A Knowledge-Centric Model for Government Orchestrated Digital Transformation of the Microbusiness Sector

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ABSTRACT

Most prior public sector digital transformation (DT) research has examined the role of digitalization in improving either the internal operational efficiency of the government or the quality of government service delivery to its external stakeholders, such as citizens and businesses. Though the digital government evolution model proposes *policy-driven digitalization* of specific sectors as the final stage of digital government evolution, government's role in orchestrating extra-government digitalization initiatives to create public value has not been sufficiently investigated. To address this perceptible void in the public sector DT literature, we study a government-led DT program designed to promote digitalization within microbusinesses (MB), a sector that has large economic and social implications. Given the significant role of technical and business knowledge in facilitating enterprise DT, we examine and theorize different *knowledge mechanisms* through which government policy initiatives can help foster DT of MBs. Drawing on qualitative data from a series of structured interviews and focus groups with government agents, digital champions, and MB owner-managers, involved with the implementation of a government-led DT program for MBs in Ireland, we identify three knowledge pathways —top-down, bottom-up, and multidirectional, each comprising distinct practices, among the different DT stakeholders playing different knowledge related roles for facilitating this transformation. Collectively the identified knowledge mechanisms in the DT program knowledge ecosystem foster social value creation for MBs and thus for the nation as a whole. Specifically, the sustenance of the DT program is achieved through the "initiation" and "instantiation" knowledge routes for social value creation. Our findings offer theoretical contributions to the fields of —government-led digital transformations, effectiveness of government led digital initiatives, and digital transformation in the MB sector. Our study also has significant implications for policy and practice.

Keywords: digital transformation, government, public sector, microbusiness, knowledge mechanisms, knowledge pathways, knowledge flows, knowledge roles, sectoral digital divide, social value, policy innovation

INTRODUCTION

Though digital transformation (DT) is often viewed as the use of digital technologies to innovate the ways in which organizations create value and prepare for the future, the context of governments and public sector is very different from that of private organizations (Carter, Desouza, Dawson, & Pardo, 2023).

Governments and the public sector are expected to create public value by implementing innovative policies, plans, and programs purported to have a positive impact on the intended societal beneficiaries. Hence, the scope of public sector DT is not restricted to digitalization efforts within government organizations, it also concerns government efforts at enabling extra-government organizations and sectors to leverage digital technologies for creating the desired public value[1] (Meynhardt, 2009, 2015; OECD, 2019 b). This extended definition of public sector DT is consistent with the *digital government evolution model*, which proposes contextualized policy-driven digitalization of specific sectors comprising extra-government stakeholders, as the final stage of digital government evolution (Janowski, 2015; Srivastava & Teo, 2005). Despite the inclusion of sectoral digitalization as the most matured stage of the digital government evolution model, prior digital government research has primarily focused on digitalization efforts within the government and public sector organizations —either for the improvement of their internal operational efficiency or for augmenting government's external service delivery (Janowski, 2015; Scholl, 2024). Clearly, of the three dimensions of public value proposed by digital government literature, namely: *improved public services, improved administration,* and *improved social value and well-being*, few studies have explicitly examined creation of social value (Twizeyimana & Andersson, 2019). However, in the context of government's efforts to digitalize extra-government sectors, public value creation is primarily directed at improving the social value and well-being of the impacted stakeholders of sectoral digitalization policies and programs rather than improving government operations. Hence, research that examines the social value dimension of public value creation through government sponsored digitalization programs for extra-government organizations and sectors would be of value to both research and practice (OECD, 2019 b) .

[1] Public value is broadly defined an abstract entity that is valued by the public, is good for the public, or both (Bryson, Crosby, & Bloomberg, 2014). It is a psychological and relational concept. In our research, it can imply the introduction of sectoral governance DT program as a public policy innovation initiative intended to bridge DT related knowledge gaps as well as digitally uplift the MB sector. It can also be construed as social value and wellbeing related impacts experienced by the beneficiaries (MB sector) and other stakeholders (government and other parties) involved in the delivery of such a policy.

As aforementioned, digital government is now expected to move beyond transforming government's own internal operations and services delivery, to stimulate exploitation of new technologies by different segments of citizens and businesses (Srivastava, Teo, & Devaraj, 2016). For effective public value creation through sectoral extra-government DT initiatives, governments aspire to focus their efforts on high-impact sectors. Microbusinesses (MBs), comprising independently owned and operated small businesses with fewer than ten employees, are one such high-impact sector (Bourke & Roper, 2019; Shirish, Srivastava, & Panteli, 2023). Accounting for over half of the world's GDP, MBs consist of about 75% of all the firms globally (Mandviwalla & Flanagan, 2021). Despite the huge potential to create significant public value, MBs generally have limited resources to undertake digital transformations (Mandviwalla & Flanagan, 2021). Furthermore, literature highlights the recurring issue of inadequate governmental business support for MBs, which results in MBs prioritizing sustenance over risky transformational strategies (Andrade-Rojas, Saldanha, Kathuria, Khuntia, & Boh, 2024; Gherhes, Williams, Vorley, & Vasconcelos, 2016). But in the current digitally impacted times, it is imperative for MBs to include digital transformation as part of their core strategy to remain competitive in the market (Andrade-Rojas, 2024). Interestingly, compared to big organizations, the small size of MBs provides them with the desired flexibility to adapt to the fast-changing market conditions, particularly required for digital transformations. Nonetheless, MBs need to acquire and assimilate the requisite capabilities and knowledge to pursue their innovation and DT ambitions (Andrade-Rojas et al., 2024). To leverage the full potential of MBs for contributing to the nation's economy by creating public value, governments are making efforts to orchestrate the use of digital technologies by MBs through different DT programs. However, it is not always clear if these government-initiated DT programs, conceived as knowledge-based public policy innovations, are creating demonstrable public value.

As explained earlier, in the context of government's efforts to orchestrate digitalization of extra-government sectors, public value creation largely concerns creation of social value and well-being of the impacted stakeholders. Further, as MBs are much smaller in size and are deeply entrenched in the entire

social and economic fabric of the society, they are closer to social value creation (Twizeyimana & Andersson, 2019). Consequently, in this research, set in the MB context, we examine the mechanisms through which sectoral public DT initiatives create the desired social value (as the relevant dimension of public value in our research context) (Kergroach, 2021; Shapira, Youtie, & Kay, 2011).

Specifically, we study how social value is created through a recent sectoral DT initiative by the Irish government called the 'Digital Start Program' aimed at orchestrating the digitalization of Irish MBs. Though Ireland views MBs as a high impact sector, the Irish MB sector currently has low productivity attributable to outdated processes, poor management practices, and weak adoption of digital technologies (OECD, 2019 a). Clearly, the Irish MB sector needs policy initiatives to create both short- and long-term social impact. Given that Ireland is one of the top five European countries with a relatively high level of digitalization of public sector, the Irish government as a part of their current national digital strategy, aspires to move to the next stage of their digital government evolution by digitalizing impactful extra-government entities (Ireland, 2023). This makes Ireland a highly suitable setting for our study.

Moreover, to be consistent with digital government literature, in this study, we uncover the reflexive experiences of stakeholders in improving social value and well-being dimension of public value for the given case context (Twizeyimana & Andersson, 2019). We posit social value creation as a measure of the effectiveness of the government-led DT programs estimated through the qualitative perceptions of the program beneficiaries (Meynhardt, 2009). Our approach of moving beyond the simple provision of technology to understanding the impact on the intended program beneficiaries helps us to better appreciate the contextual dynamics of public value creation (Benington, 2015; Benington & Moore, 2011; Meynhardt, 2015; Moore, 2012).

For effectuating the intended impacts through government-led DT programs, prior research has emphasized the provision of requisite *digital transformation-related knowledge* (DTRK) or simply DT knowledge. Such DT knowledge comprising both technical and business knowledge and is one of the most critical resources required for initiating and implementing DT efforts (Srivastava & Shainesh, 2015).

Resource-constrained MBs may be dependent on governments for acquiring the necessary knowledge, expertise, and other related resources for undertaking such transformations (Mozaffar & Panteli, 2022; Pittaway & Montazemi, 2020; Reggi & Gil-Garcia, 2021; Shirish et al., 2023). But for undertaking large scale sectoral transformations, governments may not be able to provide and disseminate all the required transformational knowledge. Hence, governments need to orchestrate *knowledge mechanisms* within sectoral ecosystems to ensure efficient production, processing, and dissemination of the required DT knowledge resources, through and among different ecosystem stakeholders. Such knowledge mechanisms consist of different *knowledge flow pathways* in the DT ecosystem. Despite their importance for transformational contexts, knowledge flows within sectoral ecosystems for orchestrating transformations have rarely been examined by prior digital government literature (Scholl, 2022). Most studies merely acknowledge its relevance in various related contexts without offering a nuanced understanding of the specific knowledge mechanisms that can enable the creation of social value (Lindberg, 2013; Scholl, 2022; Van Meerkerk, 2019). Our research, aimed at examining a government-led DT related program, leverages the concept of knowledge flows through the public policy lens to examine, understand, and theorize the underlying knowledge mechanisms for orchestrating MB digital transformations to create the desired social value (Bertot, Estevez, & Janowski, 2016; Janowski, 2015). Hence, the broad research question that we intend to address in our research is:

> *RQ: What are the knowledge mechanisms through which the innovative government policy initiatives can help orchestrate digital transformation of MBs for creating the desired social value?*

Situating our arguments in the literature on knowledge management, digital government, and public policy innovation literatures, and employing a case study method, we examine if the 'Digital Start Program' initiated by the Irish government is creating the desired social impact by digitally transforming MBs, and what are the knowledge mechanisms through which this happens. We believe that a deep theoretical understanding of the Irish Digital Start Program will help us translate this knowledge to public sector digital

transformations in other contexts. In our research, we examine how the Digital Start (DS) Program[2], working through Local Enterprise Offices (LEOs) in Ireland, provides advice, information, and support to MBs for initiating and implementing digital transformations. In specific, we examine the knowledge pathways and identify the knowledge practices through which the DS Program enables the flow of both business and technical digital transformation-related knowledge (DTRK), among different ecosystem stakeholders involved in orchestrating digital transformation of Irish MBs. For measuring the program impact through social value creation, our approach consists of gathering evidence to better understand how the DT program eases the daily operational hassles of the MBs (the policy targets) and street-level bureaucrats tasked with the DT program implementation on behalf of the government. Studying both the stakeholder groups is consistent with our approach to viewing public value creation as a relational phenomenon (Meynhardt, 2015).

In our study, the primary data is collected through structured interviews, focus groups, and semi-structured interviews with micro business owner-managers (MBOMs) and public sector stakeholders in the DS ecosystem i.e., associated with the implementation of the DS Program. In addition, we also use secondary data from different sources to better understand the context and the importance of our findings. Through a careful analysis, we unearth knowledge mechanisms comprising knowledge pathways and practices of knowledge flows (transfer and exchange) among different stakeholders for enabling digital transformation of MBs aimed at creating social value. In specific, our findings describe how the digital transformation of sectoral government gets instantiated.

We believe that a theoretical understanding of the mechanisms through which government-initiated innovative policy-driven programs spawn digital transformations in MBs would benefit not only the MB sector but also governments and societies in general. Our study makes three important contributions. First, it offers valuable insights into how digital transformation governance in the public sector can be orchestrated in a sectoral context (Faro, Abedin, & Cetindamar, 2022; Provan & Kenis, 2008; Sørensen,

[2] This pilot initiative has recently been renamed as 'Digital for Business', however, since our investigation began before the renaming, we have retained the older name (Digital Start Program) throughout the paper.

Bryson, & Crosby, 2021; Wang & Ran, 2022). As knowledge flows (transfer and exchange) happens through the involvement of multiple stakeholders, findings from our study offer the much-needed legitimacy to recommend the use of proactive and collaborative governance mechanisms by public sector bodies to respond effectively to the evolving digital trends (Bodrožić & Adler, 2022; Sørensen et al., 2021). Second, the findings from our study extend and offer empirical validity to the predominantly conceptual work in digital government literature on sectoral government (Janowski, 2015, 2016; Kalbaska, Janowski, Estevez, & Cantoni, 2017). Drawing on empirical data, we propose an inductively driven knowledge-centric model for the government-orchestrated digital transformation of the MB sector. Third, we contribute to recent literature exploring the phenomenon of DT in the MB sector, specifically by recognizing the need for collective learning of different stakeholder groups. Specifically, we conceptualize DT in the MB sector as government-led ecosystem accruing significant social value, rather than an enterprise level initiative for creating shareholder value (Mandviwalla & Flanagan, 2021; Shirish et al., 2023).

The rest of the paper is structured as follows; first, we review relevant background literature to establish digitalization of the MB sector as an important part of public sector DT initiative for the creation of social value dimension of public value, which is relevant for our study context. After discussing the important role that MBs play in economy and society at large, we present our initial research framework derived from prior public sector DT and knowledge flow pathway literature, which serves to guide our investigation. Next, we introduce the details of our case study on the Irish DS Program, which is followed by the methods section and discussion of our findings. The findings are used to populate the initially proposed research model, which summarizes our key theoretical contributions. We conclude the paper with theoretical and practical implications.

BACKGROUND LITERATURE

Digital Transformation of the Public Sector

Digital transformation is generally associated with technological capabilities that can cause organizational disruptions or other structural, processual, and cultural changes within organizations (Chanias, Myers, &

Hess, 2019; Dwivedi et al., 2015). Such transformations are typically described as strategic changes aimed at extending the organization's business model that are carried out through digital technologies such as artificial intelligence (AI), social media, cloud computing, mobile, analytics, etc., which result in changed products and processes, improved customers engagement, and new organizational structures to provide digital-based services (Carroll, Hassan, Junglas, Hess, & Morgan, 2021; Matt, Hess, & Benlian, 2015; Müller, Junglas, Vom Brocke, & Debortoli, 2016; Sebastian et al., 2020). In recent times, DT is increasingly being recognized as central to the efforts of governments and public sector to meet their obligations to the citizens and businesses (Carter et al., 2023). However, public sector DT aimed at creating 'public value', is very different from private sector DT, where the efforts are focused for the maximization of 'shareholder value' (Srivastava, 2011).

To create public value, governments are implementing multifarious public sector DT programs such as modernization of unemployment insurance in the Rhode Island, USA or pursuing different AI related initiatives to improve the operations and service delivery by the government (Carter et al., 2023). But the government's strategic goal of addressing the *social and well-being dimension of public value* can also be achieved through policy-driven digitalization of extra-government enterprises, especially within specific impactful sectors. Such a process of public sector DT is also consistent with the digital government evolution model, which proposes contextualization or policy-driven digitalization of specific sectors as the final stage of digital government evolution (Janowski, 2015; Srivastava & Teo, 2005).

Despite the acknowledgement that public sector digital transformation includes government efforts towards orchestrating digitalization of specific extra-government sectors, most public sector DT research is skewed towards understanding digital transformation for improving internal government operational processes or service delivery to the citizens (Eom & Lee, 2022; Kim & Zhang, 2016; McGrath, 2016; Pang & Lee, 2022). The underlying assumption being that internal DT initiatives will lead to government efficiency, which in turn will create future public value including improving social value and well-being of stakeholders (Twizeyimana & Andersson, 2019). Clearly, the policy driven enablement of specific

impactful sectors for undertaking DT initiatives, described by the final stage of digital government evolution model, has not been a focus for most public sector DT studies in the literature (Bodrožić & Adler, 2022; Jetzek, Avital, & Bjorn-Andersen, 2019).

