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A Knowledge-Centric Model for Government-Orchestrated Digital Transformation among the Microbusiness Sector¹²

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Author Biographies

Anuragini Shirish is a full Professor at Institute Mines-Télécom Business School, France. She has also completed her habilitation à diriger des recherches (HDR) from Université de Strasbourg, France. Her research focuses on studying the humanistic and instrumental impacts of several socio-technical phenomena in the broad areas of digital work, digital innovation and digital society. Her research has been published in international refereed journals including the *Journal of Management Information Systems (JMIS)*, *European Journal of Information Systems (EJIS)*, *Information Systems Journal (ISJ)*, *Journal of the Association for Information Systems (JAIS)* and *Communications of the Association of the Information Systems (CAIS)* among others. She has also presented her work in several premier IS and management conferences. She serves as an Associate Editor at the *European Journal of Information Systems (EJIS)*. She has been honoured with several awards including the “Outstanding Educator Award” by the Association for Information Systems (AIS) women’s network. She was recently recognized as a Distinguished Member Cum Laude by AIS and in 2023 and won the best published paper award for the year 2023 at JAIS.

Shirish C. Srivastava is Professor of Information Systems at HEC Paris. Prior to joining HEC, he has lectured at the School of Business, National University of Singapore and holds a Ph.D. from the same university. He has also completed his *habilitation à diriger des recherches* (HDR) from Université de Lorraine, France. His research interests include: technology enabled innovation, artificial intelligence, opensource, social media strategy, e-government and services sourcing. His research has been published in several top-tier journals such as *MIS Quarterly (MISQ)*, *Information Systems Research (ISR)*, *Journal of Management Information Systems (JMIS)*, *Journal of the Association for Information Systems (JAIS)*, *European Journal of Information Systems (EJIS)*, *Information Systems Journal (ISJ)*, *Journal of Information Technology (JIT)*, and *MIS Quarterly Executive (MISQE)*, among others. He has also won multiple awards, including awards for best papers at different forums such as Academy of Management, International Conference on Information Systems, Association for Computing Machinery, and Society for Information Management including the Kauffman award for best paper at ICIS 2023. He is a four-time winner of the Prix Académique de la Recherche en Management, 2013, 2015, 2016 and 2022 at Paris, France. He is on the editorial board of the *Journal of Management Information Systems (JMIS)* and currently serves as the senior editor at the *Journal of the Association for Information Systems (JAIS)* and *European Journal of Information Systems (EJIS)*, and an associate editor at the *Information Systems Research (ISR)*. In addition to research, his rich experience includes coaching senior executives on issues related to managing digital transformation, artificial intelligence, emerging technologies, innovation, entrepreneurship and cross-border business relationships.

Niki Panteli, PhD (Warwick), is a Professor of Digital Business at Lancaster University Management School and an Adjunct Professor at the Norwegian University of Science and Technology. Her main research interests lie in the areas of digital transformation, cybersecurity, virtual teams, virtual collaborations and online groups, online communities and digital health platforms. Within this field, she has studied issues of trust, conflict, creativity, identification and leadership in the online environment. She led and participated in several research projects and her work appeared in numerous top-ranked academic journals including the *Journal of the Association of Information Systems*, *Work, Employment & Society*, *Information Systems Journal*, *European Journal of Information Systems*, *Human Relations*, *Information Technology and People*, *Decision Support Systems*, *Communications of the ACM* and *New Technology, Work and Employment* among others. She served as the President for the UK Association of Information Systems (UKAIS) serving a 2-year term (2022 – 2024) promoting IS research, scholarship and teaching within the UK and beyond.

John O'Shanahan, founder and managing director of LeanBPI based in Limerick, Ireland, is a Master Black Belt in lean management with 30+ years of global operations experience. His expertise lies in business improvement for micro and small enterprises. Collaborating with university partners, he conducts research on digitalisation in micro enterprises, exploring innovative strategies and technologies to enhance small business efficiency. Currently pursuing a doctoral degree in Engineering at the University of Limerick, John combines his practical experience with academic pursuits. He is a keynote speaker at conferences, sharing insights on digitalisation for micro enterprises based on his work with Irish businesses. John's contributions to lean management and digitalization, fuelled by his dedication to empowering small businesses, established him as a respected figure in the industry. He has won the runner up research award for his conference paper on digital transformation within MB sector from the University Industry Innovation Network in 2022.

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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 external stakeholders such as citizens and businesses. Although *policy-driven digitalization* of specific sectors is key for promoting public value, 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 among microbusinesses (MB), a sector that has major 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 MBs' DT. Drawing on qualitative data from a series of structured interviews and focus groups with government agents, digital champions, and MB owner-managers involved in the implementation of a government-led DT program for MBs in Ireland, among the different DT stakeholders, we identify three knowledge pathways playing different knowledge-related roles and aiming to facilitate this transformation: top-down, bottom-up, and multidirectional. Each pathway comprises distinct practices. Collectively, the identified knowledge mechanisms in the DT program knowledge ecosystem foster social value creation for both MBs and government stakeholders, and therefore for the nation as a whole. Specifically, sustenance of the DT program is achieved through "initiation" and "instantiation" knowledge routes. Our findings offer theoretical contributions to the literatures on 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, sectoral governance

INTRODUCTION

Digital transformation (DT) is generally defined as the use of digital technologies to develop and implement innovations that improve organizations' value creation and readiness for the future. However, the contexts in which it takes place—the public and private sectors—significantly differ from one another (Carter, Desouza, Dawson, & Pardo, 2023). The public sector is expected to create public value by

implementing innovative policies, plans, and programs designed to positively impact societal beneficiaries. This means that the scope of public sector DT (PSDT) extends beyond strictly internal digitalization efforts to encompass enabling extra-government⁴ organizations and sectors to leverage digital technologies for the purpose of creating public value⁵ (Meynhardt, 2009, 2015; OECD, 2019 b; Desouza and Dawson, 2023). This idea resonates with digital government's need, aspiration, and initiatives to achieve contextualized digitalization in specific sectors (Janowski, 2015; Srivastava & Teo, 2005; Srivastava, Teo, & Devaraj, 2016).

Although understanding of such sectoral digitalization is crucial, prior digital government research has mainly focused on public sector organizations' digitalization efforts aimed at either improving internal operational efficiency or enhancing external service delivery (Janowski, 2015; Scholl, 2024; Senyo et al., 2024). Of the three dimensions of public value proposed by digital government literature—*improved public services, improved administration, and improved social value and well-being*—few studies have explicitly examined the creation of social value (Twizeyimana & Andersson, 2019). However, in the context of sectoral digitalization, public value creation's primary aim is to improve the social value and well-being of stakeholders impacted by sectoral digitalization policies and programs rather than to enhance government operations. Therefore, examining the social value dimension of creating public value via government-sponsored digitalization programs that cater to extra-government organizations and sectors would benefit both research and practice (OECD, 2019 b. Senyo et al., 2024) .

In a bid to achieve effective public value creation via sectoral extra-government DT initiatives, governments focus on high-impact sectors. Microbusinesses (MBs), which are independently owned and operated small businesses with fewer than ten employees, represent one such sector (Bourke & Roper,

⁴ The term 'extra government' refers to entities that are not solely owned and/or controlled by the government. In addition to different sectors such as microbusinesses, it includes different loosely coupled communities, cooperatives, and network of actors, contributing to the process of public value creation.

⁵ 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 well-being-related impacts experienced by the beneficiaries (MB sector) and other stakeholders (government and other parties) involved in the delivery of such a policy.

2019; Shirish, Srivastava, & Panteli, 2023). Accounting for about 75% of all firms globally, MBs contribute to over half of the world's GDP (Mandviwalla & Flanagan, 2021). MBs have great potential to create significant public value, but they generally lack the resources needed to undertake DT (Mandviwalla & Flanagan, 2021). Additionally, as the literature highlights, governmental business support for MBs is often inadequate, leading MBs to prioritize sustenance over risky transformational strategies (Andrade-Rojas, Saldanha, Kathuria, Khuntia, & Boh, 2024; Gherhes, Williams, Vorley, & Vasconcelos, 2016). But in our digital era, MBs that wish to remain competitive have no choice but to make DT part of their core strategy (Andrade-Rojas, 2024).

Interestingly, MBs' small size means they have an attribute that is essential for DT: the flexibility needed to adapt to fast-changing market conditions. Nonetheless, MBs must acquire and assimilate the requisite capabilities and knowledge to pursue their innovation and DT ambitions (Andrade-Rojas et al., 2024). To leverage MBs' full potential to contribute to the economy in which they operate by creating public value, governments are orchestrating MBs' use of digital technologies via various DT programs. However, it is unclear whether these government-initiated DT programs, conceived as knowledge-based public policy innovations, create demonstrable public value.

In the context of government efforts to orchestrate digitalization of extra-government sectors, public value creation largely pertains to creating the impacted stakeholders' social value and well-being. Because MBs are smaller and deeply entrenched in the social and economic fabric, they are closer to social value creation (Twizeyimana & Andersson, 2019). Consequently, in this study, set in the MB context, we examine the mechanisms through which sectoral public DT initiatives create the relevant dimension of public value in our research context—that is, the desired social value (Kergroach, 2021; Shapira, Youtie, & Kay, 2011).

Specifically, we study how social value is created through a sectoral DT initiative recently launched by the Irish government: the Digital Start program, whose aim is to orchestrate digitalization among Irish MBs. Although Ireland views MBs as a high-impact sector, the Irish MB sector currently has low productivity.

This has been attributed to outdated processes, poor management practices, and weak adoption of digital technologies (OECD, 2019 a). The Irish MB sector needs policy initiatives to create both short-and long-term social impacts. Ireland is one of the top five European countries in terms of public sector digitalization, and the Irish government, as part of its current national digital strategy, aspires to move to the next stage of its digital government evolution by digitalizing impactful extra-government entities (Ireland, 2023). This makes Ireland a highly suitable setting for our study.

In line with the digital government literature, we estimate social value creation via program beneficiaries' and stakeholders' qualitative reflexive perceptions to measure the effectiveness of government-led DT programs (Meynhardt, 2009; Twizeyimana & Andersson, 2019). Our approach of moving beyond the simple provision of technology to understand impacts on intended program beneficiaries and stakeholders helps us better appreciate the contextual dynamics of public value creation (Benington, 2015; Benington & Moore, 2011; Meynhardt, 2015; Moore, 2012).

