Public Management Review

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rpxm20

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**To cite this article:** Linn Slettum Bjerke-Busch & Sebastian Thorp (2023): Overcoming the Productivity Paradox in the Public Sector by Managing Deliberate Learning, Public Management Review, DOI: 10.1080/14719037.2023.2225510

**To link to this article:** https://doi.org/10.1080/14719037.2023.2225510



Published online: 20 Jun 2023.

PUBLIC MANAGEMENT REVIEW
https://doi.org/10.1080/14719037.2023.2225510

Routledge
Taylor & Francis Group



# Overcoming the Productivity Paradox in the Public Sector by Managing Deliberate Learning

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**ABSTRACT**

Digital technology offers an opportunity for increased productivity in public organizations, but organizations struggle to gain revenue from their investments, known as the productivity paradox. This study examines the role and relations of digital adoption (DA), deliberate learning (DL), and managerial dynamic capability (MDC) on improving productivity in a digital transformation (DT) process in the Norwegian courts. The results show that DL had a strong impact on productivity and that MDC plays an important role in enabling DL processes.

**ARTICLE HISTORY** Received 05 May 2022; Accepted 20 May 2023

**KEYWORDS** Public sector; digital transformation; deliberate learning; digital adoption; managerial dynamic capability

## Introduction

Digitalization has increasingly been used as a strategy to improve productivity in the Norwegian courts. Digital tools are used to streamline legal processes, increase information processing and sharing capability, and create more efficient delivery models through online services such as court proceedings, court hearings and the use of digital signatures. However, the courts' heavy investment in digital technology has not brought about concomitant changes in their productivity (Domstoladminsitrasjonen 2021).

Research in the private sector has referred to the 'productivity paradox' (Brynjolfsson 1993), meaning that, despite the potential efficiency savings and revenue promised from investments in ICT, the adoption of technology has not led to increased revenue or productivity (Tidd and Bessant 2021). The concept of the 'productivity paradox' is credited to Solow as a reference to his remark 'you can see the computer age everywhere but in the productivity statistics' (Solow 1987). The theory grew out of studies of the service industry in the US in the 70's and 80's, where several researchers found evidence that the productivity in the service sector was not able to keep pace with that in manufacturing,

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although the purchases of computers rose. They concluded that there was no relation between spending for computers, profits and productivity. Some researchers even advocated that investments in IT were counterproductive (Brynjolfsson 1993).

Brynjolfsson and Hitt (1996, 2003) later argued that the link between ICT investments and productivity may be more complex than supposed. They found a clear positive relationship between ICT investments and productivity, but also a great deal of individual variation. They concluded that investments in IT have a better chance of succeeding in combination with changes in managerial and organizational practices. They also argued that there seemed to be certain organizational capabilities that made technology adoption more likely (Brynjolfsson and Hitt 2000)

Studies from the public sector are fewer, and even more contradictory and inconclusive (Dunleavy 2005). Conflicting priorities between the large number of stakeholders, dependence on policies and regulations and institutionalized logics have been used to explain the variations (Chatfield and Reddick 2019; Meijer 2015), and may suggest an even stronger dependency to a set of organizational capabilities (Garicano and Heaton 2010), but inconsistencies in measurements of productivity and performance, make studies hard to compare and conclude (Dunleavy and Carrera 2013).

Public managers can run a high risk when investing taxpayers' money in digital technology. Initial costs are high, and politicians expect to see a rapid return of investment through higher efficiency, while users at the same time keep raising the bar for better services. A manager's capability to enable a successful digital transformation (DT) through building the right operational capabilities make managers of public agencies critical enablers in reaching the goals of improved productivity (Adner and Helfat 2003; Dunleavy and Carrera 2013; Kane et al. 2015; Pitelis and Wagner 2019). We therefore need to understand more about how managers can drive the DT to improve productivity within the boundaries of the public sector (Currie and Procter 2005).

This study contributes to filling the gap on research in the public sector aimed at improving productivity through DT. It further contributes to literature on strategic management in the public sector and to capability theory. Lastly, this study contributes to clarifying the individual and combined role of different capabilities in relation to DT in the public sector.

To examine our conceptual model, we distributed a survey to 20 Norwegian district courts in the process of digitally transforming their processes and service during Covid −19. We measured productivity before and after the adoption period. The district courts who were the objects of our study all deliver the same core services to citizens but have a set of different capabilities, making them an ideal research context to examine the following research questions:

**RQ1:** What is the role of digital adoption (DA) and deliberate learning (DL) in productivity in public organizations?

**RQ2:** What is the role of managerial dynamic capability (MDC) in enabling DA and DL in public organizations?

This paper will first set out the theories and concepts used in this study to build the conceptual model. Further, we will look at the development of our hypothesis and present the conceptual model. Methodology and findings are described after the hypothesis and conceptual model are presented. We end this paper with a discussion of the theoretical and practical implications of this study.

## Theoretical framework

### *Conceptual model*

Due to the lack of consistency in the research on the relationship between productivity and DT in the public sector, we have developed a conceptual model based on concepts and theories from research in the private sector. The Dynamic Capability (DNC) Framework was introduced by Teece, Pisano, and Shuen (1997) to help firms gain competitive advantage in turbulent environments, but recently this framework has also proven promising in explaining how public organizations can overcome challenges to DT (Pablo et al. 2007; Piening 2013) by *purposefully* changing and reorganizing their internal resources, as highlighted by Helfat et al. (2007). It is suggested by Zollo and Winter (2002) that the concept of Deliberate Learning (DL) is especially suited to explain a purposeful approach to change in the public sector. We therefore use a scale for DL to measure the courts' capability to deliberately change and reorganize their internal resources. We further use the concept of Managerial Dynamic Capability (MDC) to measure the court managers' capability to digitally transform the organization; and a scale for DA to measure the court's digital capability (DC). Finally, we have adopted a productivity measure from operational management, adapted to previous studies of productivity in the courts, to measure the outcomes on productivity as *cases processed per labour hour*.

We hypothesize that MDC is an important influence on DA and DL and that both DA and DL are necessary for an increase in productivity, but that DL will be more influential on productivity measures due to the contextual factors of the public sector. In the following section we will clarify the concepts and their relationship to DT and productivity.

### *DT in the public sector – opportunities and challenges*

DT in the public sector is driven by environmental requirements, advances in technological developments, changing needs in the population, and increased transparency through more collaborative and participative processes undertaken with the citizens and the private sector (Chen, Walker, and Sawhney 2019; De Vries, Bekkers, and Tummers 2016; Tate et al. 2018).