We posit that in addition to the digitalization of the government operations and service delivery mechanisms, targeted enablement of identified national stakeholders (citizens and businesses) for undertaking DT, is an important aspect of governments' policy driven initiatives for creating social value at an accelerated pace (Srivastava, 2011; Srivastava & Shainesh, 2015). Such innovative DT efforts, aimed at formulating policy innovations for addressing critical social challenges such as the digital inclusion in specific sectors can facilitate rapid social value creation (Bertot et al., 2016; Janowski, 2015; OECD, 2019 b; Shirish et al., 2023; Srivastava et al., 2016). For example, policy driven initiatives for digital transformation of micro-businesses (extra-government enterprises) have immense potential for creating public value via creation of social value and contributing to the economic growth of the country (Bodrožić & Adler, 2022; Reggi & Gil-Garcia, 2021; Shirish et al., 2023). This evolutionary view on public sector DT enables us to go beyond viewing government stakeholders as only the *users and providers* of digitally transformed services, to seeing them as *enablers* of digital transformation within the grassroots of society, exhibiting the ability of digital governments to make contextual, sector-focused digital transformations (Janowski, 2015; OECD, 2019 b).

However, government orchestrated sectoral DT initiatives are difficult to implement because it involves complex contextual knowledge about the sector, geographical location, and the concerned stakeholders (Srivastava & Shainesh, 2015). Scholars have called for more research to examine how DT efforts can be carried out by government agents even when they do not have all the requisite knowledge to respond appropriately to the contextual requirements (Bodrožić & Adler, 2022; Carter et al., 2023; Eom & Lee, 2022). Literature on public sector DT efforts highlights a staggering gap between the public sector's digital aspirations for social development and the digital and contextual capabilities they have (De Angelis, 2013; Janowski, 2015; Pittaway & Montazemi, 2020). This knowledge gap among government agents

implementing sectoral DT programs can hinder the success of these DT initiatives (Mankevich, Magnusson, & Svahn, 2022). In such a scenario of distributed knowledge pools, it is imperative to conceptualize public sector DT initiatives as broad social innovation knowledge ecosystems, where governments serve as the enablers for establishing and maintaining such ecosystems through plans and programs that promote the digital transformation of vulnerable business sectors (Bertot et al., 2016; Daymond, Knight, Rumyantseva, & Maguire, 2023). It aligns well with the public value literature that views value creation as a contextual and relational concept (Meynhardt, 2015). As aforementioned, MB is one such sector where the government efforts to orchestrate DT can yield impactful results (Singh, Shirish, Kumar, & O'shanahan, 2023). We develop on this theme further in the next section.

Public Sector Priority: Offering Business Advisory Support to Bridge the DT related Knowledge Gaps of Microbusiness Sector

Despite being the lifeblood of a nation's economy and the primary employment generator in rural areas, MBs are a vulnerable resource-constrained sector. Compared to large firms using complex technological applications and systems, MBs have historically used rudimentary or minimal technologies, for the conduct of their business operations (Bharati & Chaudhury, 2006; Kamal, 2015; Sellitto, Banks, Bingley, & Burgess, 2016). However, the use of digital technologies by MBs can have a tremendous impact on their efficiency and growth. For example, digitalization of MBs can enable them to grow 3.4% faster (Qiang, Clarke, & Halewood, 2006) and also help them achieve various social, economic, and human development goals (Kamal, 2015; Wolcott, Qureshi, & Kamal, 2007). In fact, digitalization of MBs, a high impact sector, is seen as a panacea for post-COVID-19 global economic recovery (Parker, Bingley, & Burgess, 2023; World Economic Forum, 2023). Given the huge potential of making an economic and social impact, in the recent times, digitalization of MBs has become one of the top priorities for most governments around the world.

By definition, MBs are small businesses with limited resources. Because of their small size, MBs can be more agile in their DT efforts (Mandviwalla & Flanagan, 2021). However, due to several local structural

and financial problems, MBs cannot make full use of digital technologies and cannot grow as much as large- and medium-sized firms (Beck, Demirguc-Kunt, Laeven, & Levine, 2008). Moreover, MBs are often so involved in day-to-day matters that they do not generally have growth and digitization on their business agenda (Greenbank, 2001; Taylor & Murphy, 2004). Most importantly, MBs lack the necessary knowledge and expertise to undertake DT initiatives.

The knowledge base of MBs is limited to that of the individual micro business owner-managers (MBOMs), who independently manage their enterprises. Moreover, not all MBOMs may have the necessary confidence for going digital (Mandviwalla & Flanagan, 2021; Singh et al., 2023). The fear of losing known benefits over promised gains from unknown digital solutions is a tough choice for most entrepreneurs, including MBOMs (Gleasure, 2015; Mandviwalla & Flanagan, 2021). Because of the small size and vulnerability of MBs, MBOMs may resist change and prefer the status quo (Shirish, O'Shanahan, & Kumar, 2022). There may also be differences across MBOMs in terms of their readiness for DT (Shirish et al., 2023).

As aforementioned, MBOMs need technical and business knowledge for carrying out DT initiatives. In addition they need environmental scanning abilities to compare and contrast their business context with other DT use cases. Clearly, lack of DT related technical and managerial knowledge (know-how and know-what) is the key impediment for MBs undertaking DT efforts. To address these digital transformation related knowledge gaps for MBs, governments can play a critical role. Consequently, promoting government-initiated innovative policy-driven digital transformation programs that facilitate financial and business advisory support is both meaningful and critical from a public policy perspective. Having established the unique context, need, and challenges related to DT among MBs, in the next section, we examine the literature on digital government through which digitalization of MBs can be viewed as a policy-driven sectoral governance initiative.

Public Sector Digital Transformation Related Knowledge Gaps in Implementing Sectoral Governance Initiatives

Rather than focusing on internal digitalization of government systems, mature digital government aims at creating contextual transformations through government-initiated innovative policy-driven programs for different sectors, localities, communities, and society (Janowski, 2015, 2016). Termed as sectoral governance, scholars have called for further research to examine how government-initiated innovative policy-driven programs become an integral part of a broader social innovation knowledge ecosystem. In such ecosystems, government is the enabling force for establishing and promoting digital transformations of vulnerable business sectors through innovative policies and programs (Bertot et al., 2016; Daymond et al., 2023).

With a view towards bridging the digital divide between the large and small firms, and involving MBs in social value creation, governments around the globe are implementing innovative policies and programs (Hilbert, 2011; Reggi & Gil-Garcia, 2021). The Digital Government Stage Analysis (DGSA) Model is a conceptual framework that advances our understanding on how governments can better address such public sector digital transformation related policy concerns (Janowski, 2015). The model explicitly captures the connection between the progress in digital government-initiated innovative policy-driven programs and its impact on development (Bertot et al., 2016; Janowski, 2016). The model exhorts governments to move from 'universal' to 'contextual' digital transformations – implying transiting from *digitalization* of the government activities, to *enabling* vulnerable business sectors to undertake digital transformations.

The four stages of digital government that Janowski (2015) describes are : (i) *Digitization* (Technology in Government), *Transformation* (Electronic Government), (iii) *Engagement* (Electronic Governance), and (iv) *Contextualization* (Policy-Driven Electronic Governance). While the first three stages are concerned with the digitalization of the government operations and services, the fourth stage describes the enablement and contextualization of DT to a particular sector, which in our study is the MB sector. The contextualization stage occurs when digital governments design and implement public policy innovations

such as DT programs and plan to support and address sector-specific digital challenges (Janowski, 2015, 2016). Such innovative policy-driven digital government programs to cater to the challenges concerning a specific sector is termed sectoral digital government (Janowski, 2015), which in our case is bridging the digital divide through digital transformation of the MB sector.

Because street level bureaucrats, i.e., the local governments have a deep contextual knowledge, they are in an ideal position to deliver such innovative policy-driven programs. However, government agents often lack *digital transformation related knowledge* (DTRK) concerning technical and managerial aspects that are crucial to successfully deliver such sectoral programs (Pittaway & Montazemi, 2020). Specifically, governments may not have the knowledge and capabilities to *instantiate* sectoral governance programs through appropriate digital transformation initiatives (Bertot et al., 2016). In such a scenario, we cannot ignore the possibility of multi-directional knowledge flows between governments and other stakeholders involved in such sectoral digital transformation programs, although studies supporting this assumption are region specific in nature (Hoffmann, Lopes, & Medeiros, 2014; Labas & Courvisanos, 2021). Prior research also shows that the level of organizational commitment as well as other sociocultural and demographic factors prevailing within a specific national context may influence the knowledge management process within public sector (Pepple, Makama, & Okeke, 2022; Razzaq et al., 2018).

Contextual Relevance of Knowledge Flow Pathways in Creating Social Value for Micro Businesses and Government Agents

Past literature describes knowledge flow pathways according to the directionality of knowledge flows, e.g., vertical versus horizontal flow. And each of these knowledge flows have their own idiosyncratic processes informing knowledge management models in the private and public-sector contexts (Van Meerkerk, 2019). Public policy literature has also conceptualized vertical, diagonal, and horizontal knowledge flow pathways, primarily for ensuring public accountability of policy programs (Lindberg, 2013). Though such studies recognize the importance of understanding knowledge flows in different contexts, they do not

explain the allied knowledge mechanisms associated with knowledge flows within a public sector DT ecosystem. For example, what is the role played by the different ecosystem stakeholders and what are the practices that ensure the facilitation of different knowledge flows for creating the desired sectoral transformation. Uncovering such knowledge mechanisms would allow us to understand how to bridge the DTRK gaps faced by government and MB stakeholder groups in order to create the desired social value to all parties within the knowledge ecosystem of a DT program.

Since knowledge based sectoral governance programs are socio-technical system, we conceive the corresponding social value impacts as either be instrumental or humanistic (Sarker, Chatterjee, Xiao, & Elbanna, 2019). Instrumental social value impacts are related to enhancing the efficiency and quality of the MB processes, such as cost benefits and process improvements. On the other hand, humanistic social value impacts concern improving the quality of life for the MB employees, such as employee empowerment or achieving employee well-being. For instance, if MBs perceive that doing business has become more efficient and easier than in the past, then the desired instrumental and humanistic social values of the DT program have been realized (Scupola & Mergel, 2022). Our view also aligns well with the contextual, psychological and relational approach to understanding public value creation from policy plans and programs (Meynhardt, 2009; Meynhardt, 2015).

In line with this, we see calls have been made to examine specific policy settings, using case study or other empirical methods to have a greater research impact (Massaro, Dumay, & Garlatti, 2015). However, a query on the latest complied digital government research reference library identified merely a handful of papers that touch upon the important aspect of knowledge flows in the public sector context (Scholl, 2022). This stream of research informs us that knowledge flows facilitated by open innovation initiatives like platforms and portals occur through interactions between knowledge agents in specific contexts — such as designing policy initiatives in the health care sector, or problem-solving actions for rural communities (Androutsopoulou, Karacapilidis, Loukis, & Charalabidis, 2017; Cooke, 2007; Hoe-Lian Goh, Yeow-Kuan Chua, Luyt, & Sian Lee, 2008; Iivari et al., 2019; Tajgardoon, Manzuri Shalmani, & Habibi,

2016; Tibben, 2013). However, many of these studies view digital governments only as the users or providers of open data, instead of considering them as enablers of digital transformation by building knowledge bridges. Such enablement means contributing to the flow and transfer of context-specific digital transformation related knowledge. Furthermore, most prior studies in this stream are either descriptive or conceptual in nature, which do not uncover the practices embedded within a specific knowledge flow pathway (vertical, horizontal, and multidirectional). In addition, these studies do not focus on how such DT knowledge can transform a specific high priority and vulnerable sector, e.g., the MB sector, which we examine in this study. Hence, addressing the prior calls to better understand knowledge management mechanisms in high impact policy settings, it is theoretically and practically relevant to understand knowledge flow pathways along with the associated stakeholder roles and the emergent knowledge practices that can be leveraged by governments when they roll out government-initiated innovative policy-driven DT programs for specific sectors, such as MBs (Contandriopoulos, Lemire, Denis, & Tremblay, 2010; Massaro et al., 2015). Such an understanding will help design and deliver effective sectoral DT programs to achieve the desired social value. Given the salience of knowledge mechanisms that facilitate knowledge transfer and exchange among different stakeholder groups for sectoral digital transformation, based on discussions in the previous sections, we formulate an initial knowledge-centric model for government-orchestrated digital transformation of the MB sector (Figure 1). This initial model paves the way for a deeper theoretical enquiry into the subject.

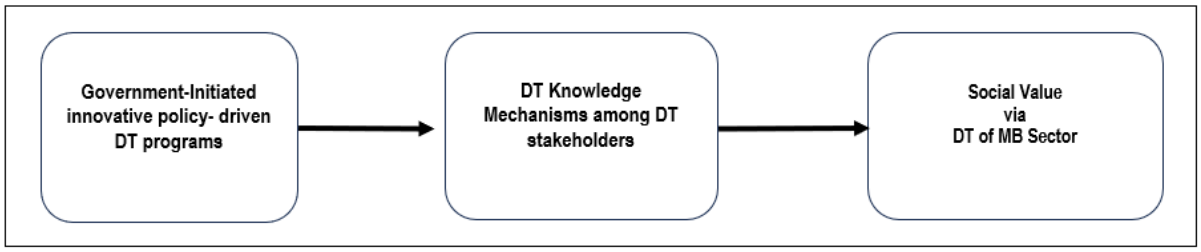

Figure 1: Preliminary Knowledge-Centric Public Sector Digital Transformation Framework

RESEARCH SETTING: IRELAND'S DIGITAL START PROGRAM

In our research, we examine Ireland's Digital Start (DS) Program (Local Entreprise Offices, 2023a), a government-led initiative for driving digital transformation in the MB sector. The DS program is a pilot initiative introduced by Local Enterprise Offices[3] (LEOs) in May 2022. The primary objective of the DS program is to enable and assist eligible small businesses to undertake DT initiatives. The program was chosen as it is a micro business (MB) digital transformation support programme. Eligibility was open to companies with less than 10 employees. Within the European Union, there are digital transformation support programmes in other countries but none that focus solely on MBs, which are unique and make up majority of enterprises in Ireland and globally. Our study adds to the ongoing discussion on digital transformation by focusing specifically on a programme that supports DT in the MB sector, which has been largely overlooked by prior DT research. The DS program is aimed at providing MBOMs with the necessary knowledge for formulating and implementing their digital adaptation strategy, which includes advisory services for both technical and managerial expertise. For most MBs, the focus of the program is on optimizing their business processes, enhancing digital customer experiences, and leveraging data for improved resource utilization through the use of digital tools and techniques.

The DS program is administered by the LEOs under the governance of Enterprise Ireland[4] (EI). The LEOs are a business support resource for small business owners, providing services and expertise to assist new and existing entrepreneurs. With dedicated teams throughout the local authority network, LEOs provide financial and non-financial support services to their clients. LEOs give priority to the development of local enterprise, enabling job creation for contributing to the growth and success of businesses in the region (Local Entreprise Offices, 2023b). LEOs function under EI, a state agency, tasked to support Irish companies to start, grow, innovate, and achieve export success.