Prior research has emphasized that to achieve the intended impacts through government-led DT programs, requisite *digital transformation-related knowledge* (DTRK), or simply *DT knowledge*, must be made available. This knowledge, comprising both technical and business dimensions, is one of the most critical resources for initiating and implementing DT efforts (Srivastava & Shainesh, 2015). Resource-constrained MBs may rely on governments to acquire the knowledge, expertise, and other resources required to undertake such transformations (Mozaffar & Panteli, 2022; Pittaway & Montazemi, 2020; Reggi & Gil-Garcia, 2021; Shirish et al., 2023). However, in the case of large-scale sectoral transformations, governments may not be able to provide and disseminate all the required transformational knowledge (Senyo et al., 2024). When this is so, they must orchestrate knowledge mechanisms within sectoral ecosystems to ensure efficient production, processing, and dissemination of required DT knowledge resources through and among different ecosystem stakeholders. These knowledge mechanisms consist of different *knowledge flow pathways* in the DT ecosystem. Despite their importance for transformational contexts, knowledge flows that facilitate orchestration of transformations

within sectoral ecosystems have rarely been examined in prior digital government literature (Scholl, 2022). Most studies merely acknowledge the relevance of knowledge flows in various contexts without offering a nuanced understanding of specific knowledge mechanisms that can enable social value creation⁶ (Lindberg, 2013; Scholl, 2022; Van Meerkerk, 2019). Examining a government-led sectoral DT program, our research leverages the public policy lens's concept of knowledge flows to examine, understand, and theorize the underlying knowledge mechanisms for orchestrating MB digital transformations that create the desired social value (Bertot, Estevez, & Janowski, 2016; Janowski, 2015). The broad research question we address is:

RQ: What are the knowledge mechanisms through which a government-led sectoral DT program helps orchestrate DT among microbusinesses to create the desired social value?

Situating our arguments in the knowledge management, digital government, and public policy innovation literatures, and employing a case study method, we examine whether delivery of the Irish government's Digital Start (DS) program is creating the desired social value by digitally transforming MBs and impacting other stakeholders, and what knowledge mechanisms this happens through. We believe that a deep theoretical understanding of the Irish Digital Start program will be applicable to PSDT in other contexts. Our research examines how DS program⁷, working through Local Enterprise Offices (LEOs) across Ireland, provides advice, information, and support to MBs so these can initiate and implement DTs. Specifically, we identify and investigate the knowledge pathways and knowledge practices through which the DS program enables the flow of both business and technical DTRK among different ecosystem stakeholders involved in orchestrating DT among Irish MBs. Our approach entailed gathering evidence to understand how the DT program eases daily operational challenges faced by MBs (policy targets) and assists the street-level bureaucrats tasked with DT program implementation on behalf of the government.

⁶ A detailed literature review on knowledge flow pathways and mechanisms in the context of public sector is covered in the next section of the paper

⁷ 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.

Studying both stakeholder groups aligns with our view of public value creation as a relational phenomenon (Meynhardt, 2015).

We collected primary data through structured interviews, focus groups, and semi-structured interviews with microbusiness owner-managers (MBOMs) and the DS ecosystem's public sector stakeholders—that is, those associated with implementing the DS Program. Additionally, we used secondary data from different sources to better understand our findings' context and the importance. Through careful analysis, we unearthed knowledge mechanisms that comprise knowledge pathways and practices and create knowledge flows (transfer and exchange) among different stakeholders; we found these pathways and practices enabled DT among MBs that is intended to create social value. Specifically, our findings describe how DT in the context of sectoral government is instantiated.

Our study makes three important contributions. First, it offers valuable insights into how the public sector's governance of DT can be orchestrated in a sectoral context (Faro, Abedin, & Cetindamar, 2022; Provan & Kenis, 2008; Sørensen, Bryson, & Crosby, 2021; Wang & Ran, 2022). Our findings provide the much-needed legitimacy to recommend proactive and collaborative governance mechanisms that public sector bodies can deploy to effectively respond to evolving digital trends (Bodrožić & Adler, 2022; Sørensen et al., 2021). Second, our findings extend and offer empirical validity to the digital government literature's predominantly conceptual work on sectoral government (Janowski, 2015, 2016; Kalbaska, Janowski, Estevez, & Cantoni, 2017). Drawing on empirical data, we propose an inductively driven, knowledge-centric model for government-orchestrated DT of the MB sector. Third, we contribute to recent literature that explores DT in the MB sector and specifically recognizes the need for collective learning among different stakeholder groups when it comes to public value creation. We conceptualize DT in the MB sector as a government-led knowledge innovation ecosystem in which significant social value accrues rather than as an enterprise-level initiative aimed at 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 that digitalization of the MB sector is an important part of PSDT initiatives aimed at creating the social value dimension of public value that is relevant to our study context. After discussing the significant role MBs play in the economy and society, we present the initial research framework that we derived from the prior literature on PSDT and knowledge flow pathways to guide our investigation. Next, we introduce details of our case study on the DS program before offering an account of our methods and a discussion of our findings. We then present our populated research model with our findings, summarizing our key theoretical contributions. Lastly, we delineate the study's theoretical and practical implications, indicate our study's limitations, and propose future research directions.

BACKGROUND LITERATURE

In this section, following a structured literature review on government-initiated innovative policy-driven DT programs we discuss how different DT knowledge mechanisms among DT stakeholders for the MB sector are instrumental in creating social value. Through this discussion, we arrive at a preliminary knowledge-centric PSTD framework, which forms the basis for our theoretically driven research enquiry.

Digital Transformation of the Public Sector

Digital transformation (DT) is generally associated with technological capabilities that cause organizational disruptions or other structural, processual, and cultural changes within organizations (Chanas, Myers, & Hess, 2019; Dwivedi et al., 2015). Such transformations are typically described as strategic changes that aim to revamp the organization's business model using digital technologies—artificial intelligence (AI), social media, cloud computing, mobile analytics, etc.—and thereby result in novel products and processes, improved customer engagement, and new organizational structures for providing 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 governments' efforts to meet their obligations to citizens and

businesses (Carter et al., 2023). However, PSDT aimed at creating "public value" differs from private sector DT, the efforts of which focus on maximizing "shareholder value" (Srivastava, 2011).

To create public value, governments are implementing various state-funded DT programs, such as the modernization of unemployment insurance in Rhode Island, or pursuing AI-related initiatives to improve government operations and service delivery (Carter et al., 2023). However, governments' strategic goal of addressing *social and well-being dimensions* of public value can also be achieved through policy-driven digitalization of extra-government enterprises, especially within specific impactful sectors (Senyo et al., 2024). This PSDT process aligns with the digital government evolution model that advocates the need to move towards contextualized or policy-driven digitalization of specific sectors (Janowski, 2015; Srivastava & Teo, 2005).

Despite acknowledging that PSDT includes government efforts to orchestrate digitalization of specific extra-government sectors, most PSDT research is skewed toward understanding digital transformation aimed at improving internal government operational processes or service delivery to citizens (Eom & Lee, 2022; Kim & Zhang, 2016; McGrath, 2016; Pang & Lee, 2022; Desouza and Dawson, 2023). The underlying assumption is that internal DT initiatives lead to government efficiency, which in turn creates future public value, including improving stakeholders' social value and well-being (Twizeyimana & Andersson, 2019). Clearly, the policy-driven enablement of specific impactful sectors to undertake DT initiatives—that is, the final stage of the digital government evolution model—has not been focused on in most studies of PSDT (Bodrožić & Adler, 2022; Jetzek, Avital, & Bjorn-Andersen, 2019; Senyo et al., 2024).

We posit that in addition to digitalizing government operations and service delivery mechanisms, enabling identified national stakeholders (citizens and businesses), via targeted efforts, to undertake DT is an essential aspect of governments' policy-driven initiatives aimed at creating social value at an accelerated pace (Srivastava, 2011; Srivastava & Shainesh, 2015). Such innovative DT efforts, aimed at formulating and implementing policy innovations to address critical social challenges such as 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 instance, policy-driven initiatives aimed at achieving digital transformation among microbusinesses (extra-government enterprises) have immense potential to create public value through generating social value and contributing to economic growth (Bodrožić & Adler, 2022; Reggi & Gil-Garcia, 2021; Shirish et al., 2023). Such a view of PSDT is consistent with the aforementioned digital government evolution model. It enables us to go beyond considering government stakeholders as only users and providers of digitally transformed services to see them as enablers of digital transformation within the grassroots of society. It also demonstrates digital government's ability to achieve contextual sector-focused digital transformations (Janowski, 2015; OECD, 2019 b).

However, government-orchestrated sectoral DT initiatives are challenging to implement because they involve tapping into complex contextual knowledge about the sector, geographical location, and business and technical knowledge from distributed pools of stakeholders (Srivastava & Shainesh, 2015; Senyo et al., 2024). Scholars have called for more research to examine how DT efforts can be undertaken by government agents even when they do not have all the requisite knowledge to respond appropriately to contextual requirements (Bodrožić & Adler, 2022; Carter et al., 2023; Eom & Lee, 2022). Literature on PSDT efforts highlights a staggering gap between the public sector's digital aspirations for social development and its digital and contextual capabilities (De Angelis, 2013; Janowski, 2015; Pittaway & Montazemi, 2020). This knowledge gap among government agents implementing sectoral DT programs can hinder DT initiatives' success (Mankevich, Magnusson, & Svahn, 2022). In such a scenario of distributed knowledge pools, it is imperative to conceptualize PSDT initiatives as broad social innovation knowledge ecosystems in which governments serve as enablers in establishing and maintaining such ecosystems through plans and programs promoting digital transformation among vulnerable business sectors (Bertot et al., 2016; Daymond, Knight, Rummyantseva, & Maguire, 2023; Senyo et al., 2024). This conceptualization aligns well with the public value literature, which views value creation as a contextual

and relational concept (Meynhardt, 2015). As we have mentioned, MB is one sector where 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 Microbusiness Sector's DT-Related Knowledge Gaps

Although MBs are the lifeblood of a nation's economy and the primary employment generator in rural areas, as a sector they are vulnerable and resource constrained. Whereas large firms tend to use complex technological applications and systems, MBs have historically used rudimentary or minimal technologies to conduct their business operations (Bharati & Chaudhury, 2006; Kamal, 2015; Sellitto, Banks, Bingley, & Burgess, 2016). However, by using digital technologies, MBs can significantly improve their efficiency and growth. For example, MBs' engagement in digitalization enables them to grow 3.4% faster (Qiang, Clarke, & Halewood, 2006) and helps them achieve various social, economic, and human development goals (Kamal, 2015; Wolcott, Qureshi, & Kamal, 2007). In fact, the digitalization of MBs, a high-impact sector, is seen as a way to help the global economy recover following the COVID-19 pandemic (Parker, Bingley, & Burgess, 2023; World Economic Forum, 2023).

By definition, MBs are small businesses with limited resources. Their small size means they can be more agile in terms of their DT efforts (Mandviwalla & Flanagan, 2021). However, the various local, structural, and financial problems that MBs encounter mean they cannot fully utilize digital technologies and so cannot leverage them for growth to the same extent as large-and medium-sized firms can (Beck, Demirguc-Kunt, Laeven, & Levine, 2008). Moreover, MBs' resources are often so heavily devoted to 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 knowledge and expertise necessary to undertake DT initiatives (Andrade-Rojas et al., 2024).

An MB's knowledge base is generally limited to that of individual MBOMs. Not all MBOMs have the confidence needed to go digital (Mandviwalla & Flanagan, 2021; Singh et al., 2023). The fear of losing

known benefits, coupled with the uncertainty surrounding promised gains from digital solutions, makes engaging in DT a tough choice for most entrepreneurs, and MBOMs are no exception here (Gleasure, 2015; Mandviwalla & Flanagan, 2021). Due to their small size and vulnerability, MBs 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 we mentioned earlier, to undertake DT initiatives, MBOMs need technical and business knowledge. Additionally, they need environmental scanning abilities so they can compare and contrast their business needs with other DT use cases. Clearly, a lack of DT-related technical and managerial knowledge (know-how and know-what) is the key impediment to MBs' undertaking DT efforts. Governments can play a crucial role in addressing MBs' knowledge gaps around digital transformation. 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 (Andrade-Rojas et al., 2024). Having established the unique context, need, and challenges related to DT among MBs, in the next section, we examine the literature on digital government wherein digitalization of MBs is viewed as a policy-driven sectoral governance initiative that must leverage a broader social innovation knowledge ecosystem.