The term DT indicates that the process involves more than a mere adoption of technology (Carr 2003). It also includes changes in the organization's capabilities (OC), such as strategy, work processes, culture, governance of the organization, and the whole economic system. Based on 28 different sources, Vial (2019, 121) defines DT as 'a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies'. This definition holds digital technology at the centre of the transformation but acknowledges the broader individual, organizational, and societal context. In this conceptualization, DT is viewed as both an opportunity and

a potential threat to the organization, which can or cannot be strategically explored and exploited to alter their value creation paths. The desired outcome of the DT process is to improve performance through increased operational capabilities.

### *Opportunities with DT in the public sector*

Digital technology poses an opportunity to improve efficiency and productivity in the public service sector by streamlining processes and changing their service delivery models. Although many digitalization projects focus on improving productivity, the underlying political focus on cost cutting have often resulted in cutting valuable activities and reducing service quality (Dunleavy 2005). The nature of digital technology have the opportunity to provide a sustainable improvement in productivity in the courts that includes more efficient processes, without a reduction in service and process quality (Dunleavy and Carrera 2013; Goh and Arenas 2020). On the one hand, DCs can provide the courts with the opportunity to streamline and automate processes, both by reducing the processing time for the citizens, and potentially improving the quality on the decisions, because they rely on data processing instead of people processing. On the other hand, increased information processing capacity allow for improved communication and collaboration with citizens and can enable better service quality and added public value through more individualized and flexible service delivery models (Bag et al. 2020; Chatfield and Reddick 2019; Chen, Liu, and Shuting 2019; Dunleavy 2005; Felsberger et al. 2020; Hänninen, Smedlund, and Mitronen 2017; Rachinger et al. 2019; Widener, Gliedt, and Hartman 2017). Improvements to the courts' DC's have the potential to adapt the court proceedings to the users geographical, demographical and personal needs (Westerman, Bonnet, and McAfee 2014).

### *Challenges to DT in the public sector*

Referring to the productivity paradox, investments in digital technology can pose a high risk for the public sector, as initial costs are high. Studies conducted on the relationship between ICT and productivity in the public sector show that internal factors such as conflicting priorities between the large number of stakeholders, dependence on policies and regulations, and institutionalized logics account for the most important barriers to an efficient digital transformation (DT) (Chatfield and Reddick 2019; Dunleavy 2005; Meijer 2015; Mergel, Edelmann, and Haug 2019) (Chatfield and Reddick 2019; Meijer 2015). As an example, digital adoption (DA) as a response to politicians' demands for efficiency in combination with conflicting demands between stakeholders often results in cutting activities and personnel without a change in practices (Dunleavy and Carrera 2013).

Challenges in relation to technology adoption in public organizations are often explained by institutional theory and the organization's need for legitimacy (Molinillo and Japutra 2017). When DT is perceived through an institutional lens, challenges to DT processes are explained with reference to the social context of the organization: Innovations and inventions that are viewed as illegitimate may be harder to implement because of the isomorphic pressures that surround the organization. The three isomorphic pressures pinpointed by DiMaggio and Powell (1983) are coercive pressures, where the DT is influenced either positively or negatively by political influence and the organization's need for societal legitimacy; mimetic pressures, which influence the organization's need for organizational legitimacy through copying other organizations;

and normative pressures, which influence the organization through professional norms and standards.

## Development of the conceptual framework

The vast increase in the number of organizations involved in DT has resulted in an increased interest in capability research in relation to DT (Vial 2019). Recently, several researchers have suggested that the capability view may also be a useful framework to study how public organizations can become more successful in their DT processes (for example Casalet and Stezano 2020; Chatfield and Reddick 2019; Goh and Arenas 2020; Pablo et al. 2007; Piening 2013). In this paper we aim to study the relationship between MDC, DL, DA and productivity to determine their role in enabling a successful DT In the public sector.

### DT capabilities

A DT in the public sector involves a 'continuous strategic process of building and reorganizing the organization's capabilities to improve the organization's operational capabilities' (Warner and Wager 2019, 344). The term 'capability' refers generally to 'the capacity to perform a function or activity in a generally reliable manner when called upon to do so' (Helfat and Peteraf 2015, 835). Helfat and Winter (2011, 1244) further define operational capabilities as 'the capabilities that help the firm operate efficiently in the present'. In a DT, digital technology is the main resource for increasing the operational capability of the organization, but a DT also includes the transformation of the organization's OCs (Dunleavy and Carrera 2013). Dunleavy and Carrera (2013) suggested that an improvement in productivity in the public sector may be even more reliant on an organization's ability to reorganize their organizational capabilities than it is in the private sector, where competition is a natural driver for change (Adner and Helfat 2003; Dunleavy and Carrera 2013; Kane et al. 2015; Pitelis and Wagner 2019).

The dynamic view has been added as a framework to explain the micro-foundations that enable the DT process. Dynamic capabilities (DNCs) are defined as 'the capacity of an organization to purposefully create, extend, or modify its resource base' (Helfat et al. 2007, 1). DNCs consist of a set of micro-foundations that is yet to be fully explored, but several researchers argue that a commonality is that they can be recognized through repetitive and recognizable patterns of organizational routines aimed to enable development and change (Helfat et al. 2007; Zollo and Winter 2002). DNCs are important for the organization because they support the learning patterns and routines aimed at building operational capabilities (Teece, Pisano, and Shuen 1997; Zollo and Winter 2002). When DL processes are established and accumulated over time, they help the organization respond to changes in the environment in a more efficient manner, and they motivate employees to respond more positively and engage in the change (Zahra and George 2002).

Due to the many conflictual demands from different stakeholders and the focus on internal reorganization in the public sector, it is likely that DL will have a positive effect on the DT process (Colli, Stingl, and Waehrens 2021; Rashidirad and Salimian 2020; Tortorella et al. 2020; Zahra and George 2002). Piening (2013) supports this claim but argues that public organizations' ability to develop DNCs can be modified by factors

such as environmental pressure, the evolutionary and technical fitness of the organization, and the degree of publicness.

The DT process is explained as a top-down and a bottom-up process in combination. Managers are pointed to as critical strategic drivers for this process, for which they have to use their capabilities to develop and communicate a strategy for the investments in and use of digital tools to improve operational capability, at the same time engaging the organization in the ongoing transformation (Adner and Helfat 2003; Dunleavy 2005; Kane et al. 2015; Pitelis and Wagner 2019). The managerial capabilities have lately been referred to as MDCs (Chatfield and Reddick 2019; Gholampour Rad and Nisar 2017; Warner and Wager 2019).