[3] The Local Enterprise Offices or LEOs are government organizations that provide advice, information, and support to small businesses for starting up or growing their business. Ireland has 31 LEOs spread across the local authority network.

[4] Enterprise Ireland is the government organization responsible for the development and growth of Irish enterprises in world markets. They work in partnership with Irish enterprises to help them start, grow, innovate, and expand export sales in global markets. Through their initiatives they support sustainable economic growth, regional development, and generate employment.

To achieve these objectives, EI collaborates directly with internationally focused Irish enterprises, particularly small and medium enterprises (SMEs), to enhance their competitiveness, productivity, and innovation (Enterprise Ireland, 2023b). EI through its Centre of Excellence division also collaborates with the network of LEOs and spearheads the delivery of an improved national enterprise support model. The EI Centre of Excellence operates service level agreements, facilitates high-potential company advancement, trains LEO staff, and establishes an online support system for entrepreneurs and micro-enterprises nationwide, thereby trying to create significant social value through various policy innovations (Enterprise Ireland, 2023a). In each Local Enterprise Office, select members from the current staff were appointed as Digital Start Champions[5] . These Digital Champions served as the dedicated resources in the LEO office, receiving training in the DS program and working with MBOMs within the framework of the program.

For the DS program, each LEO takes responsibility for procuring expert Digital Consultants[6] through a commonly used tendering process. These consultants are selected based on their experience of working with small businesses, particularly in DS program related areas, such as business process optimization and digital customer experience enhancement. Once assigned to an enterprise, consultants, also referred to as *mentors*, have flexibility in their approach. While some consultants focus on implementing projects and developing a digitalization plan, others solely work on the digital strategy for the business. Upon completing the assignment, the consultants submit a report summarizing the project objectives, activities, challenges, opportunities, and action plans. More details about the program and how consultants are selected are presented in Appendix 1.

[5] Herein after referred to as Digital Champions for brevity

[6] Herein after referred to as consultants or mentors for brevity

METHODOLOGY

Due to the exploratory nature of our study, we adopted a qualitative research approach using the case of Ireland's Digital Start Program; using this single case enabled us to delve deep into the nuanced meanings and processes presented to the researchers in their natural settings (Klein & Myers, 1999). This approach aligns with our research aim of examining the knowledge mechanisms through which government policy initiatives facilitate digital transformation of MBs and thus contributes to methodological intelligence (Mele et al., 2020). Our primary data came from 28 research participants involved with the DS program implementation —10 DS program experts termed as digital champions, 16 MBOMs, and 2 DS government stakeholders. Apart from the latter who were purposely targeted due to their direct involvement in the program, other participants were invited via a country-wide call made through LEOs and consultants linked to the DS program. This ensured representation from different industries and regions of Ireland.

Data were collected between March and May 2023 through —2 in-depth semi-structured interviews with key program stakeholders, 26 structured interviews with Digital Champions and MBOMs, and 4 focus groups each comprising at least 5 participants. Details about the Digital Champions and MBOMs who participated in the study are presented in Appendix 2. In addition to the above-mentioned primary data, we collected secondary data comprising government reports and online documentation related to the initiation and implementation of the DS program. Table 1 below presents the data sources and collection methods adopted for this study.

Data Sources	Participants	Number of Participants/Sources
Structured Interviews	LEO agents MBs owners and managers (MBOMs)	10 Digital Champions 16 clients MBOMs
Focus Groups	LEO agents (1focus group) MBs Owners/managers (3 focus groups)	LEO focus group: 7 Digital Champions Focus group 1: 5 MBOMs Focus group 2: 5 MBOMs Focus group 3: 6 MBOMs
Semi-structured Interviews	Enterprise Ireland LEO	EI Center of Excellence 1 LEO agent
Documentation Analysis	Digital Start Program – official government sources	Online sources, government documents from Enterprise Ireland (enterprise-ireland.com) and Local Enterprise Office Digital Start - Local Enterprise Office (https://www.localenterprise.ie/Digital/Digital-Start.html)

Table 1: Data Sources and Collection Methods

We started our data collection endeavor by interviewing a representative from the EI Centre of Excellence about the initiation and implementation of the DS program. As explained above, the EI Centre of Excellence has been responsible in managing the roll out of the DS program to the LEO network. Thus, it was relevant to interview the policy owner of the DS program to get an overview and understand the stakeholder groups and intent of the program so as to identify the dominant knowledge mechanism used in the delivery of the program This initial semi-structured interview was followed by a series of structured interviews with Digital Champions and MBOMs. Participants were sent a link to the interview questions and were asked to provide their responses. These structured interviews with Digital Champions were aimed at understanding the implementation and impact of the DS program, with a specific focus on the orchestration of the knowledge mechanisms comprising knowledge flows (transfer and exchange) and supporting knowledge practices among the different DT stakeholders in the ecosystem during the roll-out process (see Appendix 3). The structured interviews with MBOMs were used to gather data about their views on digitalization and the DS program (e.g., attitudes on digital technologies in general and the impact of DS on revenues, cost, and innovation) (see Appendix 3). Participants were also asked questions about their demographic attributes, company details, digital technologies used, sector of activity, and the number of employees in their MBs. In addition, we also had open-ended questions, which allowed the MBOMs to describe their experiences of using digital technologies in their respective MBs, their perceptions about the importance of DT for MBs in Ireland, and the role of government support in MBs' digitalization efforts. All this information helped us to set up the initial stage for the subsequent focus groups with the same set of MBOMs.

Subsequently, we conducted a series of focus groups, one focus group with Digital Champions and three focus groups with MBOMs, to have a rounded view about the DS program. During the focus group with the sampled group of Digital Champions, we sought to explore the similarities and differences across different regional LEOs in terms of DS program implementation with a specific focus on the related knowledge mechanisms in the DT ecosystem. The 3 focus groups with MBOMs examined participants'

rationale and motives for joining the DS program, the extent of their involvement, the outcomes from their participation in this program, and their role in the different knowledge-related mechanisms (see Appendix 3). Each focus group lasted for about two hours. After the 3 focus groups we reached theoretical saturation. A DS LEO agent who could not take part in the focus groups was invited for an interview. This particular agent was known to be actively involved in the DT program by participating knowledge practices initiated by the MBs as well as by the government stakeholder groups .

All focus groups and semi-structured interviews were recorded and transcribed with permission of the participants. The data from focus groups and semi-structured interviews amounted to over 180 single-spaced pages of transcripts, which were analyzed in conjunction with data from structured interviews and secondary data.

Analytical Approach

Our data analysis was influenced by the principles of thematic analysis (Braun & Clarke, 2006). This analytical approach was chosen as it allows researchers to remain open to emergent themes, which are inductively abstracted from the data, whilst also been guided by the research aim of the study to examine the knowledge mechanisms of public sector DT programs. NVivo was used for coding transcripts and data categorization. Adhering to the guidelines of the thematic analysis approach (Braun & Clarke, 2006), two of the authors inductively analyzed the data, first independently and then collectively. During the analytical process, the six phases of thematic analysis were followed: *familiarization of data, initial code generation, theme search, theme review, theme definition and naming,* and *writing-up* (Braun & Clarke, 2006). Collectively, the six phases sought to unearth the DT knowledge mechanisms comprising DT knowledge flow pathways (directionality and distance), stakeholder knowledge roles, and enabling practices during the DS program implementation.

Phase 1 involved an iterative reading of all the data, including interview data and focus group transcripts, which helped to develop familiarity with the data whilst enabling us to assess whether the available data could help develop a coherent story.

In *Phase 2*, we sought to unpack the different government stakeholders linked to the DS program and their role in the knowledge ecosystem of DS program; these were distinguished between government-side stakeholders and citizen-side stakeholders. Together, these stakeholders comprise the social innovation knowledge ecosystem connected to DS sectoral government initiative.

Following this categorization and informed by the research aim of the study, in *Phase 3*, we proceeded with the identification of different knowledge flow pathways based on their 'directionality' and 'distance' within the social innovation knowledge ecosystem. *Directionality* of DT knowledge flow pathway signifies the provider(s) and receiver(s) of the DT knowledge along with the other knowledge intermediaries, while *distance* of DT knowledge flow pathway indicates the number of stakeholder groups impacted by the identified DT knowledge flow pathway representing the net social value from the DS program. Our analysis revealed three knowledge flow pathways, notably: *top-down* (government-side stakeholders to citizen-side stakeholders), *bottom-up* (citizen-side stakeholders to government-side stakeholders), and *multidirectional* (both across and within the stakeholder groups). For each of the three identified knowledge flow pathways, we delineated the practices that enable knowledge transfers and exchanges among different stakeholder groups. In this Phase, we also uncovered different knowledge roles performed by different stakeholders within the DS knowledge ecosystem, notably knowledge receiver (KR), knowledge provider (KP), and knowledge intermediary (KI) (more details will follow).

In *Phase 4*, a third author reviewed and verified the identified knowledge flow pathways, knowledge roles and associated practices. It was at this stage that we reached an agreement about the directionality classification of the identified knowledge flow pathways, the emergence of a new knowledge role, that of knowledge disseminator (KD) and how the expected knowledge roles (KI, KP, KR) were dynamically changing across different knowledge practices. Following these, in *Phase 5*, we proceeded to investigate

the distance travelled by each knowledge flow pathway as well as their emergent impact or social value created through the DS program on primarily the policy target, i.e., the MBs. We specifically categorized social value impacts of the DS program as either instrumental social impacts or humanistic social impacts (Sarker et al., 2019). Instrumental social impacts are related to enhancing the efficiency and quality of the MB processes, such as cost benefits and process improvements. On the other hand, humanistic social impacts concern improving the quality of life for the MB employees, such as employee empowerment or achieving employee well-being. We aim to uncover the experiences of the DT program beneficiaries by assessing the qualitative appreciation of the perceived social value created. For instance, if MBs perceive that doing business has become more efficient (instrumental) and easier (humanistic) than in the past, then the desired instrumental and humanistic social values of the DT program have been realized (Scupola & Mergel, 2022).

FINDINGS

The findings section is divided into four parts. In the **first part**, we summarize the different stakeholder groups involved in the DS program and the knowledge roles ***that are expected*** to be performed by these actors in the context of public policy program implementation. In the **second part,** we present the three knowledge flow pathways in terms of their 'directionality' that emerged from our data analysis. The directionality of knowledge flow pathways captures the dynamics of knowledge flow across different stakeholder groups in the social innovation knowledge ecosystem of the DS program. Along with the directionality of the knowledge flow pathways, we also identified practices and associated changing nature of the knowledge roles played by various stakeholders. We briefly explain the directionality of the identified knowledge flow pathways through illustrative examples from the collected data. In the **third part** of our findings, we integrate the three identified knowledge flow pathways into two abstracted knowledge routes that enable us to better visualize the mechanisms and describe the distance travelled (or the number of knowledge stakeholders impacted) by each of these routes. Together, the 'directionality' and 'distance' along with the knowledge flow practices, explain the process and extent of impact of the DS program.

Like the earlier section, we will briefly explain the two knowledge routes and provide illustrative examples evidencing the impact to MBs as well as public sector bodies. As a conclusion, in the **fourth part,** termed the integrated findings section, we combine the findings described in the prior three subsections to develop a theory of knowledge-centric government orchestrated digital transformation of MB sector.

Findings Part 1: DS program Stakeholders and Expected Knowledge Roles

There are different stakeholders linked to the DS program, and they are expected to perform different roles in the social innovation knowledge ecosystem of DS program. These stakeholders were distinguished between government-side stakeholders and citizen-side stakeholders. Collectively all the stakeholders comprise the social innovation knowledge ecosystem connected to the specific DS sectoral government initiative. We classify three types of expected knowledge roles that are performed by the different DS stakeholder groups, notably knowledge receiver (KR), knowledge provider (KP), and knowledge intermediary (KI). Table 2 below summarizes the different stakeholder groups involved in the DS program and the primary knowledge roles expected to be performed by the respective actors. The expected knowledge flows occur in a top-down manner from the knowledge provider to knowledge receiver via the knowledge intermediaries. Knowledge is expected to flow from the policy owner to street level bureaucrats such as the Digital Champions in partnership with Consultants, to ultimately reach the policy target i.e., the MB sector. This is akin to technology transfer programs initiated by governments where the primary role of knowledge receiver is the beneficiary or the policy target in these cases. More details on how these primary roles change in the course of the DS program implementation will be underlined in parts 2 and 3 of the findings sections.

Government Side Stakeholders	Expected Primary Role		Citizen Side Stakeholders	Expected Primary Role
KP/KI			**KR/KI**	
EI agents	Policy conception and overall monitoring agent also considered the policy owner (KP).		MBOMs (Clients)*	Existing clients who sign up for DS or other business support program to receive knowledge from government initiatives (KR/KI)
Digital Champions (Implementing Agent)	Local-level DS program implementer (KI)		Employees of MBOMs (Clients)	Organizational members managed by MBOMs client who is either involved in the

	A bridge between national and local program coordination. Designated DT domain in charge within LEOs (KI)			DT project or will benefit from DT efforts (KR/Beneficiary)
LEO Staff (Implementation Support Agent)	Assist at Local-level DS program implementation when in need (KI)		Family of MBOMs (Clients)	Beneficiaries of a DT efforts
Consultants	Local, personalized program delivery agent (KI)		Broader MB sector	Targeted KR of the DS program
Notes: *Clients-those MBOMs registered within a specific LEO to receive updates about business support programs Acronyms: Knowledge Providers (KP); Knowledge Receivers (KR); Knowledge Intermediaries (KI).				

Table 2: Key Stakeholders involved in the Knowledge Ecosystem of the DS Program

Findings Part 2: Three Knowledge Flow Pathways, Embedded Roles & Enabling Practices

Top-Down Knowledge Pathway

The first identified knowledge flow pathway is the top-down pathway –from the government to the MBOMs and MBs for transforming their businesses. As a government-led DT program, DS seeks to enable MBs to grow their digital capabilities and know-how through an awareness of the DT opportunities. The program is seen as a means to support MBs in their survival, business growth, and ongoing contributions to the economy. Table 3 provides further details about the knowledge roles played by different stakeholders in the top-down knowledge flow pathway, where DT related knowledge is primarily transferred from one lead stakeholder to another in the loosely coupled knowledge ecosystem. In the context of our study, from the available data we identify two practices that facilitate top-down knowledge flow pathway —namely, *(a) Understanding the DS Program Delivery Process*, and *(b) Providing Personalized Support to MBs*.

(a) Understanding the DS Program Delivery Process: As aforementioned, different stakeholders play different roles in the delivery of DS program —some taking on the role of knowledge providers, (Consultants), while others becoming knowledge receivers (such as MBs and MBOMs), or knowledge intermediaries, (such as EI and Digital Champions). In the top-down pathway, consultants chosen to personalize the digital solutions or advise the specific MBOM, often play the knowledge provider's role.

Armed with DT related technical and managerial insights, they offer a personalized digital solution to address the contextual needs of MB clients.

However, we also notice two kinds of knowledge intermediaries displaying alter-oriented knowledge brokering behavior (Ritala, De Kort, & Gailly, 2023; Wang & Ran, 2022). Digital Champions in-charge of the program implementation play the role of 'network catalyst'. The network catalyst relates directly to knowledge elements, influencing network relationships to facilitate knowledge sharing and adoption (Ritala et al., 2023). Because Digital Champions screen and approve the MBs enrolment into the program, they can choose the appropriate consultant for the project based on client's initial needs. LEOs can also validate the application seeking funding and advisory support, thereby acting as a network catalyst. In addition, the EI agents oversee the program, regulating the conditions through which the program is promoted and implemented. EI agents, thus, play the role of 'continuity safeguarder' within this knowledge network (Ritala et al., 2023). It is the EI agents who oversee the entire DS program and set governance principles and key performance indicators (KPIs) that need to be followed by local LEOs.