Public Sector Digital Transformation-Related Knowledge (DTRK) Gaps in Implementing Sectoral Governance Initiatives

Rather than focusing on the internal digitalization of government systems, an evolved digital government aims to create contextual transformations through government-initiated, innovative, policy-driven programs for different sectors, localities, and communities, as well as for society as a whole (Janowski, 2015, 2016). Scholars have termed this endeavor "sectoral governance," and they 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 among vulnerable business sectors through innovative policies and programs (Bertot et al., 2016; Daymond et al., 2023).

To bridge the digital divide between large and small firms and involve MBs in social value creation, governments worldwide 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 of how governments can better address concerns around PSDT policy (Janowski, 2015). The model explicitly captures the connection between progress in digital government-initiated innovative policy-driven programs and their impact on development (Bertot et al., 2016; Janowski, 2016). It exhorts governments to move from "universal" digital transformations to "contextual" ones, with this move implying a transition from digitalizing 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), (ii) *transformation* (electronic government), (iii) *engagement* (electronic governance), and (iv) *contextualization* (policy-driven electronic governance). Whereas the first three stages of evolution concern digitalizing government operations and services, the fourth stage describes enabling and contextualizing DT within a particular sector—for instance, the MB sector. The contextualization stage occurs when digital governments design and implement public policy innovations such as DT programs and plans to support and address sector-specific digital challenges (Janowski, 2015, 2016). Such innovative policy-driven digital government programs catering to sector-specific challenges are described as “sectoral digital government” (Janowski, 2015). In the context of our study, sectoral digital government involves bridging the digital divide through digital transformation among the MB sector.

Owing to their deep contextual knowledge, street-level bureaucrats are ideally positioned to deliver such innovative policy-driven programs. However, they often lack DTRK about the technical and managerial aspects that successfully delivering such sectoral programs depends on (Pittaway & Montazemi, 2020; Senyo et al., 2024). Specifically, they 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, the possibility that there are multidirectional knowledge flows between governments and other stakeholders involved in such sectoral digital transformation programs cannot be discounted, although studies supporting this assumption are region specific (Hoffmann, Lopes, & Medeiros, 2014; Labas & Courvisanos, 2021). Prior research also shows that the level of organizational commitment and other sociocultural and demographic factors prevailing within a specific national context may influence the knowledge management process within the public sector (Pepple, Makama, & Okeke, 2022; Razzaq et al., 2018).

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

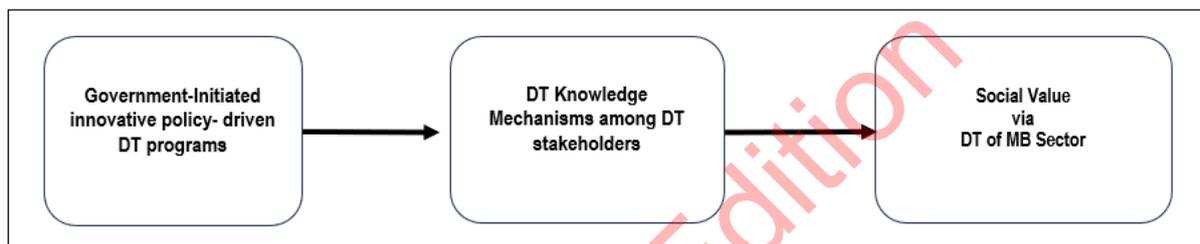
The literature describes knowledge flow pathways according to the directionality of knowledge flows, e.g., vertical versus horizontal flow. Each of these knowledge flows has its own idiosyncratic processes that inform knowledge management models in private and public sector contexts (Van Meerkerk, 2019). Public policy literature has also conceptualized vertical, diagonal, and horizontal knowledge flow pathways, primarily to ensure public accountability of policy programs (Lindberg, 2013). Although these 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 PSDT ecosystem. For example, what role do different ecosystem stakeholders play, and what practices ensure the facilitation of the different knowledge flows that enable the desired sectoral transformation? Uncovering such knowledge mechanisms allows us to understand how the DTRK gaps faced by government and MB stakeholder groups can be bridged and, in turn, how the desired social value for all parties can be created within a DT program's knowledge ecosystem.

Since knowledge-based sectoral governance programs are socio-technical systems, we conceive their corresponding social value impacts as either instrumental or humanistic (Sarker, Chatterjee, Xiao, & Elbanna, 2019). Instrumental social value impacts are related to enhancing MB processes' efficiency and

quality via, for instance, cost benefits and process improvements. On the other hand, humanistic social value impacts concern quality-of-life improvements for MB employees—for instance, employee empowerment or employee well-being. To provide an example, if MBs perceive that doing business has become more efficient and easier, the DT program's desired instrumental and humanistic social values have been realized (Scupola & Mergel, 2022). Our approach to examining social value aligns with the contextual, psychological, and relational approach to understanding public value creation arising from policy plans and programs (Meynhardt, 2009; Meynhardt, 2015).

In this vein, some scholars have made calls to examine specific policy settings and moreover suggested case studies or other empirical methods be used to this end so the research has a greater impact (Massaro, Dumay, & Garlatti, 2015). However, when we searched the most recently compiled reference library for digital government research, we identified only a handful of papers touching on the vital matter of knowledge flows in the public sector context (Scholl, 2022). These papers inform us that knowledge flows facilitated by open innovation initiatives such as platforms and portals occur through interactions between knowledge agents in specific contexts—for example, efforts to design policy initiatives in the healthcare sector or problem-solving initiatives for rural communities (Androutsopoulou, Karacapilidis, Loukis, & Charalabidis, 2017; Cooke, 2007; Hoe-Lian Goh, Yeow-Kuan Chua, Luyt, & Sian Lee, 2008; livari et al., 2019; Tajgardoon, Manzuri Shalmani, & Habibi, 2016; Tibben, 2013). However, many of these studies view digital governments only as users or providers of open data, instead of considering them as actors that enable digital transformation by building knowledge bridges. That enablement contributes to the flow and transfer of context-specific DTRK between knowledge agents. Furthermore, most prior studies in this stream are either descriptive or conceptual in nature, and so they do not uncover the practices embedded within a specific knowledge flow pathway (vertical, horizontal, and multidirectional). And neither do these studies focus on how such DT knowledge can transform a specific vulnerable high-priority sector—for example, the MB sector—as we do here. Hence, to answer the prior calls to better understand knowledge management mechanisms in high-impact policy settings, it is theoretically and

practically important 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 the MB sector (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. Building on what we have discussed thus far, Figure 1 sets out an initial knowledge-centric model for government-orchestrated digital transformation among the MB sector. This initial model paves the way for a deeper theoretical inquiry into the subject.



**Figure 1: Preliminary Knowledge-Centric Public Sector Digital Transformation Framework
RESEARCH SETTING: IRELAND'S DIGITAL START (DS) PROGRAM**

We examine Ireland's DS program (Local Enterprise Offices, 2023a), a government-led initiative for driving digital transformation in the MB sector. A pilot initiative, the DS program was introduced by Ireland's LEOs⁸ in May 2022. The DS program's objective is to enable and assist eligible small businesses so they can undertake DT initiatives. We chose to focus our research on the program because it is a microbusiness (MB) digital transformation support program. At the time of our study, the program was open to companies that had fewer than 10 employees. Although there are digital transformation support programs in other European Union countries, none focuses solely on MBs. Our study adds to the ongoing discussion of digital transformation by focusing specifically on a program supporting DT in the MB sector, which prior DT research has largely overlooked. The DS program aims to provide MBOMs with the knowledge they need to formulate and implement their digital adaptation

⁸ 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.

strategy, and it includes advisory services for both technical and managerial expertise. For most MBs, the program focuses on optimizing business processes, enhancing digital customer experiences, and using digital tools and techniques to leverage data for the purpose of improving resource utilization.

The DS program is administered by the LEOs under the supervision of Enterprise Ireland (EI),⁹ a state agency whose remit is to support Irish companies to start, grow, innovate, and achieve export success. LEOs provide business-support services and expertise (financial and non-financial) to assist new and existing entrepreneurs, including small business owners. They have dedicated teams throughout the local authority network, and they prioritize developing local enterprises with a view to enabling job creation, which contributes to businesses' growth and success in the region (Local Enterprise Offices, 2023b).

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). Through its Centre of Excellence, EI collaborates with the network of LEOs and spearheads the delivery of an improved national enterprise support model. In a bid to create significant public value through various policy innovations, the Centre of Excellence operates service-level agreements, facilitates high-potential company advancement, trains LEO staff, and runs an online support system for entrepreneurs and microenterprises nationwide (Enterprise Ireland, 2023a). Select members from the current staff of each LEO are appointed as Digital Start Champions,¹⁰ who, having received training in the DS program, serve as the dedicated local points of contact for the program and work with MBOMs within the program's framework.

Each LEO takes responsibility for procuring expert digital consultants¹¹ (also referred to as "mentors") for the DS program, using a uniform tendering process to do so. These consultants are selected based on their experience working with small businesses, particularly in DS program-related areas such as

⁹ 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.

¹⁰ Herein after referred to as digital champions for brevity

¹¹ Herein after referred to as consultants or mentors for brevity

business process optimization and digital customer experience enhancement. Once they are assigned to a company, they have flexibility in terms of the approach they take. Some consultants focus on implementing projects and developing a digitalization plan, but others work solely on the business's digital strategy. At the end of an assignment, the consultants submit a report summarizing project objectives, activities, challenges, opportunities, and action plans. More details about the program and how consultants are selected are presented in Appendix 1.

METHODOLOGY

Research Approach and Data

Owing to our study's exploratory nature, we adopted a qualitative research approach, using a single case (the DS program) to delve deep into the nuanced meanings and processes found in 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 among MBs, and, therefore, it contributes to methodological intelligence (Mele et al., 2020). Our primary data came from 28 research participants involved in the DS program: Of these, 10 were DS program experts (known as "digital champions"), 16 were MBOMs, and two were DS government stakeholders. Apart from the latter, whom we individually sought out due to their direct involvement in the program, the participants were invited via a country-wide call made through LEOs and consultants linked to the DS program. This ensured different industries and regions of Ireland were represented.