In the public sector, managers are more dependent on the decisions of elected officials and policies and regulations and bound by professional roles in the organization; judges in courts are an example. According to institutional theory, the different strategic priorities of the many stakeholders limit the managers' strategic role. We therefore need to understand more about how managers can drive DT to improve productivity within the boundaries of the sector (Currie and Procter 2005; Dunleavy 2005)

## Development of hypotheses

To examine the influence of DT on productivity in the public sector, we investigate the role of DA and DL on productivity. To measure the influence of public-sector managers on the DT process, we investigate the MDC in relation to DA and DL.

With DCs at the centre of the DT, digital adoption (DA) is an essential part of the DT process. DA refers to the organization's decision to invest in, use, and integrate digital technology in their everyday operations (Molinillo and Japutra 2017). DA is an essential part of building the organization's DC and OC to improve productivity and performance.

According to Teece (2007), learning is a core element to DNC. When organizations purposefully engage in learning efforts to use better knowledge to improve their actions, this is defined by Zollo and Winter (2002) as DL. DL is enabled through organizational structures and routines that allow knowledge sharing, integration, and creation between multiple actors (Adner 2016; Tortorella et al. 2020; Zahra and George 2002; Zahra, Sapienza, and Davidsson 2006). DL is an essential part of building the organization's DNC and OC to improve productivity and performance (Piening 2013; Teece, Pisano, and Shuen 1997).

MDC is used to measure the managers' capabilities to drive change and include the managers' intellectual, relational, human, and strategic cognition (Adner and Helfat 2003). Managerial cognition refers to 'the capacity of an individual manager to perform one or more of the mental activities that comprise cognition' (Helfat and Peteraf 2015, 835). In DT, the managers intellectual cognition can be understood as the managers' capacity to use digital awareness and skills to sense new trends in technology, while strategic cognition refers to the managers capacity to respond efficiently to environmental changes, seize technological opportunities and make sound strategic investments

(Gholampour Rad and Nisar 2017). Relational cognition refers to the managers accumulated network and their ability to gain information and practical knowledge of technology from the network, including the employees. Further, it includes their skills in facilitating collaboration across functions and sections, and with external partners (Anim-Yeboah et al. 2020; Björkdahl 2020; Rijswijk, Klerkx, and Turner 2019)

We aim to clarify the influence of DA and DL on productivity during the pandemic and the managers' role in his process. In the next section, we clarify our hypothesis before presenting our conceptual model.

## DA and productivity

Digital technology, like digital infrastructure, data processing, information processing technology, big data, open solutions, IoT, AI, robotics, etc., offers the possibility of increased information-processing capability, information-sharing capability, data-integration capability, and processing capability. According to several studies conducted the last five years, digital technology can improve productivity in several ways (Bag et al. 2020; Chatfield and Reddick 2019; Chen, Liu, and Shuting 2019; Felsberger et al. 2020; Hänninen, Smedlund, and Mitronen 2017; Rachinger et al. 2019; Widener, Gliedt, and Hartman 2017). Empirical data show how digital capabilities can enhance communication and co-creation with citizens and provide the organization with the potential for more scalability, flexibility, transparency, adaptability, interoperability, and decentralization through the restructuring of seamless processes, seamless service deliveries, and improved services. Although most studies are conducted in the private sector, there is evidence that DA improves productivity in courts in similar ways (Gomes, Tiêssa Alves, and Traguetto Silva 2018).

Despite its promising effects on productivity, Ruiz-Alba et al. (2019) argued that the adoption of technology may also have an inverted impact on organizations' capabilities, leading to more saturation of information, more work in silos, conflicts of interests, and a lack of citizen integration in addition to lower levels of human interaction and, therefore, less intense cross-functional coordination.

Despite some concerns and evidence that DA is slower in the public sector, researchers argue that if the technology is implemented successfully, it has the opportunity to increase productivity in a sustainable way (Dunleavy 2005; Dunleavy and Carrera 2013).

A direct link between DA and productivity may be hard to establish. Although we may see a positive relationship between technology and productivity, it is not clear what causes this relationship. Gomes, Tiêssa Alves, and Traguetto Silva (2018) argue that there may be an indirect relationship between investments in technology and high-performance courts and that moderators and mediators also play a part. To account for this, we also include MDC and DL in the study to examine the differences in their relationships to productivity. Thus, our first hypothesis is:

**Hypothesis 1 (H1):** DA has a positive relationship to productivity in the public sector.

### DL and productivity

Digital transformations are dependent on fundamental learning process supporting the organizations ability to identify, assimilate and exploit knowledge from the environment (Cohen and Levinthal 1990). The organization's learning patterns are developed over time and determine how knowledge is transferred between individuals in an organization and how the organization make sense of its surroundings (Thornton and Ocasio 2008, 13).

From an institutional viewpoint, public organizations may benefit from a DL approach with an emergent quality, where they learn systematically from experience and engage in planned change and imitation, dependent on each organization's path and age (Mergel, Edelmann, and Haug 2019; Zahra and George 2002; Zollo and Winter 2002), as opposed to 'learning by doing' or 'experimental learning' that are more suitable for organizations operating in rapidly changing environments (Eisenhardt and Martin 2000). Deliberate learning is based on repetitive actions by employees in firms and organizations. When learning patterns have become a part of a routine it can be viewed as a core competency, which is considered useful and efficient when the environment is stable. According to institutional logics, core competencies can also become core rigidities, which can make strategic renewal hard (Zahra and George 2002). But by deliberately facilitating ongoing interactions and learning between key actors, the organization can take advantage of the actors' potential to shape their environment, to adapt new strategies, reconfigure its resources, and change its practices and processes in a planned DTs (Thornton, Ocasio, and Lounsbury 2012).

Experimental learning has been shown to support transformation activities at a higher digital maturity level (Colli, Stingl, and Waehrens 2021), but at a lower maturity state, DL practices contribute more easily to building the evolutionary fitness of the organization (Piening 2013). The maturity process is illustrated by Demeter, Losonci, and Nagy (2020) and Cimini et al. (2020), who showed how organizations, over time, identify additional application areas for technology, enabled by the early learning processes. As the knowledge base of the organization increases, so should the positive outcomes of the learning processes (Miner, Bassoff, and Moorman 2001; Zahra and George 2002). Tortorella et al. (2020) found support for the hypothesis that the development of learning processes related to Industry 4.0 technologies, at an organizational level, has a prevailing effect on operational performance.

DL processes is both aimed at orchestrating technological capabilities, organizational capabilities and dynamic capabilities. DL processes in a DT process in the courts will be directed at both the acquisition of knowledge such as technological knowledge and knowledge about the market and user needs (Bag et al. 2020; den Hertog et al. 2010; Endres, Helm, and Dowling 2020) and of that about the activities which facilitate the development of new services and processes, such as co-creation processes and collaborative decision making (Tajudeen et al. 2021; Warner and Wager 2019). Further, DL processes in the courts will also need pay attention to knowledge and experience on how to organize, manage, and create new routines that enable the organization to plan and execute changes to its processes, structure and culture, and how these capabilities will be modified and developed over time (Adner 2016; Augier and Teece 2009; Belhadi et al. 2021; Mazumder and Garg 2021; Schilke, Hu, and Helfat 2017).