Digital champions are the key knowledge intermediary who design, execute, and select potential strategies to recruit the beneficiary MBs within their locality. They carefully orchestrate knowledge transfer by selecting appropriate consultants for each MBOMs who apply for the DS program. The delivery practice is crucial in this context as the consultant might also act as a knowledge intermediary (KI) for DS program dissemination when they are asked to provide inputs by Digital Champions and the MBOMs play the role of knowledge receiver availing the advisory services in the DS program.

(b) Providing Personalized Support to MBs: Another practice that was observed to be common within the top-down knowledge flow pathway is the personalized support extended by the knowledge providers, notably LEOs to potential DS receiving MBs. The key aspect of this practice is to identify potential applicants through direct calls or site visits to the client MBOM and encourage them to apply for the DS program based on their initial assessment by the LEO Digital Champion. In this scenario, we note that Digital Champions use both traditional community-embedded techniques (e.g., site visits), and digitally-

embedded techniques (e.g., contacting potential MBs directly via emails and phone calls). These initial touchpoints between the Digital Champions and the potential DS beneficiary serve to initiate a shared understanding on DT knowledge between government actors and MBOMs. Table 3 provides the dynamic and changing roles played by the knowledge actors using this pathway and it provides illustrative quotes representing these two practices comprising the top-down knowledge flow pathways. The benefits obtained from these practices will be covered in the next part of the findings.

Top-Down Knowledge Practices		
Understanding the DS Program Delivery Process		
Expected Knowledge Roles	Illustrative Quotes on Knowledge Flow Practice	Knowledge Roles Explained
KP-Consultant *KR-MBOM (s)* *KI (Network Catalyst)- Digital Champion* *KI (Continuity Safe guarder) - EI*	*"I think one area where we do have flexibility in the scheme is that when a* ***client applies for the digital start support****, and they are approved, we* ***can sit down with them and choose a particular consultant*** *from our panel who we think has the necessary skills and experience to, to work with that client. So, you might have a client in food manufacturing or engineering. And because* ***each LEO has a kind of a large panel*** *that they can pull from, there is great flexibility in being* ***able to match up your client with the correct consultant*** *who has the actual experience and knowledge. So that is one positive aspect of it, that it has that flexibility to choose the right consultant for the client".* **LEO3**	*KP - Digital Champion to KR MBOM*
	"… ***we were approached by LEO.*** *They were promoting the program (DS), but also we had been working with another Leo mentor* (consultant) *on another program for Green for micros, and she was working with another business locally that DS consultant XYZ had done a lot of work with and, and* ***she recommended that we look into it (DS program) as well****. So, it* (Sign up to the DS program) *came after us from a couple of different angles, really" –* **MBOM16**	*KP - Digital Champion to KR - MBOM (s)*
Providing Personalized Support		
Expected Knowledge Roles	Illustrative Quotes on Knowledge Flow Practice	Knowledge Roles Explained
KP - Digital Champion KR - MBOM(s)	"…***we keep an eye on the businesses*** *that are coming through for grants, and when they're seeking a grant from us,* ***it's to complete a site visit*** *and* ***see what the businesses are currently doing*** *in terms of* ***their digital adaptation.*** *And if* ***it seems suitable for it,*** *it can be written within the grant.* That one condition is that the business *would* ***participate in a digital program within 18 months or 12 to 18 months****".-* **LEO5**	*KP - Digital Champion to KR – MBOM*

Table 3. Top-Down Knowledge Pathway, Roles and Practices Illustration

Bottom-Up Knowledge Pathway

Our findings reveal that in the context of the DS program implementation, a very counter-intuitive kind of knowledge flow pathway has emerged. We evidenced a bottom-up knowledge pathway (deviating from the expected knowledge roles mentioned in Table 2), depicting knowledge transfer from the MBs and MBOMs, representing the citizen stakeholder groups to the government stakeholder groups. In the context of our study, we identified one practice that facilitates the bottom-up knowledge flow pathway —namely, *(a) One-to-One Demo.*

(a) One-to-One Demo*:* Initiated by the consultants acting as the knowledge intermediaries, one-to-one demos are organized between a specific LEO's Digital Champion and the client MB. These demos reveal to the Digital Champions —what DT related work has already been done through the DS program. The Digital Champion hears first-hand from the MBOMs about how the DS program was implemented and how digital transformation has impacted the policy target's business. This specific practice facilitates knowledge sharing by the MBs to the LEO agents. The MBOMs play the knowledge provider's role, by demonstrating first-hand knowledge about the implementation and impact of DT in their particular MB context. This provides insights that are both technical and managerial and enables local government agents at LEOs to further pitch the program to other MBOMs in a more confident and relevant manner. The knowledge receivers are the local government agents, such as LEO staff who may also sit in such meetings if needed and the Digital Champions. The DT related knowledge they receive through these sessions facilitates the *instantiation* of the shared understanding about DT knowledge between actors of the knowledge network. Table 4 provides the dynamic and changing roles played by the knowledge actors using this pathway and provides illustrative quotes representing this practice comprising the bottom-up knowledge flow pathway. The benefits obtained from this practice will be covered in the next part of the findings.

Bottom-Up Knowledge Practice		
One-to-One Demo		
Dynamically Changing	Illustrative Quotes on Knowledge Flow Practice	Knowledge Roles

Knowledge Roles		Explained
KI (Network catalyst) - Consultant KR - Digital Champion KR - LEO Staff KP - MBOM	"I think it was **very important** in terms of **showing**. Mr. XX (Digital Champion) … **how successful the program is** and how it is ….I think **when you have people giving you real-life examples** of how it's **actually helped them**, I think that's very important.as it **does allow them** to provide more reasons to talk (persuade) **when they are trying to promote digital start**". **MBOM12**	*KP - MBOM* *to* KP - Digital Champion
	"**Think it's good** *(1 to 1 session)* **because it does help them** (Digital Champions**) to promote it (DS program) then in future.** I think it probably also helps with their decision making when somebody comes along to ask about the program and helps (MBOMs) decision making easier". **MBOM15**	*KP - MBOM* *to* KR - Digital Champion

Table 4: Bottom-Up Knowledge Pathway, Roles and Practice Illustration

Multidirectional Knowledge Pathway

The DS program and its implementation facilitates DT related knowledge (DTRK) transfer and exchange through multiple pathways, with knowledge flowing in several directions, thereby creating social value for other MBs who may or may not be the clients of a specific LEO. These knowledge flows from: MBOMs to Digital Champions and Consultants, Consultants to Digital Champions and MBOMs, and MBOMs to other MBOMs, happen through specialized knowledge transfer and exchange practices. These practices provide credibility to the program as most knowledge transfers and exchanges are promoted by knowledge providers using their experiential learning outcomes by sharing use cases. Such a contextual narration of knowledge instances makes it more tangible for the knowledge receiver. We term this simultaneous bottom-up and lateral knowledge flows as multidirectional pathway in which DT knowledge is transferred from the citizen stakeholder group to the local government agents, or between members of the citizens stakeholder group in the loosely coupled social innovation knowledge network. The interesting revelation from our data was that despite DS program being a government-led initiative, DTRK flow is often not initiated by Digital Champions. In the context of our study, we identified four practices that enable multidirectional knowledge pathway, namely — (a) *Online Case Study Dissemination, (b) DS Awareness Webinars and Seminars, (c) Digital Champion Information Sessions,* and *(d) LEO Information Sessions.* We also observed the changes in the roles played by key actors in each of these practices.

(a) Online Case Study Dissemination: The interactions between the different stakeholders enable the identification of successful DS implementation cases among MBs. MBOMs of these successful cases are invited to share their stories to the wider MB network within their locality and beyond. Successful cases may be identified either by the Consultants or LEOs who then encourage these MBOMs to share their digitalization journey in the form of a written or video case study published online as digital story[7]. The key stakeholders involved in this knowledge transfer and exchange practice are the Consultants, who act as the knowledge intermediaries. In addition, press coverage promoted by government and local media companies can help the DS program gain further traction benefiting MBOMs in different parts of the country[8].

(b) DS Awareness Webinars and Seminars: These seminars and events led by LEOs, happen in real-time via webinars or in-person events at a local level. Digital Champions may also ask consultants, if they have local LEO clients (MBOMs), who could share their experiences about the DS program in a public webinar or seminar. Such knowledge transfer and exchange practices lead to bottom-up and lateral DTRK flows among various stakeholders of the DS program. Beneficiaries include potential MB clients, other consultants, and also Digital Champions. These events, which are both informational and promotional, strengthen the DT knowledge within a wider social ecosystem and lead to the *instantiation* of the DS program. Such practices are integral to the program implementation as they reinforce the benefits of the DS program to potential LEO clients to consider enrolling for the program.

***(c) Digital Champion Information Sessions*:** These sessions are initiated at the request of EI, in which some consultants are invited to share the program's utility with different stakeholder groups. The purpose of these sessions is to provide training and information to Digital Champions about the effectiveness of DT within the MB sector. In these sessions consultants share their work and its impact on specific client MBs. Increasingly such sessions also include client MBs presenting their case studies, especially about

[7] Few online case studies can be accessed at https://www.localenterprise.ie/Portal/Digital/Case-Studies.
[8] One such case study promoted by the local press can be accessed at https://www.thetimes.co.uk/article/boring-chores-are-just-the-job-for-workplace-bots-hcm3fj5kl

the experiential learnings from the program. These type of information sessions are supplemented by quarterly *Digital Champion meets*, in which the Digital Champions act as both the knowledge receivers and knowledge providers. In these meets, the Digital Champions offer feedback to EI as well as share best practices amongst each other to support targeting and roll out of the benefits of the DS program in their locality. This initiative transforms the bottom-up knowledge flow that each Digital Champion receives from MBOMs to a lateral knowledge flow, which benefits all Digital Champions through mutual sharing. It also helps in appreciating the significance of contextual knowledge for the creation of social value through the DT initiatives.

(4) LEO Staff Information Sessions: At the request of the EI Centre of Excellence, some focused DS program training sessions, in the form of seminars or webinars, are arranged. Such staff training sessions involve Consultants sharing experiences about interacting with MBOMs, and MBOMs presenting their case studies to the general LEO staff (not Digital Champions). In some cases, these sessions are organized for a focused discussion on specific topics that might interest the LEO staff, such as, staff retention. The consultant orchestrates the knowledge flow by sharing a relevant case that he has handled via the DS program that might suit the specific topic or theme of the event. Here the DT knowledge receiver is primarily the LEO staff members, which might also include Digital Champions. These information sessions are primarily tailored for the LEO general support staff, who may not have an understanding of the DT process. Table 5 provides the dynamic and changing roles played by the knowledge actors using this pathway and provides illustrative quotes for practices comprising the multi-directional knowledge flow pathways. The benefits obtained from these practices will be covered in the next part of the findings.

Multidirectional Knowledge Practices		
Online Case Study Dissemination		
Dynamically Changing Knowledge Roles	Illustrative Quotes on Knowledge Flow Practice	Knowledge Roles Explained

KI (Network catalyst) - Consultant KP - MBOM (s) KI (Continuity safe guarder) - EI KR - Digital Champion KR –MBOMs KD (Knowledge disseminators) - Local News Agencies/All actors advocate on social media (in general sessions and not in focused sessions)	"we did a video .. we wanted to show to other businesses what we can do with digitalization" **MBOM12**	KI (Continuity safe guarder) - EI *Co-ordinated case studies* KI – Consultant *Recommended case studies* KP - MBOM *Participated in case studies* KD (Knowledge disseminators) - Local News Agencies/All actors *Advocate case studies on social media* KR – MBOM *(new target) and Digital Champions*
	"As it (DS program) progressed and **when we were on our digital champion calls**, it would have been said, well, you know, **keep an eye out for case studies**. And (upon checking with some consultants) **consultant ABC would recommend that a case study** should be made with client XYZ. And then that was **arranged by Enterprise Ireland**. We would have had no involvement".- **LEO 5**	KI (Continuity safe guarder) - *EI arranged Digital Champion calls* KI (Network catalyst) – Consultant *Recommended Case Studies* KP - MBOM (s) *Participated in case studies* KD (Knowledge disseminators) - *Local News Agencies/All actors advocate case studies on social media* KR (implicit)– MBOM (new target) and Digital Champion
	""And **so we did a case study**, a webinar, and we were also involved in the **production of a video to promote a digital start within Leo**…we wanted to do it just because it (DS program) **made such a difference to us (**positive experience sharing with the community)" **MBOM 12**	KI (Continuity safe guarder) – EI *Organized webinars and co-ordinated case study* KI (Network catalyst) - Consultant *Proposed MBOM for case study or webinar* *KP - MBOM* *Participated in webinar and cases study* KR- (implicit)– MBOM (new targets) and Digital Champions KD (Knowledge disseminators) - Local News Agencies/All actors *advocated case studies on social media –*
DS Awareness Webinars and Seminars		
Dynamically Changing Knowledge Roles	Illustrative Quotes on Knowledge Flow Practice	Knowledge Roles Explained
KP - Consultant presenter (s) KR Consultant	"Similar to Mayo, we have had **about 40 or more webinars and semina**r in Galway"-**LEO 5**	KI (Network catalyst) - Digital Champion *Organized webinar* KP - Consultant presenter (s)
	"**There (DS awareness session),** we would have **educated** people about **the benefits of going digital**. And we would	

KP - MBOM Presenter (s) KR - MBOMs Attendees KI (Network catalyst) - Digital Champion KR – Digital Champions KR - LEO Staff KD (Knowledge disseminators) - LEOs/All actors advocate on social media	have **invited the consultants** to come along to that, as well as **targeted clients** to come to it. And we would have run that in October. And we ran a second one, which was like a follow-up, following two of the project's completion (two DS clients), which Mentor XYZ would have done for us. And we had **those speakers (MBOMs), those clients**, **come and speak** at another **event** (information sessions) just to I guess, **reinforce the benefits of the program"**- **LEO5**	KP - MBOM Presenter (s) *Presenter in the webinar* KR - MBOMs KR - Consultant KR - LEO Staff KR - Digital Champions *All attend the webinar* KD (Knowledge disseminators) - LEOs/All actors *Advocate on social media*
Digital Champion Information Sessions		
Dynamically Changing Knowledge Roles	Illustrative Quotes on Knowledge Flow Practice	Knowledge Roles Explained
KI (Network catalyst) - Consultant KI (Continuity safe guarder) - EI KP - Consultant Presenter KP - MBOMs Presenter (s) KR - MBOMs KR - Digital Champions KR-LEO Staff	"And again, when I have **the quarterly sessions** (Digital Champion information sessions) with the group (other Digital Champions) and **with EI**, I'll **feed that back to the team** (Local LEO staff) as well and what was discussed and how other offices are **doing things differently** (to promote the DS program)"- **LEO3** "**case studies (shared by consultants) were used in these training sessions** (Digital Champion Information Session), really it got **you thinking more clearly** about what Digital Start is actually about" –**LEO 7**	KI (Continuity safe guarder) – Ei *Coordinated the information sessions* KI – Consultant *Recommended MBOMs* KP - Consultant presenter (s) *Presented case studies* KP - MBOM Presenter (s) *Presented their case study* KR - MBOMs. *These MBOMs were exposed to other case studies* KR - Digital Champions KR-LEO Staff *As a way of feedback from Digital Champions*
Leo Staff Information Sessions		
Dynamically Changing Knowledge Roles	Illustrative Quotes on Knowledge Flow Practice	Knowledge Roles Explained
Consultant Presenter – KP KI (Network catalyst) - Consultant KI (Continuity safe guarder)- EI KP - MBOMs KR - MBOMs KR – Digital Champions KR – LEO Staff	"I'm talking about **the information sessions that Enterprise Ireland** would **have put on for the local enterprise office staff**. They **included some case studies (**By MBOMs)…….. **in terms of training for staff,** definitely, I would say the **case studies** that were put up **were useful"**- **LEO 7**	KI (Continuity safe guarder) - EI *Coordinated the information sessions* KI (Network catalyst) – Consultant. *Recommended MBOMs and cases studies to present* KP - Consultant presenter (s) *Presented case studies* KP - MBOM Presenter (s) *Presented their case study* KR - MBOMs

		They were exposed to other case studies presented by MBOMs KR-LEO Staff and Digital Champions

Table 5. Multidirectional Knowledge Pathway, Roles and Practices Illustration

Findings Part 3: DS Program and Knowledge Flow Distance Travelled

Having examined the 'directionality' of the various knowledge flows and the associated facilitating practices in the government-initiated DS program, we examine the impact of the knowledge flows in terms of the 'distance' travelled or the number of stakeholder groups reached. Such an analysis leads to a more comprehensive understanding of the program's social value impact and contribution in bringing about contextual transformation to the MB sector through digital government innovations (Janowski, 2015).