We collected data between March and May 2023 through the following means: two in-depth semi-structured interviews with key program stakeholders (our unit of sampling); 26 structured interviews with digital champions and MBOMs; and four focus groups, each comprising at least five participants. Details about the digital champions and MBOMs who participated in the study are presented in Appendix 2. In addition to the primary data, we collected secondary data comprising government reports and online

documentation related to initiating and implementing 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 MB owners and managers (MBOMs)	10 digital champions 16 MBOMs
Focus Groups	LEO agents (1 focus group) MBOMs (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 by interviewing a representative from the EI’s Centre of Excellence about initiating and implementing the DS program. As we explained above, the Centre of Excellence has managed the rollout of the DS program among the LEO network. Interviewing the DS program’s policy owner therefore allowed us to obtain an overview of and understand the program’s stakeholder groups and intent, enabling us in turn to identify the dominant knowledge mechanism used in delivering 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 aimed to understand the implementation and impact of the DS program. They focused on the orchestration of the knowledge mechanisms that are created from knowledge flows (transfer and exchange) and support knowledge practices among the different DT stakeholders in the ecosystem during the roll-out process (see Appendix 3). We used the structured interviews with MBOMs to gather data about their views on digitalization and the DS program (e.g., attitudes toward digital technologies in general and the impact of DS on revenues, cost, and innovation) (see Appendix 3). We also asked participants questions about their demographic attributes, company details, digital technologies used, sector of activity, and the number of employees in their MBs. We additionally asked open-ended questions, which allowed the MBOMs to describe their

experiences of using digital technologies in their respective MBs, their perceptions of 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 the stage for the subsequent focus groups with the same set of MBOMs.

Next, we conducted the focus groups. One focus group consisted of digital champions, and the other three comprised MBOMs. These groups helped us obtain a rounded view of 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, focusing specifically on the relevant knowledge mechanisms in the DT ecosystem. The three focus groups with MBOMs examined participants' rationale and motives for joining the DS program, the extent of their involvement, and the outcomes of their participation in this program. Our data analysis enabled us to plot their role in the different knowledge-related mechanisms (see Appendix 4). Each focus group lasted about two hours. After the three focus groups, we reached theoretical saturation. However, a DS LEO agent who could not participate in the focus groups had already been invited for an interview. This agent was known to be actively involved in the DT program by participating in knowledge practices initiated by MBs and government stakeholder groups, and so we added the individual to the sample.

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

Analytical Approach

Our data analysis was influenced by the principles of thematic analysis (Braun & Clarke, 2006). We chose this analytical approach because it allows researchers to remain open to inductively abstracting emergent themes from the data while also being guided by the study's research aim to examine PSDT programs' knowledge mechanisms. NVivo was used to code transcripts and categorize data. 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: 1. *familiarization of data*, 2. *initial code generation*, 3. *theme search*, 4. *theme review*, 5. *theme definition and naming*, and 6. *writing-up the findings* (Braun & Clarke, 2006). Collectively, the six phases sought to unearth the DT knowledge mechanisms, which comprise DT knowledge flow pathways (directionality and distance), stakeholder knowledge roles, and the enabling practices engaged in during DS program implementation.

Phase 1 involved an iterative reading of all the data, including interview data and focus group transcripts. This phase helped us develop familiarity with the data while 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 the knowledge roles that the program's expected practices indicated they would play. (Hereafter, we refer to these roles as "expected knowledge roles.") Together, these stakeholders comprise the social innovation knowledge ecosystem connected to the DS as a sectoral government initiative.

Following this categorization, and informed by the study's research aim, in *Phase 3*, we identified different knowledge flow pathways based on their *directionality* and *distance* within the social innovation knowledge ecosystem. The directionality of the DT knowledge flow pathway is a matter of the provider(s) and receiver(s) of the DT knowledge along with other knowledge intermediaries. The distance of the DT knowledge flow pathway is the number of stakeholder groups impacted by the identified DT knowledge flow pathway; it represents the net social value derived from the DS program. Our analysis revealed three knowledge flow pathways: top-down (government-side stakeholders to citizen-side stakeholders), bottom-up (citizen-side stakeholders to government-side stakeholders), and multidirectional (both across and within 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 various stakeholders within the DS

knowledge ecosystem, notably knowledge receiver (KR), knowledge provider (KP), and knowledge intermediary (KI). We will explain these roles in more detail later in the article.

In *Phase 4*, a third author reviewed and verified the identified knowledge flow pathways, knowledge roles, and associated practices. At this stage, we agreed on the identified knowledge flow pathways' directionality classification, the emergence of a new knowledge role—that of knowledge disseminator (KD)—and the ways in which the expected knowledge roles (KI, KP, KR) dynamically changed across different knowledge practices.

In *Phase 5*, we proceeded to investigate the distance traveled by each of the DS program's knowledge flow pathways and the emergent impact or social value each of these created, primarily for the policy target—that is, the MBs. We categorized the DS program's social value impacts as either instrumental or humanistic (Sarker et al., 2019).

In *Phase 6*, we proceeded to write up our findings in three different parts and finally integrated the findings to present a 'Knowledge-Centric Model for Government-Orchestrated Digital Transformation of the MB Sector' as a theoretical framework to advance both theory and practice.

FINDINGS

This section is divided into four parts. Part 1 summarizes the different stakeholder groups involved in the DS program and the knowledge roles we expected these actors to perform in the context of public policy program implementation. In Part 2, 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 knowledge flow dynamics across different stakeholder groups in the social innovation knowledge ecosystem of the DS program. Along with knowledge flow pathways' directionality, we also identified practices, and the associated changing nature of the knowledge roles played by various stakeholders. We briefly explain the identified knowledge flow pathways' directionality through illustrative examples from the collected data. In Part 3, 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 traveled

(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 the DS program's impact. We will briefly explain the two knowledge routes and provide illustrative examples showing their impact on MBs as well as on government-side stakeholder groups. In this part, we also discuss the type and nature of DT-related knowledge that was transferred and exchanged via the two routes. Finally, in Part 4, 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 among the MB sector.

Part 1: DS program Stakeholders and Expected Knowledge Roles

Various stakeholders are linked to the DS program, and they are expected to perform different roles in its social innovation knowledge ecosystem. These stakeholders are divided into government-side stakeholders and citizen-side stakeholders. Collectively, all the stakeholders comprise the social innovation knowledge ecosystem connected to the specific DS initiative. We classify three types of expected knowledge roles that the different DS stakeholder groups perform: 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 the knowledge receiver via the knowledge intermediaries. Knowledge is expected to flow from the policy owner to street-level bureaucrats—that is, the digital champions—and the consultants with whom they work in partnership. It is ultimately expected to reach the policy target—that is, the MB sector. This dynamic is akin to that of technology transfer programs initiated by governments, wherein the knowledge receiver's primary role is to be the beneficiary. More details on how these primary roles change during DS program implementation will be brought to the fore in Parts 2 and 3 of the findings section.

Government Side Stakeholders	Expected Primary Role	Citizen Side Stakeholders	Expected Primary Role
	KP/KI		KR/KI

El 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) A bridge between national and local program coordination. Designated DT domain in charge within LEOs (KI)	Employees of MBOMs (Clients)	Organizational members managed by client MBOM; are either involved in the DT project or will benefit from DT efforts (KR/Beneficiary)
LEO staff (Implementation Support Agent)	Assist in local-level DS program implementation when needed (KI)	Family of MBOMs (Clients)	Beneficiaries of DT efforts
Consultants	Local, personalized program delivery agent (KI)	Broader MB sector	Targeted KR of the DS program
Notes: *Clients, i.e., MBOMs registered at 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 DS Program’s Knowledge Ecosystem

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

Top-Down Knowledge Pathway

The first knowledge flow pathway we identified is the top-down pathway. This runs from the government to the MBOMs and MBs, and its purpose is to transform how they do business. (See the “Research Setting” section above for details of how and why the program works with MBs to this end.) Table 3 provides further details about the knowledge roles played by different stakeholders in the top-down knowledge flow pathway, in which DT-related knowledge, comprising both technical and managerial knowledge, is primarily transferred from one lead stakeholder to another in the loosely coupled knowledge ecosystem. Based on our data, we identify two practices that facilitate the top-down knowledge flow pathway: (a) *understanding the DS program’s delivery process*; and (b) *providing personalized support to MBs*.

(a) Understanding the DS program’s delivery process: Different stakeholders play different roles in delivering the DS program. Some are knowledge providers (consultants), while others become knowledge receivers (such as MBs and MBOMs) or knowledge intermediaries (such as EI and the digital champions).

In the top-down pathway, consultants often play the knowledge provider role vis-à-vis a specific MBOM. Armed with DT-related technical and managerial insights, they offer a personalized digital solution to address MB clients' contextual needs.

However, we also observed two kinds of knowledge intermediaries displaying alter-oriented knowledge-brokering behavior (Ritala, De Kort, & Gailly, 2023; Wang & Ran, 2022). The first kind of intermediary, digital champions and LEOs in charge of program implementation, play the role of *network catalyst*. This role relates directly to knowledge elements, influencing network relationships to facilitate knowledge sharing and adoption (Ritala et al., 2023). Digital champions are network catalysts in the sense that they screen and approve MBs' enrolment in the program as well as choose the appropriate consultant for the project based on the client's initial needs. LEOs, meanwhile, validate applications and seek funding and advisory support. The second additional kind of knowledge intermediary corresponds to EI agents, who play the role of *continuity safeguarder* (Ritala et al., 2023) within this knowledge network because they oversee the program, regulating the conditions through which it is promoted and implemented. Also, within the continuity safeguarder remit, EI agents oversee the entire DS program and set governance principles and key performance indicators (KPIs) that local LEOs need to follow.

Digital champions are the key knowledge intermediaries 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 MBOM that applies for the DS program. This aspect of their work has a significant influence on how the program is delivered, because they might select consultants who are also willing to act as a knowledge intermediary (KI) for DS program dissemination when they are asked to provide inputs by digital champions, with the MBOMs playing the role of knowledge receiver by making use of the DS program's advisory services.

(b) Providing personalized support to MBs: Another common practice within the top-down knowledge flow pathway is the personalized support extended by the knowledge providers, notably LEOs, to MBs that may receive assistance from DS. 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 made by the LEO digital champion. 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 beneficiaries serve to initiate a shared understanding of DT knowledge between government actors and MBOMs.

Table 3 sets out the dynamic and changing roles played by the knowledge actors within this pathway and offers illustrative quotes that speak to the top-down knowledge flow pathway’s two practices—that is, understanding the DS program’s delivery process and providing personalized support to MBs. 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 Safeguarder)-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)	<p>“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</p>	KP-Digital champion to KR-MBOM
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Table 3. Top-Down Knowledge Pathway, Roles and Practices Illustration

Bottom-Up Knowledge Pathway

Our findings reveal that in the context of DS program implementation, there is a counter-intuitive kind of knowledge flow pathway. We observed a bottom-up knowledge pathway (deviating from the expected knowledge roles mentioned in Table 2) that involves transfer of both technical and managerial knowledge from MBs and MBOMs (i.e., citizen stakeholder groups) to the government stakeholder groups. Moreover, we identified one practice that facilitates the bottom-up knowledge flow pathway: *one-to-one demo*.

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 practice facilitates the MBs’ sharing knowledge with the LEO agents. The MBOMs play the knowledge provider 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 pitch the program to other MBOMs more confidently and relevantly. The knowledge receivers are the local government agents—LEO staff, for instance—who may also sit in such meetings if needed, plus the digital champions. The DT-related knowledge they receive through these sessions facilitates the instantiation of a shared understanding of DT knowledge between the knowledge network’s actors.