In DT processes, learning needs to take place at multiple levels, which makes collective sensemaking processes critical elements in success (Brix 2017). Collective

sensemaking can be guided by systems and routines that capture and share learning between individuals, teams and functions, empower individuals through communicating a collective vision and direction, connect the organization and its environment, and enable strategic leadership for learning (Marsick and Watkins 2003). Enablers for DL are therefore found to be cross-functional teams, fast decision-making processes, and supportive leadership (Matt, Hess, and Benlian 2015; Warner and Wager 2019). Through DL processes, the different actors can collectively balance the exploitation and exploration of new and existing capabilities, hence allowing productivity whilst transforming their organizational capabilities (Cohen and Levinthal 1990; Hartley, Butler, and Benington 2002; Lin and Lei-Yu 2014; Svahn, Mathiassen, and Lindgren 2017).

In the public sector, it is particularly challenging to balance these concerns, considering the interdependence of a large number of stakeholders, such as citizens, civil society, public partners, private partners, users, and internal members (Bygstad and Lanestedt 2009; Hartley, Butler, and Benington 2002). Barriers to collaboration practices are found at all levels in the public sector and include the absence of a digital infrastructure across government agencies, silo structures, inflexible cultures, legal requirements and policies, collaborative tensions between employees and external partners, a rigid culture and professional roles, and differences in strategic purpose across the sector (Bjerke-Busch and Aspelund 2021; Svahn, Mathiassen, and Lindgren 2017; Tate et al. 2018).

In accordance with the discussion above, Dunleavy and Carrera (2013) and Piening (2013) argue that the public sector will find it particularly useful to invest in DL capabilities to enable an efficient response to environmental changes, as in the case of the pandemic. This point leads us to our second hypothesis:

**Hypothesis 2 (H2):** DL is positively related to productivity in the public sector.

### *DL and DA's combined relation to productivity*

The literature on DT emphasizes the importance of a transformation of both technological and organizational capabilities to create value (Warner and Wager 2019). To account for the combined effects of DA and DL, in addition to the individual effects, and as opposed to the sum of DA and DL, we propose our third hypothesis:

**Hypothesis 3 (H3):** The combined impact of DL and DA is positively related to productivity in the public sector.

### *Managers' role in enabling DA*

When public organizations adopt digital technology, they must weigh their prospects of productivity with their responsibility to ensure the delivery of key services as well as consider the safety of their citizens. Consequently, managers must be capable of balancing risk and reward against reliability (Kim 2010). As an example, AI and big

data offer endless possibilities for IoT-enabled service innovations and benefits in court systems. Nonetheless, the IoT also poses significant challenges in relation to cybersecurity, privacy, trust, and ethical standards in policies and regulations (Chatfield and Reddick 2019).

MDC is connected to the ability to make risky, yet informed, decisions based on the managers' intellectual, relational, human, and strategic capacity, as explained earlier. MDC helps the organization sense and seize new technology. Intellectually, managers use their digital awareness and skills to sense new trends in technology, and they can use their strategic skills to make better decisions on technology adoption. Relational skills can help managers to gain practical knowledge of technology from their network and knowledge of customers' needs or to facilitate collaboration across functions and with external partners (Anim-Yeboah et al. 2020; Björkdahl 2020; Rijswijk, Klerkx, and Turner 2019).

In addition to the risks associated with DA, the associated costs, especially at the early stages, are high and need to be considered alongside the dependency paths of a DT. A study by Demeter, Losonci, and Nagy (2020) explained that early digital acquisitions often influence the developmental path of an organization's DT, implying that later digital acquisitions are dependent on early investments. Despite this, early decision making in relation to DA tends to be based on managers' intuition, rather than a planned strategy; it is mostly ad hoc at the beginning of a DT (Garbellano and Do Rosário Da Veiga 2019) and depends mainly on the managers' belief and participation in the digital initiatives (Molinillo and Japutra 2017). Because of their dependence on policies, as well as the existence of regulations and other stakeholders, managers may not always have the opportunity to participate in decisions on DA in their own organizations.

Our hypothesis is that MDC in enabling DA is critical in gaining productivity from early investments, in addition to adding more long-term value. This point leads us to our fourth hypothesis:

**Hypothesis 4 (H4):** MDC is positively related to DA in public organizations.

### *Managers' role in enabling DL*

Research indicates that organizations tend to assume that learning will occur naturally, whilst underestimating the importance of engaging in and orchestrating learning across the whole organization (Tortorella et al. 2020).

Managers can use their human and relational capacity to enable the organization to change its practices, improve its processes, and build functional skills that can result in a mind change, collaborative practices, organizational learning, and new management practices (Anim-Yeboah et al. 2020; Rijswijk, Klerkx, and Turner 2019). As an example, managers that are responsible for designing and implementing new systems can change their role from a more traditional command and control leadership to a more empowering leadership where knowledgeable and talented workers can thrive. This includes involving workers in processes and decisions, which, in turn, can enable problem-solving skills, knowledge building and lead to the introduction of more

advanced technology (Felsberger et al. 2020; Garbellano and Do Rosário Da Veiga 2019).

Designing and facilitating DL processes includes re-establishing and allowing new and existing arenas for collaboration and integrating and sharing knowledge between individuals, groups, technology, etc (Mahmood and Mubarik 2020; Pablo et al. 2007; Wilson and Broomfield 2022). for example through cross-functional and multi-disciplinary teams (Sawneyh and Prandelli 2000), governance networks (Krogh 2020), knowledge brokers, or boundary practices (Eisenhardt and Martin 2000) or by using different tools and technologies to communicate, process, transfer, and visualize knowledge and thus enable faster learning (Chatfield and Reddick 2019; Warner and Wager 2019; Widener, Gliedt, and Hartman 2017; Yan, Hong, and Warren 2021).

Relational managerial capacity can be used to facilitate learning processes in periods of uncertainty by building a supportive environment for learning, taking a foundational strategic approach, and supporting continual improvement (Salvato, 2003). Pablo et al. (2007) found that leaders who focus on socializing and creating trusting relationships enable the integration and recombination of skills and knowledge. They also found that managers play a critical role in adjusting the strategic development route by learning by experimentation and learning by feedback. Facilitating interaction between the different stakeholders that work together through collaborative innovation processes across organizations should aid the organization to reach productivity goals in DT processes (Hartley, Butler, and Benington 2002).