It is noticed that not all pathways and identified corresponding practices travel a similar distance regarding the number of stakeholder groups they influence within the knowledge ecosystem and the aggregated social value they can generate. When a pathway impacts several actors within a knowledge ecosystem, we consider that the distance travelled by such a pathway is longer compared to when a specific pathway can only impact few actors within the knowledge ecosystem of the DS program. Moreover, we also observed that the pathways are interconnected and recursively influence each other. We enrich our understanding of these knowledge pathways and practices described in the earlier section by further abstracting them through the initiation and evolution perspective alluded to in digital government literature (Janowski, 2015).

Our findings show that digital government sectoral programs such as the DS program are initially introduced via a restricted route to initiate the required DT knowledge transfer and exchange process between the actors of the social innovation knowledge ecosystem (Janowski, 2015). We term this route as the ***initiation route*** because it paves the way to initiate a shared understanding of DT knowledge for the MB sector and lays the foundation for knowledge refinement and evolution within the ecosystem. Shared understanding in this case means an agreement on the relevant DT knowledge necessary to achieve the collective goal of the targeted DS program and such an understanding can contribute to

collaborative learning among stakeholders (Ansell & Gash, 2008). We notice that the top-down knowledge pathway, enactment of expected knowledge roles and practices facilitate the digital transformation of the MB sector through the initiation route, directly impacting the MBs who have completed the DS program.

As more and more knowledge stakeholders become committed and open to sharing DT knowledge within the DS social innovation knowledge ecosystem, there is an *organic evolution of the shared understanding of DT knowledge for the MB sector*, enabling us to uncover the ***instantiation route***. The bottom-up and the multidirectional knowledge pathways, enactment of dynamically changing knowledge roles and practices facilitate the digital transformation of the MB sector through the instantiation route. This route directly impacts the government stakeholder groups, including national government agents, local government agents (Digital Champions and LEO Staff) and touches the citizen stakeholder group by positively impacting the wider MB sector.

We also classify these impacts that leads to improved social value and wellbeing into *instrumental* and *humanistic* impacts to understand the nature of social impact the knowledge flows are making within the DT program (Sarker et al., 2019; Twizeyimana & Andersson, 2019). Our analysis points to several instrumental social value and humanistic social value impacts. Identified instrumental social impacts included perceptions of MB owner-managers (MBOMs) with respect to either *cost efficiencies* or *improved processes and systems*, which help in providing a competitive advantage to the MBs and ensure their survival. The DS program enabled MBs to grow through the implementation of digital tools and contributed to their DT readiness. As a result, the program helped MBOMs increase their revenues and expanded their clients and product range. Identified humanistic social value impacts included perceptions of MBOMs on aspects related to *DT knowledge development, well-being, flexibility at work, and MB employee empowerment for creating* sustainable social value. Such impacts contributed to MBOMs considering to sustainably use digital technologies in their business. The impact of knowledge transfer and exchange mechanisms were also identified in the experience shared by other knowledge stakeholders as they reported instrumental social value impacts comprising: *DS program promotion, reach, co-design for better*

implementation as well as humanistic social value impacts comprising *DT knowledge development and Government Staff Empowerment.*

Tables 6 and 7 provide some illustrative quotes from the different stakeholders of the social innovation knowledge ecosystem of the DS program demonstrating the two knowledge routes (initiation and instantiation) and the distance travelled viewed as a measure of social value and wellbeing related impacts (instrumental and humanistic) on stakeholders within the knowledge ecosystem.

Social Value and Well Being Impacts of the DS program on MBOMs illustrated through selective quotes	**Participant Codes**
Instrumental Social Value Impacts	
"The **Digital Start has not only provided solutions to problems** such as the reporting, organizing and invoicing of onsite repair works but **has also improved our overall approach to digital technology as a business**, and we have now had the c**onfidence to incorporate digital strategies** into other areas of the business, such as the growth of social media and our webpage, but we have also implemented an online cloud-based accounts system."	MBOM12
"**Efficiency** in doing documents"	MBOM8
"**Reduced hours** spent filling in paper records".	MBOM5
"**Speeded up & streamlined** record-keeping."	MBOM4
"Time is money; it **saves time**."	MBOM3
"It has made **recording the data simpler and more effective**. It provides **faster reporting** with less data entry resulting in more accurate information."	MBOM2
"It will result in considerable **time-saving and increased efficiency**."	MBOM16
"This (DS program and technology implementation) made our business operations more **efficient, improved customer service, and allowed for data-driven decisions**."	MBOM6
"By **being able to monitor enquiries better** coming into the business right through to the sale without information being lost."	MBOM7
"We have **improved our output and service to our customers**, which gives us an **edge over our competitors**."	MBOM14
"It helps streamline our wedding appointment system, **taking away the pen and going fully digital.**"	MBOM11
"**Reduced paper** records"	MBOM1
"**Previously**, we were using a manual, **pen and paper-based system** to track our inventory, which was **time-consuming and prone to errors**."	MBOM6
"**More Productive, instant access to information, Become more organized**."	MBOM10
"It has given the **girls back time** and enables them to answer more calls which is more **cost-efficient** for us as a business. It enables us to answer more calls and have **more clients."**	MBOM9
"Allows us to run our business more **efficiently** and gave us another product to advertise to our clients."	MBOM13
Humanistic Social Value Impacts	
"**Staff more in control** of our packages." [Employee empowerment]	MBOM10
"So the **digital program** in that respect has been of benefit to people they **can keep their jobs** and also they can **work from home,** and that **is huge to us**…huge aspects to our business now have **switched to paperless** thanks to, I suppose, (mentor XYZ) and the digital start program". [Employee empowerment]	MBOM10
"Digital Start has enabled us to **rethink solutions**." [DT Knowledge/Creativity]	MBOM16
"The program also **upskilled our employees** and had a **positive impact on the whole team** and our business performance." [DTRK/ Well-being]	MBOM6

Table 6. Initiation Knowledge Route and Improvement in Social Value and Well being Impacts

Impact on different knowledge stakeholders illustrated through selective quotes	Participant Codes
"There'll be a fairly broad approach which will be just bringing the concept of digital **start out to the wider client base**. That will be done through **social media work** in particular. And then separate to that, there's the more **impactful promotion of it, which is done through 1 to 1 meeting with individual clients** (Those who have undertaken DS program)[9]. So, I will see that particular client (Potential DS program client of a LEO), because of the nature of what they do or the nature of how they do things, would be very suitable for this. So, **I'll speak to them directly on it and try to get them engaged with the concept**"- [Helping LEO agents in promotion of the DS program].[10]	LEO12
"**Working closely** with **Consultants** has been particularly **enlightening** in relation to the program". [Helping DS champions develop their DT knowledge for better empowering LEO staff]	LEO7
"I have attended several programs offered by LEOs, but the Digital Start program was really unique, and that program caught my eye. I think, I just started (looking on the website), **it had a few case studies on there**, and **one case study which caught my eye** was with Mentor XYZ, another company that had worked on them for digital transformation, I think was with the jewelry maker and their business…**They have multiple inventories** with multiple stock items, and different things. **Similar to what we have in Nutty Nuts** (Name changed) as well. Over the period, we have grown from 40 to 400 products, and everything **was paper based** (Before signing up for the DS Program)" [Enabled new MBOMs to join the DS knowledge ecosystem]	MBOM6
"There was a Jewellery business from Limerick (a state in Ireland) that was **featured in the website** (case study undertaken during the pilot phases)…**this inspired me to think of similar cases** (to target) **in my area** (for promotion)" [Impact of case study sharing on LEO digital champion for better reach of the program]	LEO11
"I recently **attended an event** at which I **had invited two of our clients to present** at the event (LEO organized). One had previously completed the DS program, and the other had not. I was **party to a conversation during a coffee break** with both, where one was telling the other about the program. Afterwards, the **second client asked me about the program** and is due to start on his own program shortly. This was an **example of one MBOM sharing their experience with another and selling the positives of the program without any involvement from LEO**" [MBOM DS program client sharing impact another MBOM non-client]	LEO2
"There (DS awareness session), we would have educated people about the benefits of going digital. And we would have invited the consultants to come along to that, as well as targeted clients to come to it. And we would have run that in October. And we ran a second one….and we **had those speakers (MBOMs**), those clients, **come and speak** at another event (information sessions) just to I guess, **reinforce the benefits** of the program. And that first initiative that we would have run resulted in us getting think we **got nine applicants to participate in the program** and since we have done **the follow-up one** during local enterprise week, I think we have **another 4 or 5 that are participating in it**. And so that's how we are currently doing it (Rolling out the DS program)" [Committed MBOM's sharing led to the signup of more non-client MBOMs to the DS program]	LEO5
"the **businesses who participated in the program are the people who can sell this program better** than anyone, like better than the consultant, better than us." [MBOMs are crucial for sustaining the relevance of the DS program as they are seen to act in its implementation along with LEO agents]	LEO5
"As a micro business, **you are learning a lot of things; by helping others,** you are also learning from them." [Evolution of DT knowledge through impact on MBOMs via consultant sharing and other MBOMs sharing]	MBOM8
"**Knowledge gained** from s**eeing the outcomes of the program from both consultants and the clients** has provided me with a **great insight and knowledge** of what can be achieved by the DS program." [Evolution of DT knowledge through impact on DS champions]	LEO2

[9] Throughout the tables illustrating findings, bold phase highlight relevance and round brackets are used to clarify the context of a quote from respondents

[10] Throughout the tables illustrating findings, we use square brackets to communicate our inference from a given quote

"**Realization** that we (I) **need more understanding of digital solutions** for us & Clients." [Development of DT knowledge among DS champions that will enable them to provide their services better]	LEO9
"We have **seen some transformations** first-hand and **intend to apply** some of the measures within our **own LEO** (practice what we preach!)"- [MBOMs and Consultant sharing impacts other LEO in different regions]	LEO8
"I think that **webinars,** in particular case examples, **are a huge influence in the LEO confidence** in the program's benefits." [Developing DT readiness among LEOs leading up to better service delivery to citizens]	LEO1

Table 7. Instantiation Knowledge Route and Social Value and Wellbeing and Impacts

Per the Digital Government Stage Analysis model, *initiation* and *instantiation* of digital government sectoral program should lead to the institutionalization of the sectoral government. In our specific case of the DS program, we find that the social innovation ecosystem self-sustains the program, which eventually becomes integrated as a digital government offering for effectuating contextual digital transformations of the MB sector (Janowski, 2015). The pilot nature of the DS program could have impacted these findings and may need further validation so as to extend these to other government-supported programs. More details on the digital government stage analysis for this specific case can be found at Appendix 5.

Our findings show that the *initiation knowledge route* empowers only those MBOMs who have signed up for the DS program. Enrolled MBOMs have the opportunity to acquire contextual DT knowledge through learning by exposure and are able to build their own DT knowledge in action through learning by experience, albeit in the narrow sphere of their firm's context (Shirish et al., 2023). Such knowledge is usually explicit in nature. It can include both technical and managerial aspects of DT. Hence, the knowledge flows are constrained by the distance between the knowledge actors in the network influenced by the initiation route. In our case, the knowledge stakeholders are local government agents, consultants, and the MBs, specific to a locality. Clearly, the distance travelled by the knowledge is shorter than the knowledge flow distance that the instantiation route may cover.

We note that the instantiation route has a greater reach as it empowers enrolled MBOMs to appreciate the value of digital transformation related knowledge and DT efforts in the broader context of different knowledge actors within the ecosystem. The knowledge receiver in this route could be, Digital Champions, LEO Staff, EI agents, other MBOMs (clients or non-clients of local governments), and Consultants from various localities. In this knowledge route, the knowledge providers are usually MBOMs and not local

government agents, as is in the case of the knowledge initiation route. Out of their own volition, experienced MBOMs and local consultants may engage with other actors in the knowledge network, to disseminate their DT knowledge obtained through the initiation route to a broader set of stakeholders. This voluntary sharing of use cases by MBOMs, complemented with the consultants providing their expert knowledge through various practices described earlier, makes the DT knowledge transfer effective, stickier, nuanced, sector-specific, and accessible to the broader stakeholder network. The DT knowledge transfer sometimes goes beyond the known network stakeholders to attract new MBOMs towards the DS program. This creates a wider and more significant impact on the broader social innovation knowledge ecosystem, limited not only to the DS program but the entire MB sector. Moreover, the knowledge transfer and exchange that occur via this route involves both implicit and explicit DTRK. However, we notice a greater exchange on the managerial aspects of DT. However, it is essential to understand that not all MBOMs who have benefited from the initiation route would contribute to the instantiation route.

Appendix 4(a, b) provide further details on the commitment levels of the certain proactive and prosocial MBOMs to the DS knowledge ecosystem by depicting the variety and intensity through which they contributed towards specific knowledge pathways and practices such that their roles vary accordingly. Such knowledge-sharing contributions of empowered and committed MBOMs not only help aspiring MBOMs but also enable the government agents to promote the program in a targeted, compelling, and relevant manner. The knowledge gained by government agents through such sharing sessions contributes to the initiation route for pitching the DS program to other deserving, interested MBOMs from different localities. Moreover, we uncover that crucial role of local news agencies acting as knowledge disseminators within certain identified practices. We also see that gradually, the instantiation route enables the institutionalization of the DS program (Janowski, 2015).

Integrated Findings

In this section, we integrate the findings delineated in the previous three sub-sections (Findings Part 1, Findings Part 2, and Findings Part 3) to describe the results emerging from our research.