Table 4 sets out the dynamic and changing roles played by the knowledge actors using this pathway and offers illustrative quotes that speak to the relevance of this practice within 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 Knowledge Roles	Illustrative Quotes on Knowledge Flow Practice	Knowledge Roles Explained
KI (Network catalyst)-Consultant KR-Digital champion KR-LEO staff	“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
KP-MBOM	“ Think it's good (<i>one-to-one session</i>) 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 facilitate DTRK transfer and exchange through multiple pathways, with knowledge flowing in several directions, creating social value for other MBs who may or may not be clients of a specific LEO. These knowledge flows from MBOMs to digital champions and consultants, from consultants to digital champions and MBOMs, and from MBOMs to other MBOMs happen through specialized knowledge transfer and exchange practices. These practices lend the program credibility, as most knowledge transfers and exchanges are promoted by knowledge providers who share their experiential learning outcomes in the form of use cases. Such a contextual narration of knowledge instances makes the DTRK more tangible for the knowledge receiver. We characterize these simultaneous bottom-up and lateral knowledge flows as a multidirectional pathway, in which DT knowledge is transferred from the citizen stakeholder group to local government agents or between members of the citizen stakeholder group in the loosely coupled social innovation knowledge network. Our data revealed that although the DS program is a government-led initiative, DTRK flow is often not initiated by digital champions. We identified four practices that enable multidirectional knowledge

pathways: (a) *online case study dissemination*; (b) *DS awareness webinars and seminars*; (c) *digital champion information sessions*; and (d) *LEO information sessions*. We also observed changes in the roles played by key actors in each of these practices.

(a) *Online case study dissemination*: Interactions between the different stakeholders enable successful DS implementation cases among MBs to be identified. MBOMs from these successful cases are invited to share their stories with 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 a written or video case study that is published online as a digital story.¹² The key stakeholders involved in this knowledge transfer and exchange practice are the consultants, who act as 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.¹³

(b) *DS awareness webinars and seminars*: These seminars and events led by LEOs happen in real time via webinars or take place in person at a local level. Digital champions may also ask consultants whether 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 the DS program's various stakeholders. Beneficiaries include potential MB clients, other consultants, and digital champions. These events, which are both informational and promotional, strengthen DT knowledge within a broader social ecosystem and lead to the DS program's instantiation. Such practices are integral to the program's implementation, because they reinforce the DS program's benefits to potential LEO clients when they are thinking about enrolling in the program.

(c) *Digital champion information sessions*: These sessions are initiated at the EI's request, and consultants are invited to them to share the program's utility with different stakeholder groups. The

¹² Some online case studies can be accessed at <https://www.localenterprise.ie/Portal/Digital/Case-Studies>.

¹³ 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>

purpose of these sessions is to provide training and information to digital champions about DT's effectiveness 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, who present case studies that focus especially on the experiential learnings from the program. These information sessions are supplemented by quarterly digital champion meets, in which the digital champions act as both knowledge receivers and knowledge providers. In these meets, the digital champions offer feedback to EI and share best practices with each other to support targeting and roll-out of the DS program's benefits in their locality. This initiative transforms the bottom-up knowledge flow that each digital champion receives from MBOMs into a lateral knowledge flow, which benefits all digital champions through mutual sharing. It also helps in appreciating the significance of contextual knowledge when it comes to creating social value through DT initiatives.

(4) LEO staff information sessions: At the request of the EI's Centre of Excellence, focused DS program training seminars or webinars are arranged. Such sessions involve consultants sharing experiences about interacting with MBOMs and MBOMs presenting their case studies to the general LEO staff (and not only digital champions). In some cases, these sessions are organized so as to provide 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 case they have handled within the DS program that might be relevant to the event's specific topic. Here, the DT knowledge receiver is primarily the LEO staff members; digital champions may figure among them, though these information sessions are primarily tailored to the LEO general support staff, who may not understand the DT process.

Table 5 sets out the dynamic and changing roles played by the knowledge actors within this pathway and offers quotes that speak to the practices within the multidirectional knowledge flow pathway. 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

<p>KI (Network catalyst)-Consultant</p> <p>KP-MBOM (s)</p> <p>KI (Continuity safe guarder)-EI</p> <p>KR-Digital champion</p> <p>KR-MBOMs</p> <p>KD-local news agencies/all actors Advocate on social media (in general sessions and not in focused sessions)</p>	<p>“we did a video ... we wanted to show to other businesses what we can do with digitalization” MBOM12</p>	<p>KI (Continuity safe guarder)-EI <i>Coordinated case studies</i></p> <p>KI-Consultant <i>Recommended case studies</i></p> <p>KP-MBOM <i>Participated in case studies</i></p> <p>KD (Knowledge disseminators)-Local News Agencies/All actors <i>Advocate case studies on social media</i></p> <p>KR-MBOM (new target) and digital champions</p>
	<p>“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” LEO5</p>	<p>KI (Continuity safe guarder)-EI <i>arranged digital champion calls</i></p> <p>KI (Network catalyst)-Consultant <i>Recommended Case Studies</i></p> <p>KP-MBOM (s) <i>Participated in case studies</i></p> <p>KD (Knowledge disseminators)-Local News Agencies/All actors <i>advocate case studies on social media</i></p> <p>KR (implicit)-MBOM (new target) and digital champion</p>
	<p>“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)” MBOM12</p>	<p>KI (Continuity safe guarder)-EI <i>Organized webinars and coordinated case study</i></p> <p>KI (Network catalyst)-Consultant <i>Proposed MBOM for case study or webinar</i></p> <p>KP-MBOM <i>Participated in webinar and cases study</i></p> <p>KR (implicit)-MBOM (new targets) and digital champions</p> <p>KD-local news agencies/all actors <i>Advocated case studies on social media.</i></p>
DS Awareness Webinars and Seminars		
Dynamically Changing Knowledge Roles	Illustrative Quotes on Knowledge Flow Practice	Knowledge Roles Explained
<p>KP-Consultant presenter (s)</p> <p>KR Consultant</p> <p>KP-MBOM Presenter (s)</p>	<p>“Similar to Mayo, we have had about 40 or more webinars and seminar in Galway”-LEO5</p>	<p>KI (Network catalyst)-Digital champion <i>Organized webinar</i></p>
	<p>“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</p>	<p>KP-Consultant presenter (s)</p> <p>KP-MBOM Presenter (s)</p> <p><i>Presenter in the webinar</i></p>

KR-MBOMs Attendees KI (Network catalyst)- Digital champion KR-Digital champions KR-LEO staff KD (Knowledge disseminators)-LEOs/All actors advocate on social media	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	KR-MBOMs KR-Consultant KR-LEO staff KR-Digital champions <i>All attend the webinar</i> KD (Knowledge disseminators)-LEOs/All actors <i>Advocate on social media</i>
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	<p>"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</p> <p>"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" LEO7</p>	KI (Continuity safe guarder)-EI <i>Coordinated the information sessions</i> KI-Consultant <i>Recommended MBOMs</i> KP-Consultant presenter (s) <i>Presented case studies</i> KP-MBOM Presenter (s) <i>Presented their case study</i> KR-MBOMs. <i>These MBOMs were exposed to other case studies</i> KR-Digital champions KR-LEO staff <i>As a way of feedback from digital champions</i>
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	<p>"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" LEO7</p>	KI (Continuity safe guarder)-EI <i>Coordinated the information sessions</i> KI (Network catalyst)-Consultant. <i>Recommended MBOMs and cases studies to present</i> KP-Consultant presenter (s) <i>Presented case studies</i> KP-MBOM Presenter (s) <i>Presented their case study</i> KR-MBOMs <i>They were exposed to other case studies presented by MBOMs</i>

		KR-LEO staff and digital champions
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Table 5. Multidirectional Knowledge Pathway, Roles and Practices Illustration

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 now examine the impact of the knowledge flows in terms of the “distance” traveled—that is, the number of stakeholder groups reached. In doing so, we offer 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).

Not all pathways and identified corresponding practices travel a similar distance in terms of 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 the distance traveled by such a pathway to be longer than that of a specific pathway that only impacts a few actors within the DS program's knowledge ecosystem. Moreover, we also observed that the pathways are interconnected and recursively influence each other. We enrich our understanding of the 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 social innovation knowledge ecosystem's actors (Janowski, 2015). We call this route the *initiation route* because it initiates 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 required to achieve the targeted DS program's collective goal, and such an understanding can contribute to collaborative learning among stakeholders (Ansell & Gash, 2008). We observed that in the top-down knowledge pathway, enactment of expected knowledge roles and practices facilitated the digital transformation of the MB sector through the initiation route, directly impacting the MBs that completed the DS program.

As more knowledge stakeholders become committed and open to sharing DT knowledge within the DS social innovation knowledge ecosystem, an organic evolution of the shared understanding of DT knowledge for the MB sector takes place. We call this the *instantiation route*. The bottom-up and multidirectional knowledge pathways' enactment of dynamically changing knowledge roles and practices facilitates the MB sector's digital transformation through the instantiation route. This route directly impacts the government stakeholder groups, including national government agents and local government agents (digital champions and LEO staff), and it has an effect on the citizen stakeholder group by positively impacting the wider MB sector.

To understand what kinds of social value impact the knowledge flows have within the DT program, we classify the impacts that lead to improved social value and well-being into instrumental and humanistic impacts (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 MBOMs' perceptions regarding either *cost efficiencies* or *improved processes and systems*, which help provide a competitive advantage to the MBs and ensure their survival. The DS program enabled MBs to grow through implementing 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 MBOMs' perceptions of aspects related to *DT knowledge development*, *well-being*, *flexibility at work*, and *MB employee empowerment*, all of which create sustainable social value. Such impacts contributed to MBOMs' considering sustainably using digital technologies in their business. The impact of knowledge transfer and exchange mechanisms was also identified in the experience shared by other knowledge stakeholders as they reported instrumental social value impacts, comprising *DS program promotion reach* and *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 quotes from the different stakeholders that speak to the DS program’s social innovation knowledge ecosystem. The quotes demonstrate the two knowledge routes (initiation and instantiation) and the distance traveled in terms of social value and well-being-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 confidence 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

Social Value Impact on different knowledge stakeholders illustrated through selective quotes	Participant Codes
<p>“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 one-to-one meeting with individual clients (Those who have undertaken DS program)¹⁴. 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]¹⁵</p>	LEO12
<p>“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]</p>	LEO7
<p>“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]</p>	MBOM6
<p>“There was a jewelry 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]</p>	LEO11
<p>“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]</p>	LEO2
<p>“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 four or five 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]</p>	LEO5
<p>“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]</p>	LEO5
<p>“As a microbusiness, 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]</p>	MBOM8
<p>“Knowledge gained from seeing 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”</p>	LEO2

¹⁴ Throughout the tables illustrating findings, bold wording highlights relevance and round brackets are used to clarify the context of a quote from respondents

¹⁵ Throughout the tables illustrating findings, we use square brackets to communicate our inference from a given quote

[Evolution of DT knowledge through impact on DS champions]	
“Realization that we (I) need more understanding of digital solutions for us and 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 Well-Being Impacts

According to the digital government stage analysis model, initiation and instantiation of digital government sectoral programs should lead to the institutionalization of the sectoral government (Janowski, 2015). In our specific case of the DS program, we find that the program’s social innovation ecosystem is self-sustaining, and it eventually becomes integrated as a digital government offering for effectuating contextual digital transformations among the MB sector (Janowski, 2015). The pilot nature of the DS program could have impacted these findings, which may need further validation before they can be generalized to other government-supported programs. More details on the digital government stage analysis for this specific case can be found in Appendix 5.