Research on DT has argued that managers' capability to enable DL processes that balance the exploitation and creation of competencies may explain the differences in how well organizations perform (Adner and Helfat 2003; Gholampour Rad and Nisar 2017; Goh and Arenas 2020; Kane et al. 2019; Matt, Hess, and Benlian 2015; Piening 2013; Warner and Wager 2019; Zahra, Sapienza, and Davidsson 2006). This point leads us to our fifth and sixth hypotheses:

**Hypothesis 5 (H5):** MDC has a positive impact on DL processes.

**Hypothesis 6 (H6):** MDC has a positive impact on the organization's productivity.

Based on the literature review, we propose the conceptual model, illustrated in Figure 1, for the role of MDC, DL processes, and DA on productivity in DT.

## Method

### *The research context*

'Justice delayed is justice denied' (Voigt, 2014). The courts of Norway provide justice services that ensure the citizens their legal rights. The resulting caseload consists of the number of cases awaiting trial in the courts. By the end of 2019, about 12,000 cases were pending in the Norwegian Courts (Domstoladminsitrasjonen 2021). The slowness of the courts is considered the most important threat to the judicial rights of citizens, and it is also reported to be what most dissatisfies the latter. When Norwegian

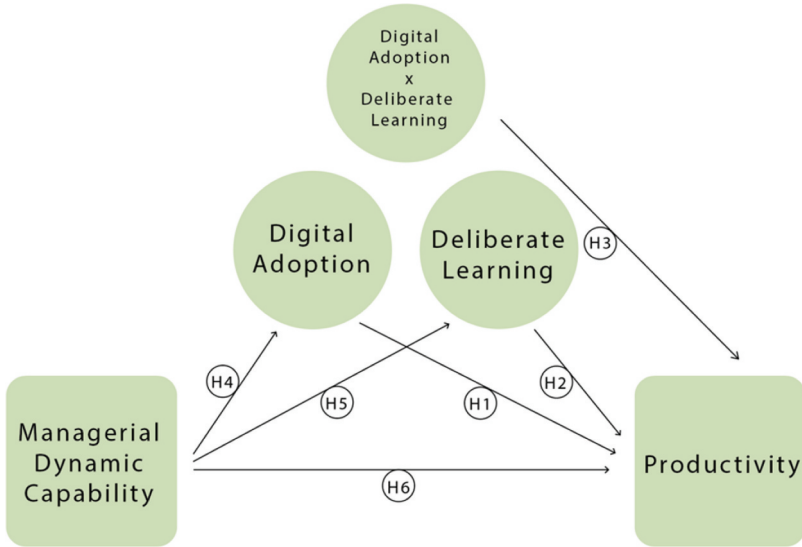


**Figure 1.** Conceptual model.

society went into lockdown on 12 March 2020, the Norwegian courts needed to limit the negative consequences on society and find new ways to serve citizens.

In collaboration with the Department of Justice, the Norwegian Court Administration (NCA) was able to implement a temporary corona law as early as 24 March that provided the district courts with an opportunity to adopt digital information technology rapidly to transform their processes and services with the aim of maintaining production in the courts. It also gave us an opportunity to study the role of DA, DC, and the different strategic responses displayed by the managers of the different district courts in response to changes in the environment and their effect on productivity. The corona law included several changes to the courts' services and processes. In our study we focused on digital court hearings, digital examinations, digital deliberations, digital signatures, and digital service of process. The changes in these specific services and processes both required the adoption of new digital information technology and changes to the employees' work processes, relationships and roles.

One feature of the district courts is that they are highly independent in terms of how they manage and administrate their organizational processes and services. Although they have a mission, professions, policies, and regulations in common, they differ greatly in their leadership, work processes, recruitment, employee development, and distribution of competence and resources. They also differ in size and geographic location.

During the pandemic, we were able to construct an experiment to measure key capabilities and their relation to productivity changes under the environmental pressure that the pandemic exerted on the courts. Although the study is a case study of the Norwegian courts, we believe the results are relevant for other international judicial services and public organizations in a similar context that are concerned with capabilities, management, and DT.

Table 1. Age distribution of the sample.

| Age | No. |
|---|---|
| 18–29 | 12 |
| 30–39 | 23 |
| 40–49 | 24 |
| 50–59 | 36 |
| 60–69 | 10 |
| Preferred not to say | 2 |

## Sample

Employees employed at 20 different district courts in Norway were offered the opportunity to respond to a questionnaire. The total sample consisted of 111 respondents from 14 district courts. The district courts differed in size and geography, although the majority of the respondents were members of the largest district courts, in terms of number of cases heard and employees. Of the 111 responding participants, four were deleted because their consent was lacking. The remaining 107 participants consisted of 69 females, 37 men, and one participant who did not want to disclose their gender. Age was measured in six groupings (see Table 1), ranging between 18 and 69 years. The median age group was 40–49 years. Two participants chose not to disclose their age.

## Procedure

The study was approved by the management group and board of directors of the Norwegian courts in May 2020. A special advisor was assigned as internal coordinator and contributed by enabling access to relevant documents and communication with key stakeholders and in coordinating, distributing, and facilitating the study inside the organization. We included documents in the study that concerned the corona law as well as the technology and processes surrounding the transition from analog to digital services. Further, we conducted interviews with employees from different courts and from the IT department to gain a more comprehensive understanding of the context, perceived challenges, scope, and impact of the digital changes in the courts.

The questionnaire was approved and checked against the General Data Protection Regulation (GDPR) by the legal department in the court administration before it was distributed to the 20 different court leaders through the special advisor on 11 May 2020. Respondents were asked to submit responses within one month. The court leaders distributed the questionnaire to their employees by email along with information addressing issues such as anonymity, objectives, participants, security issues, etc.

## Instruments/Questionnaires

### Variable construction

A research instrument was developed to serve as the basis for collecting data pertaining to DA, MDC, DL, and productivity.

We adopted a one-sided seven-point Likert scale where 1 = strongly disagree and 7 = strongly agree. It should be noted that no standard measures yet exist for the operationalization of capabilities in empirical research. The way such capabilities are measured varies extensively, and because of this variance their respective models and results presented in the empirical literature are often disjointed (Hoopes, Butler, and Walker 2003). In the present study, the development of scales was based on theoretical contributions from scholars within the field of innovation management and on extensive consultation with academics and court employers.

DL was operationalized using a similar questionnaire, built on the previous work of Prencipe and Tell (2001), Protogerou, Caloghirou, and Lioukas (2011), Pavlou and El Sawy (2011), Schilke and Goerzen (2010), Kump et al. (2018), and Rashidirad and Salimian (2020). We developed questions based on their classification of learning. MC was operationalized using items from Augier and Teece (2009), Adner and Helfat (2003), Tortorella et al. (2020), and Mahmood and Mubarik (2020). DA was operationalized using literature on DA, digital maturity, and DT from Verhoef et al. (2021) and Andal-Ancion, Cartwright, and Yip (2003).