Based on the findings in the described previous sub-sections, we unpack three different knowledge roles performed by the key DS stakeholder groups, notably Knowledge Receiver (KR), Knowledge Provider (KP), Knowledge Intermediary (KI) which are similar to the expected roles, but we also discovered the role of Knowledge Disseminators (KD). We present these via Figure 2 below, which represents the revised roles performed by knowledge actors as the DS program unfolded. It goes beyond the expected knowledge flows that were initially discussed in the findings section part 1 that primarily depended upon top-down knowledge flow pathway that covers the initiation route, where the DT-related knowledge was expected to flow from the policy owner to street-level bureaucrats such as Digital Champions and LEO staff in partnership with consultants to ultimately reach the policy target, i.e., the MB sector and its beneficiaries, thus creating the desired impact and social value. However, the Figure 2 shows the dynamic changes that occur to these expected roles of actors, including EI, Consultants, Digital Champions, MBOMs, Leo Staff and Local News Agencies (newly added) in the DS program knowledge ecosystem when knowledge flow directions change, reflecting key changes to how the DS program gets instantiated via the associated practices within the instantiation route. It shows how the DS program can be impacted by bottom-up as well as multidirectional DT knowledge resource pathways and practices, where actors of the knowledge ecosystem have been instrumental in the creation and the enactment of bottom-up knowledge resource pathways and practices as well as multidirectional DT knowledge resource pathways and practices which in turn helps in the implementation and eventual sustenance of the digital transformation initiative as it unfolds in reality. In these identified pathways and practices, the knowledge provider is not usually from the government stakeholder side, and the knowledge receiver is not only MBOMs as initially expected from such public policy initiatives. For example, if we take bottom up knowledge practice, *one to one demos, w*e notice in Figure 2 below that knowledge receiver role is reversed from MBOMs to Digital Champions. The knowledge provider role is played by MBOMs and not Consultants as may be expected in a government led program delivery context. However, such knowledge transfer leads to sharing of new learning from past DT program delivery, thus feeding the government

stakeholder with up-to-date case contexts to further strengthen the DT program implementation. Similarly, in the multidirectional knowledge practices termed as *LEO staff information sessions*, we notice in Figure 2 that MBOMs, Digital Champions and LEO staff are all knowledge receivers of contextual DT knowledge while the knowledge provider role is played by the Consultants. This practice appears to build targeted contextual DT knowledge amongst LEO staff, the presence of other actors including multiple MBOM clients in such events foster both knowledge transfer and exchange leading to a shared understanding of DT knowledge within the social innovation knowledge ecosystem of DS program as a whole.

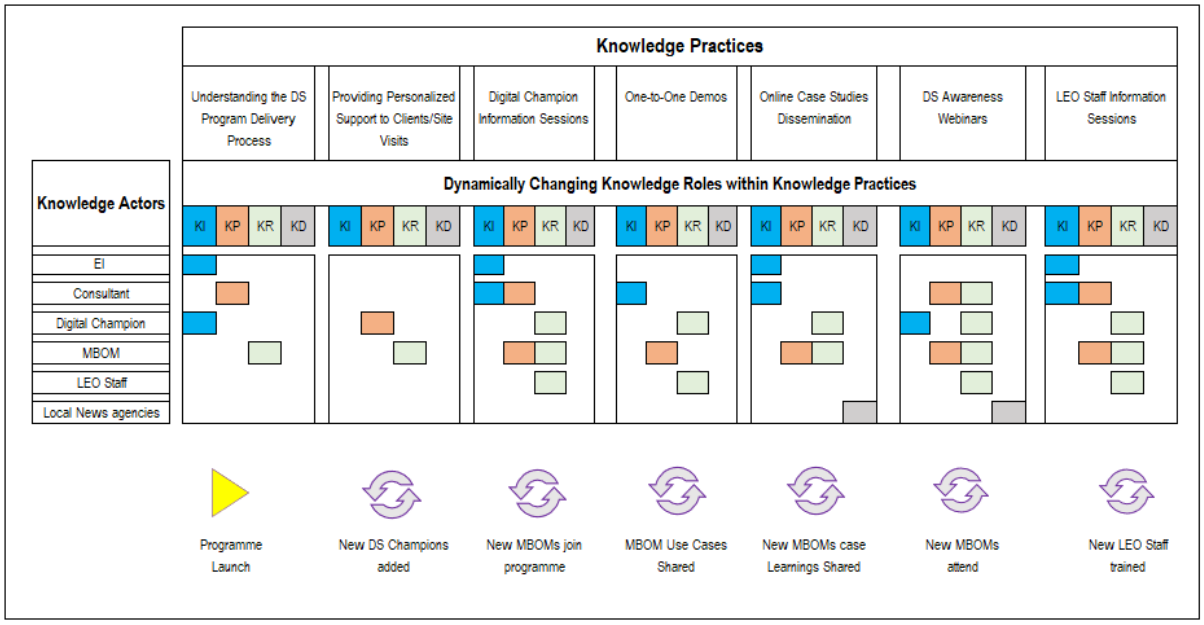

Figure 2: Dynamic and Changing Nature of the Roles played by Key Knowledge Actors within the Knowledge Ecosystem

Based on our findings we populate our initially proposed research theoretical model (Figure 1) to arrive at our integrated findings depicted in Figure 3. The revised theoretical model presented in Figure 3 describes the knowledge-centric model for the government-orchestrated digital transformation of the MB sector. Regarding the significance of the two-knowledge transfer and exchange routes: initiation and instantiation, Digital transformation related knowledge becomes more relevant and has the most significant impact when pathways and practices support the instantiation route. Both routes allows us to understand the relational nature of public value-social value creation. We notice that through knowledge mechanisms one can create social value to the targeted sector of the public policy innovation as well as improve DTRK of

the public sector stakeholders who are involved in the delivery of such sectoral DT programs as well. Such relational social value creation process fueled by knowledge mechanisms allow for the sectoral DS program to become sustainable in the long run.

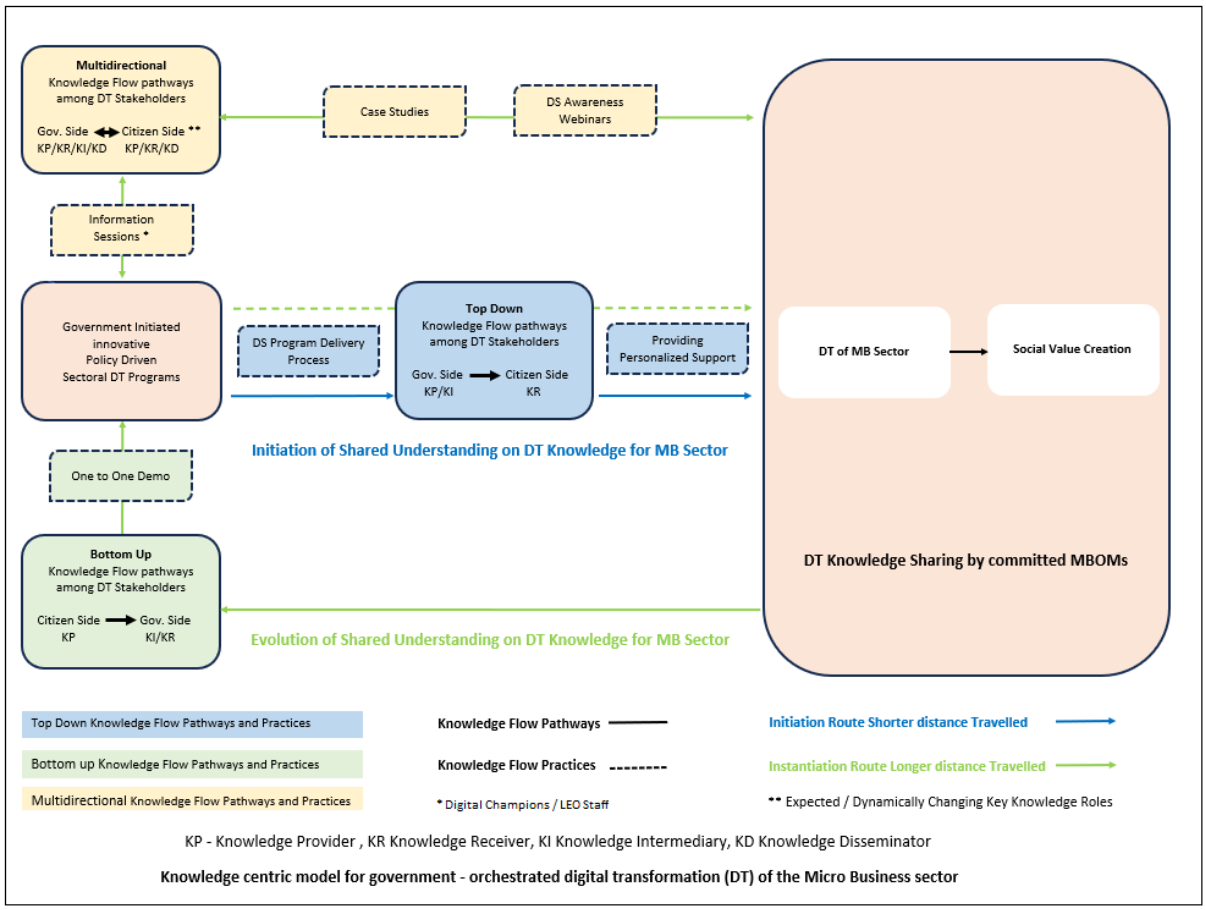

Figure 3: Final Theoretical Model - Knowledge-Centric Model for Government-Orchestrated Digital Transformation of the MB Sector

DISCUSSION

Research aiming to examine government's actions through plans and programs to *orchestrate the digitalization of extra-government organizations and sectors* would be of value to both research and practice. Hence, we set out to examine the impact of digital government DT programs targeting specific MB sector and study how digital government orchestrate knowledge mechanisms within sectoral social innovation knowledge ecosystems to ensure efficient production, processing, and dissemination of the required DT knowledge resources, through and among different ecosystem stakeholders. Such knowledge mechanisms comprise different kinds of 'knowledge flow pathways' in the DT knowledge

ecosystem along with the different 'knowledge-related roles' played by the ecosystem stakeholders. Thus, looking to better answer our research question, which was: What are the knowledge mechanisms, through which the innovative government policy initiatives can help orchestrate digital transformation of MBs for creating the desired social value? Despite the importance of knowledge mechanisms for such transformational contexts, knowledge flows within sectoral ecosystems for orchestrating transformations have rarely been examined by prior digital government literature. Thus in this study, we used the less researched, crucial yet highly conceptual and contextual notion of knowledge flows in the context of the public sector for theory development (Scholl, 2022) and concurrently viewed digital government not only as *users* and *providers* but also *as* ***enablers*** of digital transformation in the society. We specifically look at knowledge mechanisms — the knowledge flow pathways and practices pertaining to specific contextual knowledge known as digital transformation related knowledge (DTRK) also referred to as DT knowledge. Using an exploratory lens that leverages both structured and unstructured data collection methods covering diverse respondents from public policy stakeholder groups comprising both the government and the citizen side, we uncover robust findings that answer our research question using a case study method for the chosen digital government program context (Massaro et al., 2015). Our study establishes the link between public sector DT programs and social value creation through knowledge-centric sectoral governance emanating through three unique knowledge pathways using a contextual specific, psychological and relational approach to understanding public value creation from innovative government initiated policy plans and programs (Meynhardt, 2009, 2015). By focusing on a specific sectoral government DT program in Ireland, the study extends and offers empirical validity to the predominately conceptual work in digital government literature on sectoral government (Janowski, 2015, 2016; Kalbaska et al., 2017). The DS program initiated by the Irish government to orchestrate digital transformation in the Irish MB sector has created significant social value (instrumental and humanistic) via the *initiation* and *instantiation* knowledge routes.

The “initiation knowledge route” is triggered by the top-down knowledge flow pathway. This route lays the foundation to create a shared understanding of DT among the MBs and public sector agents. Although collaborative, this network is centralized in structure and covers mostly explicit technical and managerial DT knowledge transfer to MB sector. The bottom-up and multidirectional knowledge pathways and the associated practices further nurture the initial shared understanding of DT among the MBs and public sector agents. However, in contrast to the top-down knowledge flow pathway, these collaborative networks are decentralized in structure and takes into account both explicit and implicit technical and managerial DT knowledge transfer and exchange among multiple stakeholder groups. They are based on relationships, trust, extent of knowledge sharing, and commitment levels of all stakeholders, including MBOMs (Ansell & Gash, 2008; Massaro et al., 2015). This leads to the instantiation of joint efforts undertaken by all the network stakeholders and are termed as the “instantiation knowledge route”.

The instantiation route is central for maintaining the relevance of sectoral government DT initiatives to generate sustained and significant improved social value and well-being of the MB sector. Further, the instantiation route results in considerable DT knowledge gains for the government stakeholder groups facilitating their performance when local government agents are forced to adapt to emerging digital trends through innovative policy and program delivery (Carter et al., 2023). However, it must be noted that both “initiation” and “instantiation” knowledge routes are recursive in nature. Over time, the recursive nature of the three knowledge pathways and practices will evolve into sustainable digital government management practices, thereby paving the way for the public sector's institutionalization of the sectoral digital transformation efforts (Janowski, 2015).

Our findings also extend prior studies highlighting how different alter-oriented knowledge brokering behavior jointly benefits the network stakeholders in the public sector knowledge ecosystem context (Ritala et al., 2023). Two specific alter-oriented knowledge brokering roles were identified in this study. The ‘network catalyst’ relates directly to knowledge influencing network actors altering relationships to facilitate knowledge sharing and adoption (Ritala et al., 2023). The ‘continuity safeguarder’ relates to the

social fabric of the network; they regulate the conditions for social exchange among other stakeholders in the network (Ritala et al., 2023). In particular, we notice that the national government, in our case the EI agent, often plays the role of 'continuity safeguarder', and the consultants are seen to alter between the role of knowledge providers, knowledge receivers, and network catalysts in different scenarios.

The EI agent also plays a strategic role in fostering emergence and evolution of the DT innovation policy ecosystem by playing the role of ecosystem architect and strategically creating conditions for coalescence, so that ecosystem stakeholders form embryonic relationships and initial mechanisms for interacting through the initiation route (Daymond et al., 2023). Further, evidence of instantiation route identified in this study also supports the recommendation that public sector architects should make strategic efforts to create conditions for cooperation, wherein ecosystem stakeholders pursue compatible goals while exchanging resources and engaging in joint activities for developing a shared understanding of the DTRK (Daymond et al., 2023).

Moreover, committed MBOMs who regularly share their DT knowledge via bottom-up and multidirectional pathways can also serve as network catalysts for effectively influencing other MBOMs who are not yet the clients of local government agencies (LEOs). Such MBOMs can help encourage their peers to benefit from digitalization by signing up for DT programs provided by LEOs. This also means we need to look outside the organizational commitment context and look at ecosystem level commitments when researching on how knowledge management practices influence public sector (Massaro et al., 2015). More research on future evolution of policy-driven innovation ecosystems such as these needs to be evaluated to better understand how government and citizen stakeholders adjust and cope with evolutionary changes in DT program knowledge ecosystems. The findings also address the void in literature to understand how to build DT related knowledge among government agents (Andrade-Rojas et al., 2024; Pittaway & Montazemi, 2020).