Our findings show that the initiation knowledge route empowers only 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, and 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 that are 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 traveled 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, because 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 (which may or may not be the local government's clients), and consultants from various localities. In this knowledge route, the knowledge providers are usually MBOMs and not local government agents, as they are in the knowledge initiation route. Of their own volition, experienced MBOMs and local consultants may engage with other actors in the knowledge network to disseminate to a broader set of stakeholders the DT knowledge they obtained through the initiation route. This voluntary sharing of use cases by MBOMs, complemented with consultants' providing their expert knowledge through the 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 to the DS program. This creates an impact on the broader social innovation knowledge ecosystem, one that is more significant and is not limited to the DS program but instead extends to the entire MB sector. Moreover, the knowledge transfer and exchange that occur via this route involve both implicit and explicit DTRK. However, we observed a greater level of exchange in relation to DT's managerial aspects. Moreover, it is essential to appreciate that not all MBOMs who have benefited from the initiation route would contribute to the instantiation route.

Appendices 4a and 4b provide further details on certain proactive and prosocial MBOMs' commitment levels to the DS knowledge ecosystem. They depict the variety and intensity through which these actors contributed to specific knowledge pathways and practices. Empowered and committed MBOMs' knowledge-sharing contributions 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 by which the DS program is pitched to other deserving and interested MBOMs from different localities. Moreover, we observed that local news agencies played a crucial role as knowledge disseminators within certain identified practices. We also note how the instantiation route gradually enabled the DS program to become institutionalized (Janowski, 2015).

Integrated Findings

In this section, we integrate the findings delineated in the previous three parts to describe the results emerging from our research.

We will now unpack three different knowledge roles performed by the key DS stakeholder groups: knowledge receiver (KR), knowledge provider (KP), and knowledge intermediary (KI). These are expected knowledge roles. In addition to these, we also discerned the role of knowledge disseminators (KD), a new role played by local news agencies. We present these via Figure 2 below, which shows the revised roles performed by knowledge actors as the DS program unfolded. The enacted roles go beyond the expected knowledge flows initially discussed in the first findings section; these roles are primarily dependent on the top-down knowledge flow pathway that covers the initiation route, wherein the DT-related knowledge was expected to flow from the policy owner to street-level bureaucrats (such as digital champions and LEO staff) and the consultants they partner with and ultimately reach the policy target—that is, the MB sector and its beneficiaries—and thus create the desired impact and social value. In addition,, Figure 2 also shows the dynamic changes that occur to these expected roles played by actors – including EI, consultants, digital champions, MBOMs, Leo staff, and local news agencies – in the DS program knowledge ecosystem when knowledge flow directions change. It therefore reflects key changes in how the DS program is instantiated via the associated practices within the instantiation route. It shows how the DS program can be impacted by bottom-up as well as by multidirectional DT knowledge resource pathways and practices. Within these, the knowledge ecosystem’s actors are instrumental in creating and enacting bottom-up knowledge resource pathways and practices as well as multidirectional DT knowledge resource pathways and practices, thereby assisting in the implementation and long-term persistence of the digital transformation initiative. 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 is initially expected in the context of such public policy initiatives. To use the bottom-up knowledge practice one-to-one demos as an example, Figure 2 shows how the knowledge receiver role occupied not by

MBOMs but by 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 the sharing of new learning from past DT program delivery, providing the government stakeholder with up-to-date case contexts to further strengthen the DT program’s implementation. Similarly, in the case of another multidirectional knowledge practice, namely the LEO staff information sessions, Figure 2 shows that MBOMs, digital champions, and LEO staff are all receivers of contextual DT knowledge, and the knowledge provider role is played by the consultants. This practice appears to build targeted contextual DT knowledge among LEO staff. The presence of other actors, including multiple MBOM clients, at such events fosters both knowledge transfer and exchange, leading to a shared understanding of DT knowledge within the social innovation knowledge ecosystem of the DS program as a whole.

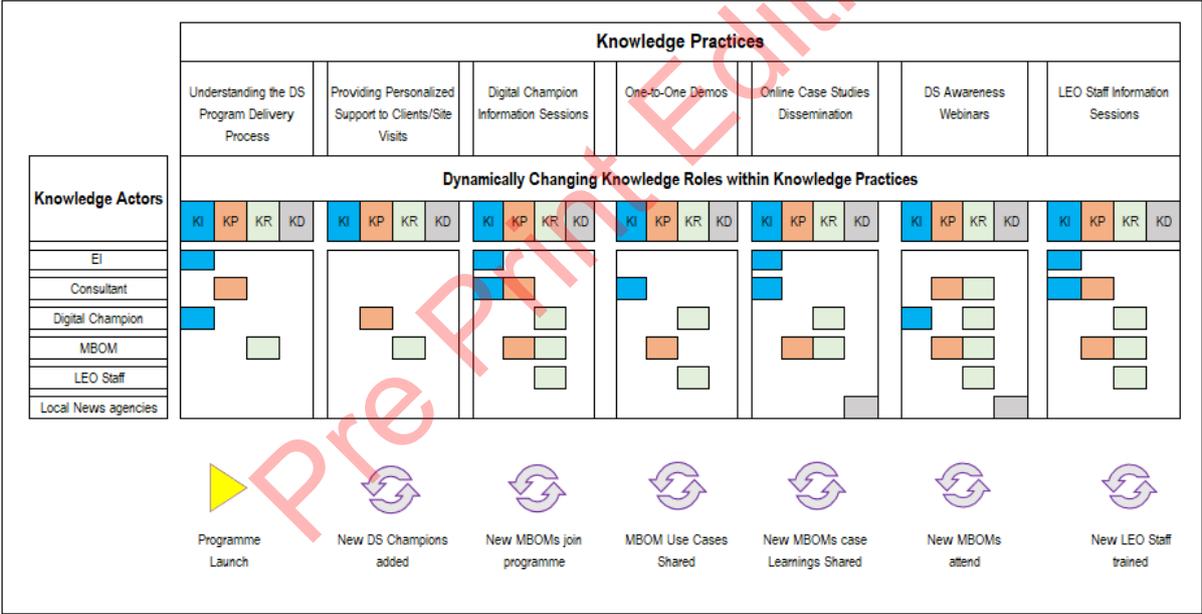


Figure 2: Dynamic and Changing Nature of the Roles played by Key Knowledge Actors within the DT Knowledge Ecosystem

Based on our findings, we populated our initially proposed theoretical model (Figure 1) to arrive at our integrated findings, which are shown in Figure 3. The revised theoretical model presented in Figure 3 describes the knowledge-centric model for government-orchestrated digital transformation among the MB sector. Regarding the significance of the two knowledge transfer and exchange routes (i.e., initiation and instantiation), digital transformation-related knowledge becomes more relevant and has the most

significant social value impact when pathways and practices support the instantiation route. Both routes allow us to understand the relational nature of the social value dimension of public value creation. We observed that knowledge mechanisms allow social value to be created for the targeted sector of the public policy innovation (MBs) and improve the DTRK of the public sector stakeholders involved in delivering such sectoral DT programs. Relational social value creation processes that are fueled by knowledge mechanisms have allowed the sectoral DS program to become sustainable in the long run.

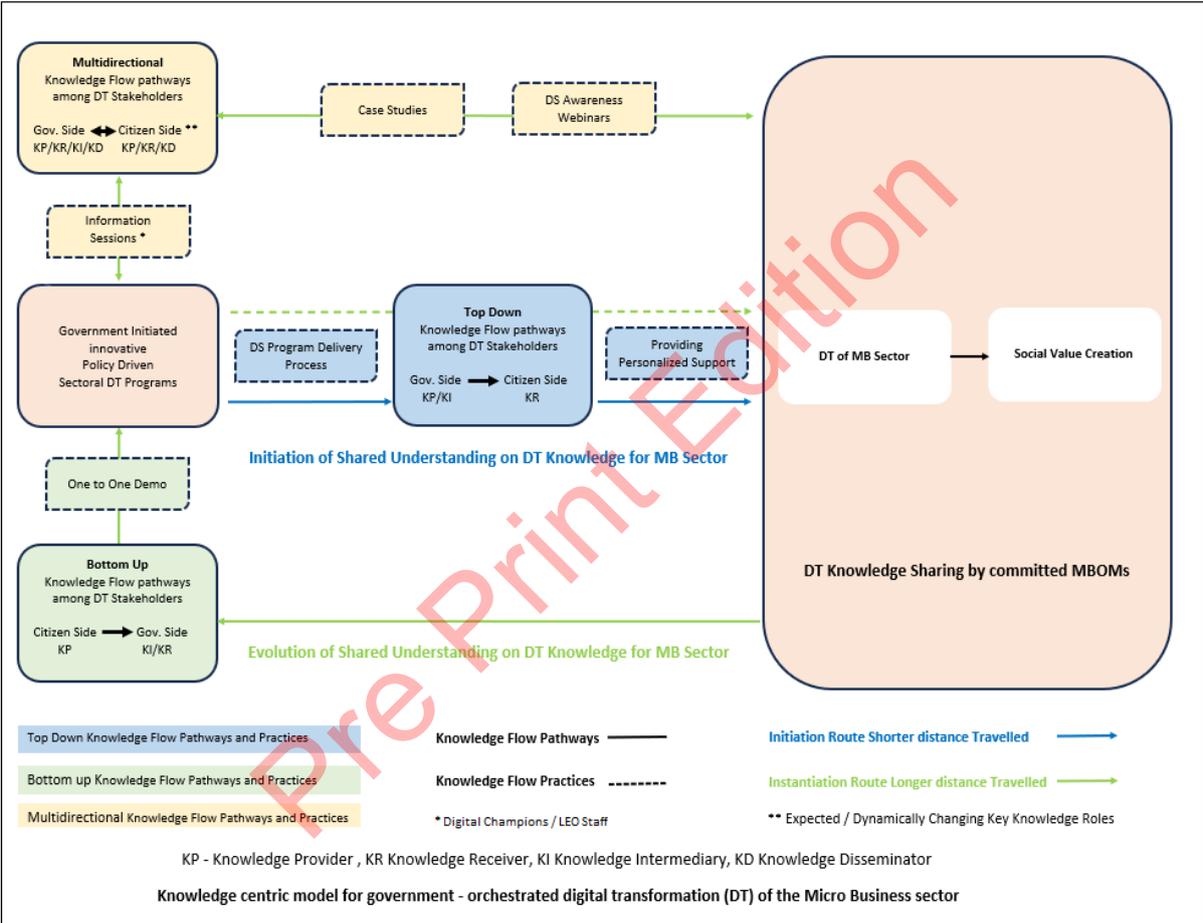


Figure 3: Final Theoretical Model-Knowledge-Centric Model for Government-Orchestrated Digital Transformation of the MB Sector

DISCUSSION

We set out to examine the impact of digital government DT programs targeting specifically the MB sector and to study how digital government orchestrates 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, plus different dynamic knowledge-related roles played by the ecosystem stakeholders. Despite the importance of knowledge mechanisms to such transformational contexts, knowledge flows that are established within sectoral ecosystems with a view to orchestrating transformations have rarely been examined by prior digital government literature. For the purpose of theory development, in our study of the public sector we drew on the concept of knowledge flows, which is crucial yet highly conceptual and contextual, not to mention seldom used in research (Scholl, 2022). Concurrently, we conceptualized digital government not only as a set of users and providers but also as enablers of digital transformation in society. We specifically looked at knowledge mechanisms pertaining to specific contextual knowledge—that is, DTRK, which is also referred to as DT knowledge. Using a case study method for the chosen digital government program context and an exploratory lens that leveraged both structured and unstructured data collection methods applied to diverse respondents from public policy (government and citizen) stakeholder groups, we uncovered robust findings that answer our research question (Massaro et al., 2015). Our study establishes that PSDT programs and social value creation are linked through knowledge-centric sectoral governance emanating from knowledge mechanisms. These mechanisms are knowledge flow pathways and practices pertaining to specific contextual DT knowledge. Using a context-specific psychological and relational approach to understanding the creation of public value from innovative government-initiated policy plans and programs, we observed three unique knowledge pathways, with their corresponding practices (Meynhardt, 2009, 2015). By focusing on a specific sectoral DT program in Ireland, our study extends and offers empirical validity to the digital government literature's predominantly conceptual work on sectoral government (Janowski, 2015, 2016; Kalbaska et al., 2017).

