue, or
(d) to help you more fully understand some process.

Possible statements to help facilitate the interviews:
- Can you give me an example of what you mean?
- Please tell me more about that.
- What you are sharing (or have said) is important.
- Can you say more?
- How does your experience before that time compare to your experience now?
- Tell me more about that experience (or that time)?
- How do you see that (or yourself) in the future?
- If you could change anything about that experience, what would it be?

References

Patton, M. Q. (2003). Qualitative evaluation checklist. *Evaluation checklists project*, *21*, 1-13.

Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice*. Sage publications.