THEORETICAL CONTRIBUTIONS

Our study offers three key theoretical contributions to the IS discipline. First, the study advances literature on digital transformation of the public sector by examining the enabling role of digital government innovative initiatives and the specific role of government stakeholders within the social innovation knowledge ecosystem in promoting digital transformation efforts to a vulnerable, yet economically and socially significant MB sector (Bodrožić & Adler, 2022; Ritala et al., 2023). The study departs the predominant focus of IS scholars from examining how digital technologies can transform the service delivery and efficiency of the public sector to considering how digital governments can create sustainable social value impacts through their innovative policy-driven DT sectoral governance initiatives (Janowski, 2015). Our findings add to previous research that has mainly examined private sector actors as facilitators of DT within the SME sector by looking at the specific role of government stakeholder groups as facilitators of DT within the MB sector (Leong, Pan, Newell, & Cui, 2016; Li, Su, Zhang, & Mao, 2018). The study also highlights the importance of fostering digital transformation related knowledge (DTRK) among local government stakeholders to enable them to carry out sectoral digital transformations, thereby advancing research in this important area (Pittaway & Montazemi, 2020). While, most prior studies focus on supply side DT policies of the government, such as provision of broadband services, our work contributes to the demand-side digital government literature by examining how digital innovation policies lead to the digitalization of the MB sector (Bertot et al., 2016; Henderson, 2020). The results offer further clarity in how to best conceptualize the less precise sub dimension of public value namely improving social value and well-being of stakeholders in a sectoral governance context (Twizeyimana & Andersson, 2019) using a contextualized, psychological and relational approach that categories the impacts into instrumental and humanistic.

Second, we further expand the literature on public sector DT by identifying three knowledge flow pathways through which innovative government policy initiatives foster DT related knowledge (DTRK) for the digitalization of the MB sector, namely —top-down, bottom-up and multidirectional pathways. From these three knowledge flow pathways and the corresponding practices, we abstract two higher-level knowledge

routes —initiation and instantiation, through which DTRK is disseminated and used by network stakeholders in government-orchestrated DT program. These initiation and instantiation routes contribute to our understanding of how to institutionalize government driven DT programs for the MB sector with a view to ensure their sustenance. Drawing on these findings, we proposed an inductively driven knowledge-centric model for the government-orchestrated digital transformation of the MB sector (Figure 3), which can serve as the point of departure for future studies on the subject. The identified nuances extend similar studies looking at strategic architecting and orchestrating knowledge transfers between stakeholders in loosely coupled settings such as public sector ecosystems and online communities by understanding knowledge flow 'direction' and 'distances' (Daymond et al., 2023; Mozaffar & Panteli, 2022) going beyond looking at the role of platforms and portals (Androutsopoulou et al., 2017; Cooke, 2007; Hoe-Lian Goh et al., 2008). Prior literature has focused on top-down and bottom-up knowledge flows in the public sector context (Van Meerkerk, 2019). Our work extends this line of enquiry to offer how bottom-up knowledge flow influence can lead to lateral impact, creating wider social value for the entire MB sector as well as to government stakeholders through the creation of shared understanding (Ansell & Gash, 2008; Kelman, Hong, & Turbitt, 2013). These findings also offer valuable insights to digital transformation governance in the public sector especially the orchestration of sectoral governance (Faro et al., 2022; Provan & Kenis, 2008; Sørensen et al., 2021; Wang & Ran, 2022) and it highlights the need to focus on relational aspects of co-production approaches to knowledge management relevant to strategizing, design, implementation and evaluation of public policy (Meynhardt, 2015; Scupola & Mergel, 2022), thus enhancing overall accountability of digital government's DT initiatives (Lindberg, 2013).

Third, we contribute to recent literature exploring the phenomenon of DT in the MB sector by extending MBOMs' individual learning process for DT efforts to the collective learning and knowledge exchange within the boarder DT knowledge ecosystem for government led DT initiatives (Mandviwalla & Flanagan, 2021; Shirish et al., 2023). To the best of our knowledge, this is one of the first studies to examine the process and impact of government led innovative DT programs for the MB sector complementing other

notable studies that cover the SME sector (Shapira et al., 2011). Prior literature on MB has primarily identified challenges when small businesses carry out DT efforts mainly to gain instrumental value as they pivot trying to adapt specifically to crisis situations (Andrade-Rojas et al., 2024; Mandviwalla & Flanagan, 2021; Parker et al., 2023; Sellitto et al., 2016). Our study extends this literature and reports on the additional humanistic benefits attained through DT efforts when MBs have enhanced sense of commitment to their sector and to the wider community (Mandviwalla & Flanagan, 2021; Morgan, Anokhin, Ofstein, & Friske, 2020; Shirish et al., 2023) . In doing so, the study answers to the call for DT researchers to study contextual DT practices both within private and public sector enabling the execution of DT strategies, instead of merely examining theoretical notions of DT strategy (Carroll, Hassan, Junglas, Hess, & Morgan, 2023; Massaro et al., 2015).

IMPLICATIONS FOR POLICY & PRACTICE

Our study has clear practical implications for public sector bodies. Although many countries have not advanced beyond the lowest digitalization stage of the digital government maturity model, they are experiencing political and social pressures to design and implement demand-side digital policies that can create sustainable social value. In this context, we recommend that governments promote demand-side DT innovative policies such as the DS program, which can uplift societies in an equitable way by improving their digital competencies and competitiveness. The DS program and the associated knowledge-centric understanding is a good theory of change model that can be followed by other policymakers aspiring to undertake and evaluate sectoral digital governance initiatives for the MB sector (Funnell & Rogers, 2011). Introducing expert advisory support services along with other supply-side DT policies such as the provision of broadband connectivity, especially in rural areas, can help in sustaining the high impact MB sector.

The study also provides a ready-to-use analysis grid to design and evaluate future government-initiated policy-driven DT programs. It does so by delineating a sectoral governance knowledge stakeholder mapping and stage mapping, which identifies key knowledge stakeholders within the policy-driven

innovative program ecosystem for the context of MB sector. It also identifies triggers and facilitators that can contribute towards implementing digital government sectoral programs in countries similar to Ireland in terms of their digital government maturity. This can act as a good logic model for policy makers (Funnell & Rogers, 2011). The study also identifies a new class of digital innovation related to sectoral governance that is evident through the DS program, termed *'DT-focused expert advisory support'*[11]. The expert advisory support is a public policy innovation that uses a combination information, participation and technology element within it. The advisory support is executed by digital consultants who are selected by government stakeholder groups but they are chosen by the policy targets for their respective digital transformation program. These consultants personalize the digital transformation contextual knowledge transfer to the policy targets by either focusing on implementing projects and developing a digitalization plan (project-based approach) or work on the digital strategy for the business (plan-based approach)[12]. Moreover, they also are instrumental in the knowledge transfer to government agents and other MBOMs. This type of innovation which has similarity with technology extension programs that should be promoted through DT programs in addition to *outcome-based funding,* which has dominated the digital governance policies (EU, 2023).

Further, we were able to gather suggestions for improving the DT program delivery and implementation from our interviewees. We identified that when MBOMs are initiated with digital transformation related knowledge via the experiential learning method (project based approach), it makes the knowledge sticker and more useful for future transfer within the knowledge ecosystem. Usually, MBOMs with such experience seem to be highly committed towards supporting other MBOMs in their DT journeys and get involved in facilitating bottom up and multidirectional knowledge flow pathways for ensuring knowledge transfers and exchanges. Therefore, it is crucial to design such programs with an active learning pedagogy.

[11] See Appendix 1, Appendix 5a, and Figure 2 for more details

[12] Most of the MB samples who took part in this study benefited from a consultant who used a project-based approach

MBOMs can play a crucial role in bridging the digital divide between small and big companies by collaboratively promoting such DT programs after the initiation to digital transformation related knowledge via DT program participation. These experienced MBOMs collaborate with the consultants and government agents, and often agree to share knowledge voluntarily within the social innovation knowledge ecosystem. This leads to a chain reaction which provides greater social value in comparison to a scenario where the government has the sole responsibility for creating contextual digital transformations in society. Therefore, governments should identify committed MBOMs and invite them to contribute to the DT of MB initiative through various bottom-up and multidirectional knowledge sharing practices, identified in this study.

Because MBOMs wear several hats, time constraints coupled with weak digital readiness mindsets can be major barriers for the uptake of such programs (Shirish et al., 2023). It is recommended that governments and consultants join in networking events organized by the MBOM community to improve the knowledge flow distance that can be travelled by DT programs. This will help inform reluctant MB sectors, thereby nurturing cooperation for joint efforts from multiple stakeholder groups within the ecosystem. In addition to the aforementioned initiatives, our interviews with MBOMs revealed several concrete ways to improve the uptake of innovative government-led DT programs such as the DS program. These include: *investing in more advertisement, reaching out to local associations and professional networks that MBs frequent, and communicating success stories of previous MBOMs,* and *reinforcing provision of personalized support to MBs.*

Further, the study shows that developing government agent's DT knowledge through various mechanisms is quintessential for the effective delivery of DT programs in the MB sector. In particular, our study has shown that Consultants providing the expert advisory service play a crucial role in bridging digital transformation related knowledge among government agents by acting as a network catalyst and promoting knowledge adoption and infusion through their own experiential learning and use case sharing. The diverse pathways identified in our study demonstrate that knowledge transfer and exchange around

government orchestrated DT programs happens through multiple stakeholder involvement. These findings reinforce the need for proactive collaborative governance by public sector bodies for responding to changing digital trends.

LIMITATIONS AND FUTURE RESEARCH

Despite its several theoretical and practical contributions, our study is not without limitations. Our study has examined the impact of government-orchestrated digital transformation programs at a specific period and within a particular sector. Moreover, we use a single case study approach, which does not allow us to offer generalizable findings and may limit transferability to other settings that may lack strong government investment in digitalization (Chang & Panteli, 2024), leaving room for further theory development. Further research is needed to capture the long-term effects of such programs. Especially because we could not critically examine the design and implementation of knowledge practices as these were based off a pilot sectoral governance DT program. It is possible that in the future we can further offer such examination to better understand the boundary conditions to our theorized model. Therefore, we encourage longitudinal studies in this area for the specific case in the future. Eventually also looking at various other high impact sectors such as sustainability, energy and education. Moreover, the program investigated in this study was at the pilot stage which could have impacted the conduct and evaluation approaches that were currently taken by the government in this context. It is also possible that our theoretical model could be applicable beyond the DT context to other support programs that are situated in dynamic contexts requiring both specialized managerial and technical knowledge to succeed.

Future research could investigate how to encourage the commitment levels of MBOMs and joint efforts levels of all DT knowledge stakeholders in government-orchestrated DT knowledge ecosystems. Moreover, looking into the extent of the commitment of such MBOM and identifying micro-level factors that may be unique to the MB sector can further aid the public sector to better leverage knowledge resources for promoting sectoral governance initiatives, such as the DS program implementation. Such research can add value to collaborative governance literature (Wang & Ran, 2022) and strategic

architecting of public sector innovative policy-driven knowledge ecosystems (Daymond et al., 2023). However, more research is needed to evaluate the appropriate governance model that best suits the current knowledge-centric model for the government-orchestrated digital transformation programs (Provan & Kenis, 2008).

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APPENDICES

Appendix 1

Digital Start Program and Digital Consultant Selection

Digital Start

Digital Start is a pilot initiative from the Local Enterprise Offices designed to help small businesses to develop and implement a digital strategy. The program had a soft launch in May 2022. The program was not "over advertised" as the pilot program was limited to companies in the manufacturing and internationally traded services sectors. The program is still in the pilot stage as of Jan 2024.

Initially the Digital Start was advertised on the LEO National website[13] as well as on the individual LEOs website.[14]The program has not been promoted separately through national media. In Q4 2023, the LEOs launched a new campaign "All in a days work.[15]. This national advertising campaign featured three separate support program for small business, Digital Start being one

[13]See https://www.localenterprise.ie/
[14] See https://www.localenterprise.ie/Limerick/
[15]See https://allinadayswork.ie/

of the featured program. The “All in a days work” campaign was heavily advertised in national media, LEO website, YouTube, Facebook, Instagram, Twitter etc.

Micro Business owners could apply to join the program through a web link on the LEO website. In addition, LEO Digital Start champions approached qualifying clients in their local area to sign up for the program.

Eligibility for the Digital Start program includes businesses in the Manufacturing or Internationally Traded Service sector, with up to 10 full-time employees. Start-ups that have been trading for at least 6 months and have generated revenues in excess of €30,000 may also qualify for the program. Not all applicants met the eligibility criteria resulting in some applicants being refused a place on the program. The services offered under the Digital Start program include support in obtaining digital strategy, technical, and advisory services.

Expert digital consultants are contracted by the Local Enterprise offices to help small businesses to develop a digital strategy, create a digital adaptation plan based on their needs, and assist in implementing this plan. Companies can avail of 4 to 5 days support from an approved digital consultant. The program is fully paid for by the Local Enterprise offices. The stated focus is on three areas, business process optimization, enhancing the digital customer experience, and better utilisation of data. Digital initiatives around website development, online trading or digital marketing are supported under different programs.

Digital Consultants Selection

There are 31 Local Enterprise Offices in the republic of Ireland, covering 26 counties. Each local enterprise office operates a panel of digital consultants to deliver the Digital Start program. The Local Enterprise office procurement department publish a Request for Tender (RFT) on the e-tenders website.[16]

Consultants are requested to demonstrate an understanding of the SME sector. The selection criteria includes relevant experience and qualifications. RFTs require consultants to be able to support owner managers in preparing a strategy for the adoption of digital tools and techniques across the business. Tenderers are requested to include details of two or three prior completed contracts as references, demonstrating how these are similar to the Digital Start contract being tendered.

The evaluation criteria differs among Local Enterprise Offices. For example, one scoring criterion allocated 45% for showing the tenderer's capability to effectively deliver services to both the client and Local Enterprise Office through various methods, and 55% for the technical expertise of the consultancy team proposed for service delivery.

Consultants that are successful in their tender application are added to the Digital Start delivery panel. Companies that are successful in their Digital Start applications can request a specific Digital consultant from the panel or they can be allocated a consultant by the Local Enterprise Office Digital champion.