The initiation knowledge route is triggered by the top-down knowledge flow pathway. This route lays the foundation for creating a shared understanding of DT among the network of MBs and public sector agents. Although collaborative, this network is centralized in structure and covers mostly explicit technical and

managerial DT knowledge transfer to the 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 take into account both explicit and implicit technical and managerial DT knowledge transfer and exchange among multiple stakeholder groups. They are based on relationships, trust, the extent of knowledge sharing, and the commitment levels of all stakeholders, including MBOMs (Ansell & Gash, 2008; Massaro et al., 2015). They lead to the instantiation of joint efforts that are undertaken by all the network stakeholders; we describe these as the instantiation knowledge route.

The instantiation route is central for maintaining the relevance of government-led sectoral DT initiatives aimed at generating sustained and significantly improved social value and well-being for the MB sector. Furthermore, the instantiation route results in considerable DT knowledge gains for the government stakeholder groups, facilitating their performance when street level bureaucrats 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 the initiation and instantiation knowledge routes are recursive in nature. Over time, the recursive nature of the initiation and instantiation knowledge routes comprising 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 sectoral digital transformation efforts (Janowski, 2015).

Our findings also extend the insights from prior studies that highlight 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). Continuity safeguarders contribute to the network's social fabric by regulating the conditions for social exchange

among stakeholders in the network (Ritala et al., 2023). In particular, we find that the national government—in our case, the EI agent—often plays the role of continuity safeguarder, and consultants alternate between the roles of knowledge providers, knowledge receivers, and network catalysts in different scenarios.

The EI agent also plays a strategic role in fostering the emergence and evolution of the DT innovation policy ecosystem by serving as the ecosystem's 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). It is similar to digital branching idea put forth by IS scholars (Senyo et al., 2024). Our observation of the instantiation route also supports the recommendation made by Daymond et al. (2023) for public sector architects to make strategic efforts to create conditions for cooperation wherein ecosystem stakeholders pursue compatible goals while exchanging resources and engaging in joint activities aimed at developing a shared understanding of the DTRK.

Committed MBOMs who regularly share their DT knowledge via bottom-up and multidirectional pathways can also serve as network catalysts by effectively influencing other MBOMs who are not yet 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. The implication of this finding is that it is important for researchers to look outside the organizational commitment context and at ecosystem-level commitments when they study how knowledge management practices influence the public sector (Massaro et al., 2015). More research on the 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. Our findings also address the void in the literature by explicating how DT-related knowledge can be built 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, it advances literature on digital transformation among the public sector by examining the enabling role of digital government innovation initiatives and government stakeholders' specific role within the social innovation knowledge ecosystem in promoting digital transformation efforts to MBs, which constitute a vulnerable yet economically and socially significant sector (Bodrožić & Adler, 2022; Ritala et al., 2023). The study departs from IS scholars' predominant focus on how digital technologies can transform the public sector's service delivery and efficiency, considering instead how digital governments can create sustainable social value impacts through their innovative policy-driven DT sectoral governance initiatives (Janowski, 2015; Desouza and Dawson, 2023). By looking at government stakeholder groups' specific role as facilitators of DT within the MB sector, we add to previous research that has mainly examined private sector actors as facilitators of DT within the SME sector (Leong, Pan, Newell, & Cui, 2016; Li, Su, Zhang, & Mao, 2018). The study also highlights the importance of fostering DTRK among local government stakeholders to enable them to carry out sectoral digital transformations, thereby advancing research in this important area (Pittaway & Montazemi, 2020). Whereas most prior studies focus on governments' supply-side DT policies—providing broadband services, for instance—our work contributes to the demand-side digital government literature by examining how digital innovation policies digitalize the MB sector (Bertot et al., 2016; Henderson, 2020; Senyo et al., 2024). The results offer further clarity regarding how to best conceptualize and measure both planned and emergent improvements to stakeholders' social value and well-being in a sectoral governance context—to date, this has been a less precise subdimension of public value (Twizeyimana & Andersson, 2019)—by using a contextualized psychological and relational approach that categorizes the social value impacts as instrumental or humanistic.

Second, we expand the literature on PSDT by identifying three knowledge flow pathways— top-down, bottom-up, and multidirectional—through which innovative government policy initiatives foster DTRK that contributes to digitalizing the MB sector. 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 programs. These initiation and instantiation routes contribute to our understanding of how to institutionalize government-driven DT programs that help the MB sector to survive and prosper. Drawing on these findings, we proposed an inductively driven knowledge-centric model for the government-orchestrated digital transformation of the MB sector (Figure 3); this might serve as the departure point for future studies on the subject. The nuances we identified add to findings from similar studies that examine strategic architecting and orchestrating knowledge transfers between stakeholders in loosely coupled settings—generally public sector ecosystems and online platforms—through the lens of knowledge flow directions and distances (Daymond et al., 2023; Mozaffar & Panteli, 2022). Our contribution extends the research focus beyond 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 inquiry by ascertaining how bottom-up knowledge flow can lead to a lateral impact in the form of creating wider social value for the entire MB sector and government stakeholders by stimulating shared understanding through both explicit and implicit DT knowledge transfer and exchanges (Ansell & Gash, 2008; Kelman, Hong, & Turbitt, 2013). Our findings also offer valuable insights into 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). Moreover, they highlight the need to focus on relational aspects of the coproduction approaches to knowledge management that are used to strategize, design, implement, and evaluate public policy (Meynhardt, 2015; Scupola & Mergel, 2022) and thus enhance the 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 in the sense that we focus on examining MBOMs' learning processes at the collective level instead of at the individual level. The prior literature establishes that DT efforts involve leveraging three types of learning mechanisms

(exposure, experience, and expertise) among individual MBOMs (Shirish et al., 2023). In our study, we highlight how, in the context of government-led DT initiatives, these mechanisms operate to bring about collective learning and knowledge exchange within the broader DT knowledge ecosystem (Mandviwalla & Flanagan, 2021; Shirish et al., 2023). Such collective learning is manifested through orchestrated knowledge practices; these involve enacting dynamically changing knowledge roles that are performed by both government and citizen-side stakeholder groups, and they demonstrate knowledge creation's relational nature in the context of PSDT. To the best of our knowledge, ours 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 MBs has primarily identified the challenges small businesses face when, attempting to adapt to crisis situations, they pivot to undertaking DT efforts mainly for the purpose of gaining planned instrumental value (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 emergent humanistic benefits attained through DT efforts when MBs have an enhanced sense of commitment to their sector and to the wider community (Mandviwalla & Flanagan, 2021; Morgan, Anokhin, Ofstein, & Friske, 2020; Shirish et al., 2023). Our study therefore answers the call for DT researchers to study contextual DT practices within both the private and public sectors and to focus on 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 AND PRACTICE

Our study has clear practical implications for public sector bodies. The focus of digital government efforts around the globe has primarily been to improve internal operations and government delivery services. However, currently governments are experiencing political and social pressures to design and implement demand-side digital policies that can create sustainable public value (OECD, 2019). In line with this emerging phenomenon and as per our findings, we recommend that governments promote demand-side DT

innovative policies similar to Ireland's DS program; these can equitably uplift societies 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). Especially in rural areas, introducing expert advisory support services along with other supply-side DT policies can help sustain 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. The grid offers a sectoral governance knowledge stakeholder mapping and stage mapping. It depicts the identified key knowledge stakeholders within the policy-driven innovative program ecosystem (See Table 2 and Appendix 5.) It also identifies triggers and facilitators that can contribute to implementing digital government sectoral programs in countries that are similar to Ireland in terms of their digital government evolution (See Appendix 5), making it a good logic model for policymakers (Funnell & Rogers, 2011). Moreover, our study identifies a new class of sectoral governance-related digital innovation that the DS program makes evident. We describe this public policy innovation as "DT-focused expert advisory support."¹⁶ It combines information, participation, and technology elements. Furthermore, it is executed by digital consultants who are selected by government stakeholder groups and are chosen by the policy targets for their respective digital transformation programs. These consultants personalize the transfer of contextual knowledge about digital transformation to the policy targets by either focusing on implementing projects and developing a digitalization plan (project-based approach) or working on the business's digital strategy (plan-based approach).¹⁷ Moreover, they play a role in DT knowledge transfer to government agents and other MBOMs. This type of innovation, which has similarities with technology-extension programs, should be promoted through both DT programs and outcome-based funding, which has dominated digital governance policies (EU, 2023).

¹⁶ See Appendix 1, Appendix 5a, and Figure 2 for more details

¹⁷ Most of the MB samples who took part in this study benefited from a consultant who used a project-based approach

We were able to gather suggestions for improving DT program delivery and implementation from our respondents. We ascertained that when MBOMs are given an initiation in digital transformation-related knowledge via the experiential learning method (project-based approach), the knowledge is stickier and more useful for future transfer within the knowledge ecosystem. MBOMs that undergo this method often seem highly committed to supporting other MBOMs in their DT journeys and to becoming involved in facilitating bottom-up and multidirectional knowledge flow pathways to ensure knowledge transfers and exchanges. Therefore, incorporating an active learning pedagogy into such programs is essential.

MBOMs can play a crucial role in bridging the digital divide between small and big companies by collaboratively promoting DT programs after they have been given an initiation in 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 that provides greater social value compared 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 initiatives via the various bottom-up and multidirectional knowledge sharing practices identified in this study.

Because MBOMs have such a wide-ranging remit within their businesses, time constraints, coupled with weak digital readiness mindsets, can be major barriers to the uptake of such programs (Shirish et al., 2023). We recommended that governments and consultants join networking events organized by the MBOM community to improve DT programs' knowledge flow distance. This will help inform reluctant MB sectors, thereby nurturing cooperation among multiple stakeholder groups within the ecosystem in joint efforts. 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 advertisements, reaching out to local associations and professional networks*

that MBs frequent, communicating previous MBOMs' success stories, and reinforcing the provision of personalized support to MBs.