Productivity is commonly defined as the ratio of inputs produced, divided by the inputs used. The economic understanding of the term used to measure productivity in the private sector, where price and the market are important factors, is not viable in the public sector, and a well-aligned conceptual understanding is still lacking (for a more thorough literature review on this, see Dunleavy, 2013). In the judicial sector, productivity is conceptually understood as operational productivity, borrowed from industrial engineering, where the output is the produced goods, and the input is the resources used to produce the output (Sumanth, 1994). The majority of studies on productivity in the courts measure operational productivity as the *number of cases processed* (output) and the *amount of labour required to process those cases* (input) (Voigt, 2014). The statistics do not differentiate between complexity of cases or quality of the proceedings, but, according to NCA, despite its limitations, this is the best measure of productivity (Domstoladminsitrasjonen 2021).

The questionnaire was adjusted, in cooperation with the special advisor, to suit the courts. The items pertaining to each scale were then pre-tested in several steps: first in face-to-face interviews with three academics and then in a group interview with a reference group consisting of employers from different departments in the court administration. Participants were asked to identify any problematic items which, in turn, were either revised or eliminated, and new ones were developed. The pre-testing process allowed us to assess the face and content validity of the items and ensure that the respondents understood the research instrument as intended. We used Typeform as a tool to collect the data.

### *Performance measurement*

To measure the performance of the 20 courts, data were collected on the number of decided civil litigation cases (CLC) and criminal cases (criminal case proceedings composed of one professional judge and two lay judges) (CC) for each court. Performance measurements were calculated for each court by the number of decided CLC and CC divided by full-time equivalent persons for both 2019 (pre-Covid–19 performance) and 2020 (performance during Covid–19). Measurements were collected from 13 March (beginning of Covid restrictions in Norway) until 31 October (currently available data for 2020) for both 2019 and 2020. The final performance

measure was calculated by dividing 2019 performance by 2020 performance. A limitation of this calculation is that the number of working days for each year and the fact that 2020 was a leap year were not controlled. However, the number of working days was similar across all courts. Thus, for the goal of comparing performance prior to and during Covid−19, this limitation was deemed acceptable.

## Results and analyses

The software used for the statistical analyses was IBM SPSS Statistics (version 27) and XLSTAT (2022). The present study uses partial least squares structural equation modelling (PLS-SEM), as its nature and use of latent construct measurements lend itself to this approach (Hair et al. 2019). By estimating the entire structural relationship of the model, the method accounts for measurement errors and allows for flexible models such as the interaction term in the current analyses. Moreover, PLS-SEM allows for reduced sample size requirements while having good statistical power (Sarstedt et al. 2020). The results of these analyses are described below.

### *Missing data*

Several items were missing from the returned questionnaires. A Little's (1998) test of Missing Completely at Random (MCAR) was non-significant ($\chi^2 = 141.49$, DF = 140, $p = .45$), indicating that the missing data are randomly distributed (Kang 2013). Descriptive analysis showed that 285 items were missing (5.50% of the data). Generally, missing up to 5% of data is considered acceptable (Hair, Ringle, and Sarstedt 2013). To fill in the missing data, a mean imputation was performed using the function of XLSTAT.

### *Assessment of the measuring model*

The reliability and validity of the measurement model were assessed based on the correlation of items with their respective latent variables, composite reliability (CR), Cronbach's alpha, and average variance extracted (AVE).

#### *Indicator reliability*

It is generally suggested that indicator variables should have loadings above .708 with their respective latent variables, which indicates that the construct explains more than 50% of the indicator's variance (Brown 2015). Wong (2013) suggested that items loading above .70 are considered significant, while loadings of less than 0.40 should be removed from the analyses. All items except DA_06 (.65) and DL_07 (.62) were above the threshold of .70. These two items were discarded. See Table 2 for item loadings.

#### *Construct reliability*

Construct reliability was assessed using Cronbach's alpha and CR scores. According to Hair, Ringle, and Sarstedt (2013), Cronbach's alpha values > 0.8 are very satisfactory (Wong 2013). As presented in Table 2, the Cronbach's alpha values indicate that MC (.96), DL (.89), DA (.88), and DL*DA (96) are robust in terms of their internal consistency reliability. Compared to Cronbach's alpha, CR does not assume the same

**Table 2.** Reliability test.

| Item | Loadings | Variable | AVE | D.G. Rho | Cronbach α |
|---|---|---|---|---|---|
| MDC_01 | 0.86 | Managerial dynamic capabilities (MDC) | .73 | .96 | .96 |
| MDC_02 | 0.86 | | | | |
| MDC_03 | 0.86 | | | | |
| MDC_04 | 0.91 | | | | |
| MDC_05 | 0.90 | | | | |
| MDC_06 | 0.91 | | | | |
| MDC_07 | 0.88 | | | | |
| MDC_08 | 0.82 | | | | |
| MDC_09 | 0.77 | | | | |
| MDC_10 | 0.77 | | | | |
| DL_01 | 0.76 | Deliberate learning (DL) | .60 | .91 | .89 |
| DL_02 | 0.82 | | | | |
| DL_03 | 0.72 | | | | |
| DL_04 | 0.85 | | | | |
| DL_05 | 0.80 | | | | |
| DL_06 | 0.84 | | | | |
| DA_01 | 0.76 | Digital adoption (DA) | .63 | .91 | .88 |
| DA_02 | 0.86 | | | | |
| DA_03 | 0.83 | | | | |
| DA_04 | 0.89 | | | | |
| DA_05 | 0.76 | | | | |
| | | DL*DA | .40 | .98 | .98 |

**Table 3.** Hypothesis conclusions.

| Hypothesis | Finding | Conclusion |
|---|---|---|
| H1: DA has a significant positive impact on productivity | (β = .07, $p < .05$) | Supported |
| H2: DL has a significant positive impact on productivity | (β = .16, $p < .05$) | Supported |
| H3: DL in relation to DA has a significant impact on organizations' productivity | (β = .19, $p < .05$) | Supported |
| H4: MDC has a significant positive influence on the DA process in the organization | (β = .29, $p = .54$) | Not supported |
| H5: MDC has a significant positive impact on DL processes | (β = .56, $p < .005$) | Supported |
| H6: MDC has a significant impact on the organization's productivity | (β = .08, $p = .81$) | Not supported |

weight of each indicator and may thus be a better measure of internal consistency. As seen in Table 2, all CR values are > .90, indicating a high construct reliability. Notably, the interaction variables and MC have CR and Cronbach values > .95. As noted by researchers (Diamantopoulos et al. 2012), values of .95 and higher might indicate redundancy of items, reducing construct validity.