Appendix 2

LEO/EI Participants demographics			
Type	LEO Code	Age Range	Gender
LEO FG and SI	LEO 1	40-50	Female
LEO FG and SI	LEO 2	40-50	Female
LEO FG and SI	LEO 3	40-50	Male

[16] Etenders 2023, accessible at https://publicprocurement.ie/etenders-feed/

LEO FG and SI	LEO 4	40-50	Male
LEO FG and SI	LEO 5	30-40	Female
LEO FG and SI	LEO 6	40-50	Female
LEO FG and SI	LEO 7	30-40	Female
LEO SI	LEO 8	40-50	Male
LEO SI	LEO 9	40-50	Female
LEO SI	LEO 10	30-40	Female
LEO Interview	LEO 11	40-50	Male
Enterprise Ireland Participant Demographics			
Manager at EI Interview	EI 1	40-50	Male

Table 2a: LEO/EI staff participant demographics

MBOM participant demographics					
MBOM Code	Age	Gender	Region/ Industry	role in Position	SMACIT*
MBOM1	40-50	Male	West Cork/Secondary	Managing Director	Social media, mobile, analytics, cloud computing,
MBOM2	50-60	Female	Clare/Secondary	Company Director	Social media, mobile, analytics, cloud computing,
MBOM3	40-50	Male	North Cork/Secondary	Director	Social media, mobile, cloud computing,
MBOM4	30-40	Female	West Cork/Secondary	Director	Social media, mobile, cloud computing,
MBOM5	30-40	Male	Kerry/Secondary	Managing Director	Social media, mobile, cloud computing,
MBOM6	30-40	Male	Dublin/Tertiary	Co-Founder	Social media, mobile, analytics, cloud computing,
MBOM7	Over-60	Male	Tipperary/Secondary	Director	Social media, mobile, cloud computing,
MBOM8	50-60	Male	Meath/Tertiary	HRS Consultants	Social media, mobile, cloud computing,
MBOM9	40-50	Female	Cork/Tertiary	Director/Sales	Social media, mobile, cloud computing,
MBOM10	50-60	Female	Limerick/Tertiary	Director	Social media, mobile, cloud computing,
MBOM11	40-50	Male	Longford/Tertiary	Director	Social media, mobile, analytics, cloud computing,
MBOM12	20-30	Female	Carlow/Secondary	Office Manager	Social media, mobile, cloud computing,
MBOM13	30-40	Male	Meath/Tertiary	Technical Manager	Social media, mobile, cloud computing,
MBOM14	50-60	Male	Limerick/Tertiary	Owner	Social media, mobile, cloud computing,
MBOM15	50-60	Female	Waterford/Secondary	MD	Social media, mobile, cloud computing,
MBOM16	50-60	Female	West Cork/Secondary	Director	Social media, mobile, cloud computing,

*Acronym for social media, Mobility, Analytics, Cloud Computing, and Internet of Things. We mention those digital technologies that were leveraged by MBs as part of their DT efforts within the DS program.

Table 2b: MBOM structured interviews and focus group participant demographics

Appendix 3

Structured Interview Questions and Focus Group Protocols

Appendix 3a: Focus Group Protocol

The focus groups revolved around we focused on four common themes (Theme 1, 2, 3 and 4). We added a sub theme for theme 2 on the implementation and management of DS program when we conducted the focus group with government side stakeholders. The themes mentioned below followed by the respective questions.

Theme 1: Digital Start Program Implementation and Impact
Theme 2: Stakeholder Involvement and Impact
Theme 2a: Implementation and Management of DS program
Theme 3: Role of LEO as a Public Institution
Theme 4: Perceptions of MBs on the DS programs

The questions for Theme 1 involved:

1. How is the digital start program implemented and managed within LEOs?
2. Did you face any challenges in implementing this program?
3. Have you introduced/seen any new ways of working since the start of this program within LEOs? (New digital technologies?)
4. What is the impact of this program? (More question for the citizen stakeholder group were asked in theme 4)
5. Business Owner's Perceptions/LEO agents

The Questions for Theme 2 involved:

1. How does their involvement contribute to LEOs?
2. How does their involvement contribute to other clients or MBs?
3. How does their involvement contribute to society?
4. Why do you think are so very involved in the program?

The Questions for Theme 2a involved:

1. How is the digital start program implemented and managed within LEOs?
2. Did you face any challenges in implementing this program?
3. Have you introduced/seen any new ways of working since the start of this program within LEOs? (New digital technologies?)
4. What is the impact of this program?
5. Do you think the involvement of mentors and micro businesses is important for the program?

The Questions for Theme 3 involved:

1. What is the broad duty and role of LEOs in your locality and to society?
2. As a public institution, why is helping MB with the digital transformation journey important?
3. What is your role? What motivates you at work?

The Questions for Theme 4 involved:

1 How did you know about this program?
2 How has DS program helped you (your company, your employees, family)?
3 Have you engaged with LEOs or EI to promote this program? What was your experience? (learning, contributing to others, etc.)
4 How motivated are you to help other business owners to onboard on to the digital journey?
5 What are your suggestions for improving the reach and impact of the Digital Start program?

Appendix 3b: Structured Interview Questions for Citizen Stakeholder Groups

Demographic Information including age, gender, education, other company details followed by below questions

1 What sector is your company active in?
2 Primary (extracting and harvesting natural products , eg Agriculture, fishing and mining)
3 Secondary (food, manufacturing and construction)
4 Tertiary (eg retail services, entertainment, information or financial services)
5 How many Full time employees do you have now?
6 Do you have experience with the use of digital technologies to improve your business? (Yes/No)
7 How would you rate your digitalisation level on a scale of 1 to 5 (1 low to 5 very high)

8 Please describe in your own words one of your business experiences with digital technologies and its potential outcome (If you have no prior experience you may talk about your experience with use of digital technology in general)
9 Please describe in your own words the role of digital technologies for micro-businesses in Ireland (Employing less than 10 employees)
10 In General, to what extent do you have an interest in technological innovations? (1 Low interest to 5 very high interest)
11 To what extent do you have a positive attitude towards the use of digital technology?
12 In general, to what extent you are comfortable using new digital technology when no help is available?
13 Please tick one or more option below in how the digital start program has benefitted you (your business, employees, family)?
    - Digital start program has helped me to increase my revenue?
    - Digital start program has helped me to reduce costs?
    - Digital start program has helped me to innovate (new products, services, channels?)
14 Please elaborate in your own words how the digital start program has benefited you (your business, employees, family)?
15 To what extent do you agree with the following sentences (1 strongly disagree to 5 strongly agree).
    - I wish to fully support the change process bought about by the digital start program
    - I wish to fully engage with LEOs or other public sector bodies to promote the DS program
    - I wish to share my experience from the Digital Start Program so other MBs can also benefit from the program
16 Please write a few ideas on how we can encourage more participation from MBs for the promotion and delivery of the program?

Appendix 3c: Structured Interview Questions for the Government Stakeholder Groups

Demographic Information including age, gender, the title and role of the government agent followed by the following questions

1) Enter Number of Digital Start (DS) stakeholder interaction sessions initiated or hosted by your LEO
2) How has the DS program and its roll out in the past year influenced you / your teams digital or other competencies?
3) How has the DS program and its roll out influenced Micro Businesses (MBs) and their stakeholders?
4) What are some key pain points that you faced during the initial roll out and/or when DS has been launched? Provide one instance of your experience if possible.
5) How important it is for LEOs to have key performance indicators (KPIs) for the roll out of the DS program? Would it matter if these were not in place?
6) Why do you think MBOMs engage in promoting the DS program?

Appendix 4

MBOM Code	BOT 1 to 1 demo	MUL LEO Staff Information Sessions	MUL DS Awareness Seminars	MUL DS Public Webinars	MUL Press coverage	MUL Online Case Study	Grand Total
MBOM15	1	1		1	1	1	5
MBOM11	1	1	1	2			5
MBOM13	1	1		1		1	4
MBOM16	1	1		2			4
MBOM2	1	1	1	1			4
MBOM12	1	1		1		1	4
MBOM14	1			1	1	1	4
MBOM7	1			1			2
MBOM1			1	1			2
MBOM9		1		1			2
MBOM10				1	1		2
MBOM6			1	1			2

Notes: BOT-Bottom-Up Knowledge Pathway and MUL-Multidirectional Knowledge Pathway

Table 4a: Detailed practices enacted by committed MBOMs within the knowledge network

MBOM Code	Bottom Up	Multidirectional	Grand Total
MBOM15	2	3	5
MBOM11	1	4	5
MBOM2	1	3	4
MBOM14	2	2	4
MBOM13	1	3	4
MBOM12	1	3	4
MBOM16	1	3	4
MBOM7	1	1	2
MBOM10	1	1	2
MBOM6		2	2

Table 4b: Summary of practices enacted by committed MBOMs based on instantiation route to DT knowledge flows

Appendix 5

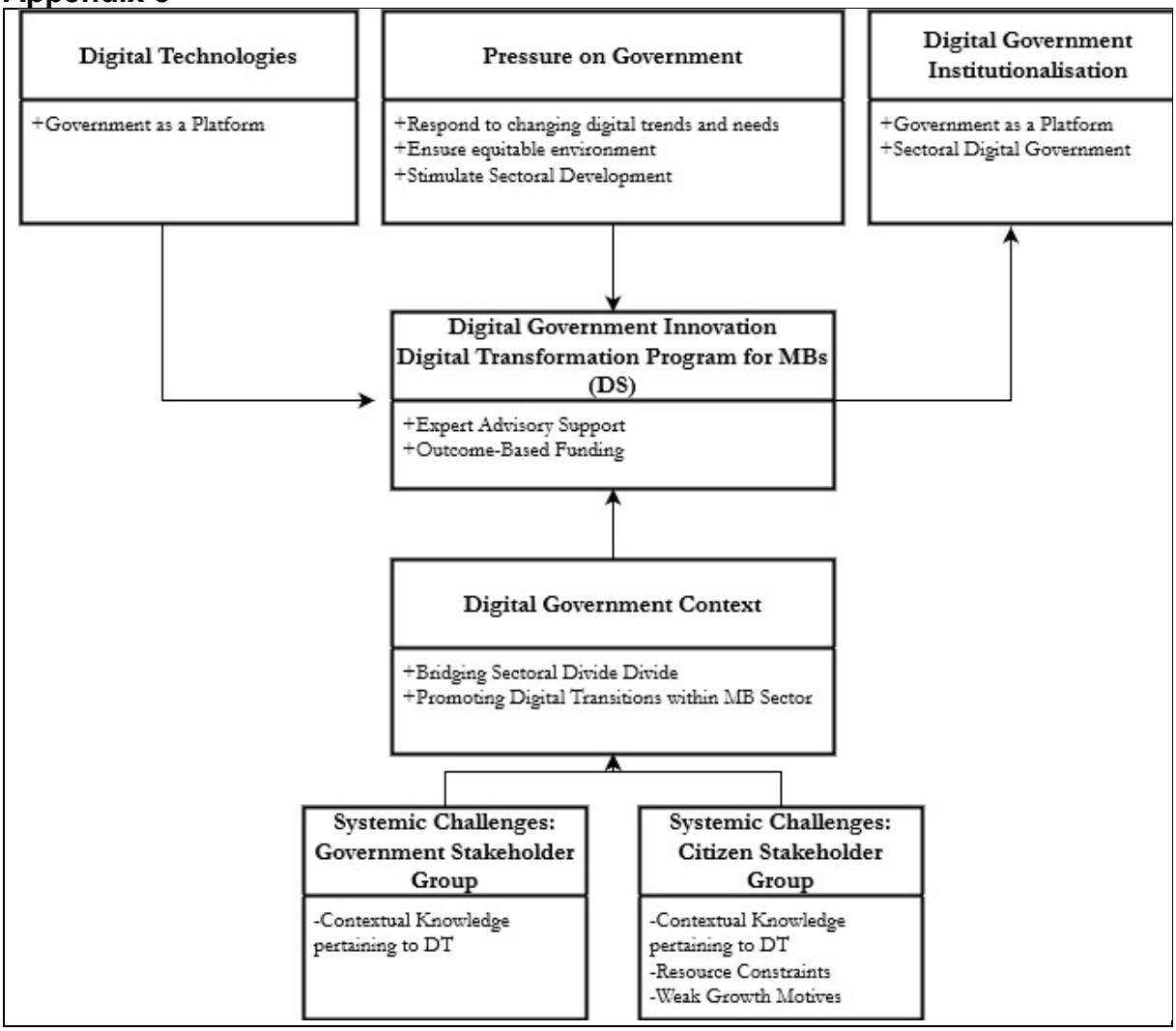

Figure 5a: Digital government stage analysis framework (abstracted by authors using available primary and secondary data)

Context Surrounding the DS Program and Systemic Gaps	Illustrative Quotes from Policy Owner

The Digital Start Program (DS) is primarily aimed at bridging digital divide and providing digital capabilities to microbusinesses so they can confidently undertake digital transformation efforts.	*"Large business has many ways to support their digital transformation efforts. We (Government) now have more resources, money and are better positioned than before to look at how to the support the 200 thousand small businesses* ***who are left behind in the digital economy*** **(digital divide)**…….***Digitalization is a necessity. So long as we meet the boarder condition that our programs must bridge the digital divide so no small businesses are left behind****, we are good.* ***Through the DS program we prompt (MBs) them to develop their digital capabilities, capacity, and knowledge through funding and advisory support****…we hope that it will change their way of thinking about digitalization and empower them to use digital technologies for future transformations" EI 1* *"The goal is to get people of board with DS program, we want that they not stop at this program* (DS) *but to take on more digital transformation efforts* (on their own)……*undertaking digital projects* (as opposed to digital maturity assessment) *is better* (for MBs) *so it ,* (expected changes) *depends upon consultancy time that are provided through the DS program" EI 1*
Systemic Gap- Citizen Stakeholder Group The specificity of this program and alleviating the digital transformation knowledge gap within the MB sector were seen as the main reasons for the launch of the DS program and continue to be the fundamental motive of policymakers to roll out the DS program. Other gaps were identified from the MB literature and elaborated in the literature review sections.	*'* *"Schemes that are directly offered by enterprise Irelands are usually in the form of grants and funding opportunities but* ***DS program is run by LEOs*** **(sector/local level),** ***this is a consultant-run program that provide funding for digital transformation-related advisory support and services****……..initially we came up with trading online and digital vouchers to bridge the digital divide and positioned it to businesses as a support program, we are now promoting DS, we do not know if this positioning is good" EI 1*
Stakeholder involvement in implementing digital policy and need to find ways to instantiate sectoral governance were raised as aspects that were important for the government	*"****Sectoral governance of digital policy implementation is about the key strategic goal of the program****, we get a road map from our parent institution, we then go out and talk to stakeholders****, it is mostly bottom up, we talk to users, business owners, we talk to public agents, we talk to consultants, we then develop a pilot programs*** *(digital policy) and we continue to see how to improve (instantiate) this new digital policy…….Government will be conscious of how the program is being roll outs, we have meetings once in 2 month, people* (Stakeholders) *are open to provide feedbacks to government (EI)….our programs normally do not last if they are any negative complaints or feedback for any stakeholder or higher up… so far, the DS has been rolling out fine, we have not received any negative feedback or publicity about the program, it has all been positive outcomes" EI 1*
The aspiration to develop DT knowledge from the government side is clear. Establishment of Digital Champions within each LEO for governance purposes was one way to do this. Other aspects of the government stakeholder context and their lack of DT knowledge are elaborated on in the literature review section.	*"……giving staff* (government agents) *a better understanding of digitalization, is a big consideration for us…… to us success of the program would mean having a decent approval rates* (of those who applied for DS support), ***the staff*** **(LEO employees)** ***having increased knowledge capabilities…****……we learnt from colleagues and from our prior programs on green initiatives (another business support program on sustainability) that it was good to identify someone at the LEO office that it important to have a dedicated person to DS program and this person can sit on events on behalf of LEOs such as EI runs a webinar or public events…….****these digital champions are expected to have and develop an increased interest in digital transformations and they are expected to self-learn***

	rather than told to do, but we do not know if this (governance setup) *works on the ground "-EI 1*
EI agents believe that bridging DT knowledge gap and building digital capabilities among government stakeholder groups is essential to the success of this program. They speak about going over and above the current government as platform services and understand how best to reach the MBs and care for their digital development.	*"The program is implemented using standard information systems, like submission systems, it is not an intelligence system, but we have developed an online reporting systems to follow up on the program outcomes… we would like to know how to target and roll out a program as digitalization (MBs) itself is a seen as a new concept for many government* (LEO staff) *agents"-EI 1*

Table 5b: Digital government stage analysis framework (abstracted by authors using available primary and secondary data)