Our study indicates that developing government agents' DT knowledge through various mechanisms is essential for the effective delivery of DT programs in the MB sector. In particular, it has shown that consultants providing expert advisory services 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 experiential learning and use-case sharing. The diverse pathways identified in our study demonstrate that knowledge transfer and exchange around government-orchestrated DT programs happen through the involvement of multiple stakeholders. These findings reinforce the need for proactive collaborative governance by public sector bodies when it comes to responding to changing digital trends.

LIMITATIONS AND FUTURE RESEARCH

Despite its several theoretical and practical contributions, our study is not without limitations. It has examined government-orchestrated digital transformation programs' social value impact 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. Moreover, the program investigated in this study was at the pilot stage, which could have impacted the conduct and evaluation approaches that were taken by the government in this context. Above all, we could not critically examine the design and implementation of knowledge practices, as these were based on a pilot sectoral governance DT program. Further critical examination is needed to capture the long-term effects of such programs and practices so that we can understand our theorized model's boundary conditions. Therefore, we encourage longitudinal studies in this area for the specific case in the future. Looking at various other high-impact sectors such as sustainability, energy, and education could also be envisaged. Likewise, it is 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 commitment among MBOMs and the joint efforts of all DT knowledge stakeholders in government-orchestrated DT knowledge ecosystems. Moreover, looking into the extent of such MBOMs' commitment and identifying micro-level factors that may be unique to the MB sector can further aid the public sector in better leveraging knowledge resources to promote sectoral governance initiatives such as the DS program. 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). In addition, more research is needed to evaluate the governance model that best suits government-orchestrated digital transformation programs' current knowledge-centric model (Provan & Kenis, 2008).

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APPENDICES

Appendix 1

The Digital Start Program and Digital Consultant Selection

Digital Start

Digital Start is a pilot initiative run by Ireland's Local Enterprise Offices. It is designed to help small businesses to develop and implement a digital strategy. The program had a soft launch in May 2022. As of Jan 2024, it is still in the pilot stage.

Initially, Digital Start was advertised on LEO's national website¹⁸ as well as on the individual LEOs' own sites.¹⁹ The program was promoted separately through national media. In Q4 2023, the LEOs launched a national advertising campaign called "All in a Day's Work."²⁰ It featured three separate support programs for small business, Digital Start being one of these. The campaign was heavily advertised in national media and on the LEO website, as well as on YouTube, Facebook, Instagram, Twitter etc.

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

The pilot version of the Digital Start program is open to businesses that operate in the manufacturing or internationally traded service sectors and have up to 10 full-time employees. Startups that have been trading for at least six months and have generated revenues in excess of €30,000 may also qualify for the program. Not all applicants met the eligibility criteria; some were therefore 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 themselves of four to five days' support from an approved digital consultant. The program is fully paid for by the LEOs. The stated focus is three areas: business process optimization, enhancing the digital customer experience, and better utilization of data. Digital initiatives around website development, online trading, or digital marketing are supported under different programs.

Digital Consultant Selection

There are 31 Local Enterprise Offices in the Republic of Ireland, covering 26 counties. Each LEO operates a panel of digital consultants to deliver the Digital Start program. LEOs' procurement departments publish a request for tender (RFT) on a government-run e-tenders website.²¹

Consultants are asked to demonstrate an understanding of the SME sector. The selection criteria include 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.

¹⁸See <https://www.localenterprise.ie/>

¹⁹ See <https://www.localenterprise.ie/Limerick/>

²⁰See <https://allinadaywork.ie/>

²¹ Etenders 2023, accessible at <https://publicprocurement.ie/etenders-feed/>

The evaluation criteria differ from one LEO to another. For example, one scoring criterion allocated 45% for demonstration of the tenderer's capability to effectively deliver services to both the client and LEO 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 LEO digital champion.

Appendix 2

LEO/EI Participants demographics			
Type	LEO Code	Age Range	Gender
LEO FG and SI	LEO1	40-50	Female
LEO FG and SI	LEO2	40-50	Female
LEO FG and SI	LEO3	40-50	Male
LEO FG and SI	LEO4	40-50	Male
LEO FG and SI	LEO5	30-40	Female
LEO FG and SI	LEO6	40-50	Female
LEO FG and SI	LEO7	30-40	Female
LEO SI	LEO8	40-50	Male
LEO SI	LEO9	40-50	Female
LEO SI	LEO10	30-40	Female
LEO Interview	LEO11	40-50	Male
Enterprise Ireland Participant Demographics			
Manager at EI Interview	EI1	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 the 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 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 (e.g., new digital technologies) since the start of this program within LEOs?
4. What is the impact of this program? (More question for the citizen stakeholder group were asked in theme 4)
5. Business owners' /LEO agents' perceptions

The Questions for Theme 2 involved:

1. How does your involvement contribute to LEOs?
2. How does your involvement contribute to other clients or MBs?
3. How does your involvement contribute to society?
4. Why do you think you have decided to become so 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 (e.g., new digital technologies) since the start of this program within LEOs?
4. What is the impact of this program?
5. Do you think the involvement of mentors and microbusinesses 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 vis-à-vis society?
2. As a public institution, why is helping MBs 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 the DS program helped you/your company/your employees/your family?
3. Have you engaged with LEOs or EI to promote this program? What was your experience (e.g., learning, contributing to others)?
4. How motivated are you to help other business owners to sign up for 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 the questions below.

1. What sector is your company active in?
2. Primary (extracting and harvesting natural products, e.g., agriculture, fishing and mining)
3. Secondary (food, manufacturing and construction)
4. Tertiary (e.g., 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 digitalization 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 microbusinesses (employing fewer than 10 employees) in Ireland.
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 toward the use of digital technology?
12. In general, to what extent are you comfortable using new digital technology when no help is available?
13. Please tick one or more options below about how the digital start program has benefitted you/your business/your employees/your family:
 - has helped me to increase my revenue
 - has helped me to reduce costs
 - has helped me to innovate (new products, services, channels)
14. Please elaborate in your own words how the digital start program has benefitted you/your business/your employees/your 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 brought 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 in 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 your own or your teams' digital or other competencies?
- 3) How has the DS program and its rollout influenced microbusinesses 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 is it 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 One-to-one 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

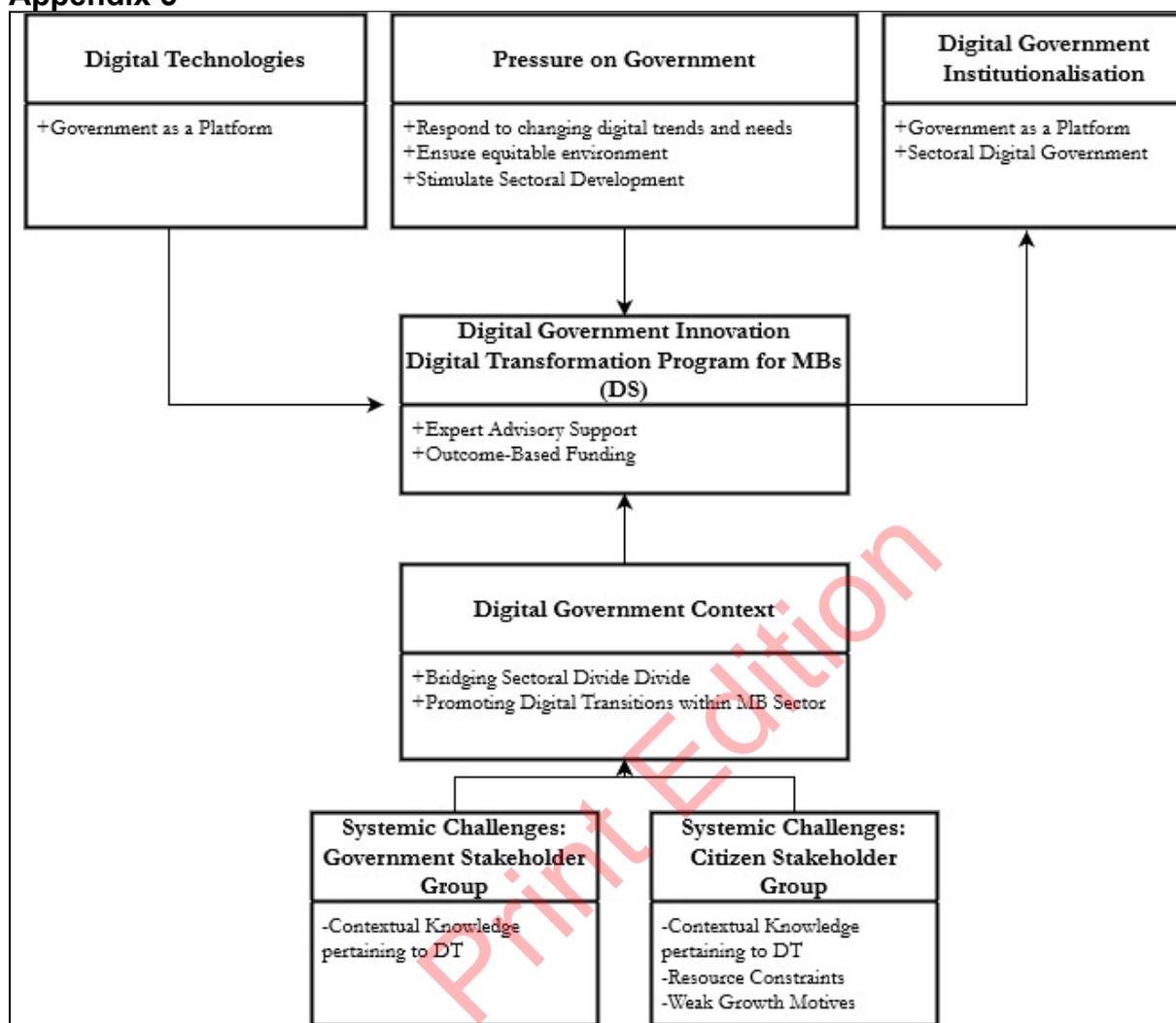


Figure 5a: Digital government stage analysis framework (abstracted by authors using available primary and secondary data)

Context Surrounding the DS Program and Systemic Gaps	Illustrative Quotes from Policy Owner
<p>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.</p>	<p>"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 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" E11</p> <p>"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 evolution assessment) is better (for MBs) so it (expected changes) depends upon consultancy time that are provided through the DS program" E11</p>

<p>Systemic Gap-Citizen Stakeholder Group</p> <p>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.</p>	<p>“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” E11</p>
<p>Stakeholder involvement in implementing digital policy and the need to find ways to instantiate sectoral governance were raised as aspects that were important for the government</p>	<p>“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 there 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” E11</p>
<p>The aspiration to develop DT knowledge from the government side is clear. Establishing digital champions within each LEO for governance purposes was one way to achieve this. Other aspects of the government stakeholder context and their lack of DT knowledge are elaborated on in the literature review section.</p>	<p>“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 rate (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” E11</p>
<p>EI agents believe that bridging the DT knowledge gap and building digital capabilities among government stakeholder groups are 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.</p>	<p>“The program is implemented using standard information systems, like submission systems, it is not an intelligence system, but we have developed an online reporting system to follow up on the program outcomes ... We would like to know how to target and roll out a program as digitalization (of MBs) itself is a seen as a new concept for many government (LEO staff) agents” E11</p>

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