### *Convergent and discriminant validity*

To assess discriminant validity, the AVE was assessed. AVE reflects the average communality for each latent factor in a reflective model. It is generally recommended that a latent variable should capture at least 50% of the variance of its indicators (Chin 1998). As can be seen in Table x, values for all factors are above the suggested threshold, suggesting good convergent validity. Discriminant validity can be assessed by examining whether the AVE of observed items is larger than the squared correlations of latent variables in the model. As can be seen from Table 2 and the correlation values shown in Figure 2, discriminant validity is established in the current analyses,

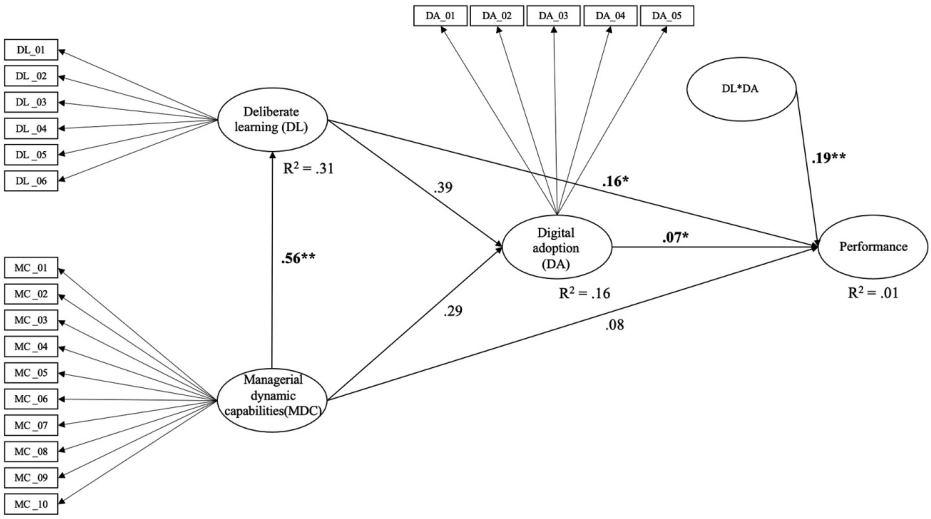


Figure 2. The structural equation model.

showing that latent variables share more variance with their respective items than with the latent variables in the model (Fornell and Larcker 1981).

### *Multicollinearity*

Variance inflation factor (VIF) was examined to assess multicollinearity between indicators forming the latent variables. According to Allison (1999), VIF values above 2.5 can be considered representative of multicollinearity. A linear regression analysis was calculated to examine multicollinearity. The analysis yielded VIF scores for MC (1.57), DL (1.65), and DA (1.18) that were under the threshold value.

## *Assessment of the structural model*

The $R^2$ values of the structural model show the amount of variance in the dependent variable explained by the model. Figure 2 shows the $R^2$ values of the model, with a value of .31 for DL, .16 for DA, and .01 for Performance. Figure 2 demonstrates correlations for each path as well as significant levels.

The results confirm H1, H3, and H5. Based on the results, both DA and DL have a significant impact on productivity. DL has a stronger relation to productivity, with 0.16. DA, on the other hand, only has a 0.07 relationship with productivity, at a .05 significance level, which is rather weak, although significant. Our results further show that it is a combination of DA and DL that has the most positive relation to productivity, with 0.19. Therefore, it can be concluded that both DA and DL can positively impact organization' productivity. The weak relationship between DA and productivity seems to confirm our hypothesis while showing that the impact on productivity is limited. DL's positive relationship to productivity indicates that DL processes are important to the organization's performance on a general basis.

Further, the results confirm H4, but we do not find support for H2 and H6. Based on the results, we conclude that public managers' direct influence on productivity is

limited. We find strong support, with 0.56 at a .005 significance level, of MDC influencing DL processes but no support for the impact of MDC on DA. Based on the results, we argue that managers can influence the DT processes significantly through a focus on the DL processes in the organization. We also find that public managers have little influence on the DA process in the organization. Table 3 provides an overview over the hypothesis conclusions.

## Discussion and implications

Since the production paradox was introduced, stating that technological adoption may not increase an organization's productivity despite its promise (Brynjolfsson 1993), many researchers have tried to solve this issue. The growth of digital public services shows the degree of trust in technology in society, but most researchers agree that an improvement in organizational capabilities is necessary to reap the benefits from technology, especially in the public sector. Strategic management is believed to be critical in private organizations undergoing DT to enable both the top-down and bottom-up processes needed to drive the transformation. However, the managers' role in the public sector is more bound strategically because of the number of stakeholders, and we know too little about how this situation influences the DT processes in public organizations. This study contributes to strategic management theory and public management theory by clarifying the relation of different capabilities to productivity in the public sector and the public managers' role in enabling these capabilities, as shown in our conceptual model. Further, this study contributes to practical management by demonstrating how public managers can enable more efficient DT processes. In the following section, we examine the theoretical contributions, practical implications, and limitations to this study and make suggestions for further research.

### *Theoretical contributions*

This study contributes to filling the gap in research on the public sector aimed at improving productivity through DT. It further contributes to literature on strategic management in the public sector and to the capability theory. First, we developed a conceptual model by reviewing literature on different capabilities related to digital transformation, with two central questions addressed: *'What is the role of DA and DL on productivity in public organizations?'* and *'What is the role of MDCs in enabling DA and DL in public organizations?'*

#### *DCs and productivity*

Our results suggest that DA impacts productivity in public organizations, which is consistent with claims by researchers that DA leads to increased performance (Bag et al. 2020; Chatfield and Reddick 2019; Chen, Liu, and Shuting 2019; Felsberger et al. 2020; Hänninen, Smedlund, and Mitronen 2017; Rachinger et al. 2019; Widener, Gliedt, and Hartman 2017). However, the positive relationship between DA and productivity is quite weak, possibly because, as argued by Brynjolfsson and Hitt (1996, 2003), it takes a long time for the organization to reconfigure and enable the technology to improve productivity.

If we look at DA in combination with DL, we see a significantly stronger relation to productivity. According to Piening (2013), organizations that were evolutionarily and technically fit have a better chance of adopting and implementing new technology. This means that for an organization to be able to benefit from technology adoption at an early stage, it is an advantage for productivity improvement if the organization has dynamic capabilities. The positive relationship between DL and productivity supports the argument that dynamic capabilities may be even more important in the public sector due to the strong focus on internal factors (Dunleavy, 2013).

### *Dynamic capabilities and productivity*

Consistent with Tortorella et al. (2020) and Zahra and George (2002), our results show that organizations with implemented DL practices benefit more from DA than organizations who score lower on DL practices. Our results are supported by institutional theory, which emphasizes isomorphic pressures as a driver for change (DiMaggio and Powell 1983). DL is built from within the organization, and through these patterns, the isomorphic pressure will become a driver in the DT process; in a DA process, in contrast, the isomorphic pressure is more likely to become a counterproductive force. Learning patterns may ensure collective knowledge sharing and sensemaking across the organization, thereby enabling the legitimate adoption of digital technology. Based on our results, we argue that organizations in the public sector who aim to adopt technology will experience a more rapid improvement in productivity if they build learning patterns and routines in advance. We further contribute to the discussion on the productivity paradox in the public sector by showing how it may be overcome by DL practices, not only by combining DCs with organizational capabilities, but by preparing the organization to reconfigure their capabilities through undertaking DL practices in advance.

### *MDC and productivity*

Our unique theoretical contribution lies in our results that show that public managers can enable these DL practices through using their dynamic capabilities. The positive relationship between DL and MDC is strong and indicates that managers may have a larger impact on strategic change in the public sector than earlier research has implied.

Earlier studies have argued that public managers have limited influence on the DA processes in their organizations (for example Currie and Procter 2005). This relationship is non-significant in our study. According to earlier studies, managers may have a limited strategic impact on DA processes because of the many stakeholders and the natural limitations on policies, regulations, and financial investments (Bygstad and Lanestedt 2009; Hartley, Butler, and Benington 2002). If public managers have limited participation in the decisions about and implementation of DA, or they don't believe or understand the investment in technology, it can lead to less improvements in productivity (Molinillo and Japutra 2017). The strong relationship between MDC and DL may be due to the boundaries within which public managers operate and their influence within these boundaries. Based on our results, we argue that public managers can have a major impact on productivity within the boundaries of their own public organizations when they focus on building dynamic capabilities through an orchestration of collaboration practices aimed at learning across the range of

stakeholders involved in the DT to overcome the challenges associated with DT in the public sector, enabling DL practices.

## Practical implications

This paper makes important practical contributions for practitioners. Based on the findings of our study, creating patterns and routines for collective learning, knowledge sharing and sensemaking, and facilitating collaboration practices in the public sector should be preferred strategies for public managers, considering the rising number of public organizations engaging in DT.

Many researchers point to the many stakeholders and conflicting strategic needs as a barrier to DT (Chatfield and Reddick 2019; Meijer 2015). The public sector has a tendency towards stricter hierarchical structures and silo structures, which operate as barriers to knowledge sharing and collective sensemaking. Our results show that a more rapid growth of productivity in the public sector depends on public managers' ability to create and facilitate DL processes. Focusing on enabling learning capabilities releases the DT capability of the whole organization, whereas focusing on DA processes may lead to endless battles with employees that are resisting the change. When the different stakeholders engage in systematic and DL processes, they gain a common vision and understanding of the challenges related to DT. Engaging in DT through facilitated learning processes is more efficient than overemphasizing DA to create new organizational knowledge and recalibrate capabilities through a collective sensemaking process. Digital technology may have the potential to increase productivity, but our results support Penrose (1959/2009 hypothesis from 60 years ago, that 'the real power resides within the human and managerial resources of the organization and that these capabilities must be released in an orchestrated and deliberate way'.

## Limitations and suggestions for further research

This study has some important limitations that provide opportunities for future research. First, this research has methodological limitations. We conducted our study in a specific period during Covid−19, and the findings are related to that particular time and context. We suggest that further studies consider a more longitudinal strategy to ensure that productivity measures last over a longer period of time. Moreover, the study was conducted in the Norwegian courts, and measures should be taken to generalize the findings to more public organizations. Further studies may also look more into the differences of strategic management across different services within the public sector.

This study further has a limited measure of the courts' performance. The scales and measures that are used are within the current understanding of productivity in the courts. For this study the important measures were that the measures were comparable across multiple district courts. As the discussion of measurements of productivity in the public sector develops, more refined studies should be conducted to ensure a more precise measurement of productivity in the public sector generally and in the courts specifically.

The scales that are used to measure the different concepts have been validated and verified earlier and for this study in particular. Limitations to the scales may be that they do not cover all aspects of all the concepts comprehensively. As the concepts develop the scales should also be revised and revalidated for future studies.

We believe that our findings are also relevant for the private sector, and the study should therefore also be tested in other industries and countries. There are limitations regarding our choice to examine only two capabilities related to DT. At the same time, each of these capabilities has many micro-foundations that should be studied separately in relation to productivity. Further studies should include both more DT capabilities and more detailed studies at a micro-foundation level.

Our measurement of MDC is limited to our definition of MDC. We have not included management styles or personalities or measured managerial competence. It can be argued that different types of managers will gain different results based on different profiles, and further studies can examine this more closely.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Funding

This work was funded in part by the Research Council of Noway.

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# Appendix

## *Overview of the constructs and questionnaire items*

The questionnaire is translated from Norwegian.
The factors are not validated in English.

| | |
|---|---|
| Managerial Dynamic Capabilities (MDC) | MDC_01: My manager has enabled and facilitated communication amongst employees |
| | MDC_02: My manager has ensured the involvement of employees in the transformation processes |
| | MDC_03: My manager has ensured that the purpose of the digital solutions is clear |
| | MDC_04: My manager has ensured that the employees have a clear understanding of their role and responsibility before and after the digital transformation |
| | MDC_05: My manager has facilitated necessary changes to routines and processes |
| | MDC_06: My manager has guided and supported the employees during the implementation of the digital solutions |
| | MDC_07: My manager has adapted to the digital changes |
| | MDC_08: My manager has shown a willingness to learn about new technology |
| | MDC_09: My manager looks at errors as a learning opportunity |
| | MDC_10: My manager has facilitated the employees' adaption of work processes to the new digital solutions |
| Digital Adoption (DA) | DA_01: We have improved our technological infrastructure |
| | DA_02: We have used digital technology to adapt to, or improve existing services |
| | DA_03: We have used digital solutions to improve communication with our users |
| | DA_04: we have increased the use of digital solutions in proceedings |
| | DA_05: we have increased the use of digital collaborative tools |
| Deliberate learning (DL) | DL_01: Knowledge and experiences are shared across teams in and across the courts |
| | DL_02: Management receive frequent information about the employee's newly gained experiences |
| | DL_03: Positive and negative experiences are shared between employees |
| | DL_04: The employees are involved in strategic discussions about the digital solutions |
| | DL_05: The employees are encouraged to engage in critical discussions about the digital solutions |
| | DL_06: We have conducted evaluations of "what has worked and what has not worked"during the transformation process |