

# Ambidexterity and Maturity Models for Governments in (Digital) Motion: Asian Dynamics and Nordic Noir

Kim Normann Andersen, Department of Digitalization, Copenhagen Business School, andersen@cbs.dk

Jungwoo Lee, Yonsei University, Seoul, jlee@yonsei.ac.kr

Helle Zinner Henriksen, Department of Digitalization, Copenhagen Business School, hzh.digi@cbs.dk

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Disclaimer. This is a paper in progress. In this drafted version we have not included the Appendices. Also, please observe that the list of reference is to be updated. Also, we are yet to have the paper proofread by native English speaker. Please forward comments or suggestions by talking to us and/ or sending e-mail. The corresponding author of this paper is Kim Normann Andersen to be reached through e-mail andersen@cbs.dk

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## 1 Introduction

The empirical foundation of this paper is nested in two of the world's digital frontrunners: South Korea and Denmark. While being a world apart, the two countries continuously being in the spotlight of being top-ranked yet the paths to and benefits from the top-level position spells out extreme different in the two countries. While the dynamic and innovation focused Korean approach to digitalization of government had led to export earnings and by large been driven by industry needs, the Danish approach has been driven by efficiency gains and demonstrating benefits for citizens and government.

While we acknowledge that empirical validation of cause-relationship between increased use of IT and radical transformation of structural boundaries of government, work empowerment, service improvement remain disputed for the past fifty years of computing in government (i.e., Kraemer & King, 2015; Danziger, 1977), our mission to qualify the research input to the policy

agenda on forward uptake of technology in government by revisiting the maturity models and qualify these in the context of efficiency and innovation of government.

In general, the information systems research on maturity models have not embraced government as a unique unit of analysis. Our proposition is that because government has been ignored as a unit of analysis, IS research have failed to address unique factors of government and eventually is less capable of understanding and even less prescribing what government should do next with regards to digitalization. For example, in the senior scholars basket of eight journal we have identified 30 papers that have maturity models as their key focus in either conceptual or empirical work. None of these papers address digitalization of government. Consequently, the IS research is short of relevance for understanding and possible engaging in one of the biggest transformation of society in the making.

Instead, maturity models for digitalization of government have been developed more outside the core IS-field than inside the core IS-field. Most notable is the work on maturity models appears in journals such as *Government Information Quarterly* and *Public Administration Review*. While this research indeed have focus on the nature of government by for example including participation, involvement, transparency and accountability in the work on maturity models, they are fall short of guiding the digitalization forward. In our research we try to span both areas of research, arguing that there is an theoretical and practitioner reason to combine the two streams of research.

In government there is strong push for being innovative and simultaneously deliver efficiency and remonstrate effectiveness. While research on ambidexterity has demonstrated that organizations have the capacity to embrace the shifting logics and agendas (March, 1968; 2008) through for example structural separation, sequential alternation, and behavioral integration Birkinshaw (2013), the digitalization and the structural budget logic of government and how this might impact the digital transformation of government have been largely ignored in the maturity model research community (Agarwal et al., 2017).

To divert from the traditional trajectories depicted in stage models, the outcome of this paper offers *four vignettes* or stories rather than future stages to capture the changes in the organizational sphere and knowledge sharing in the digital government. The aim of the paper is to nest the conceptualization of maturity beyond pure office automation and web interfaces by linking the vignettes to ambidexterity, digitalization, and budgeting, while also identifying possible different paths via a variety of vignettes.

The paper starts with an overview of the existing maturity model research. We then proceed to detail our research design, including our collection of data. In section four, we present our findings from Korea and Denmark. In the concluding section, we discuss our findings, outline the main conclusions, and propose possible areas of additional research. Although we focus on two frontrunner of digitalization, we believe the research is equally useful for conceptualization of maturity and governments in digital motion in other countries.

## **2 Theoretical approach**

Maturity models divides the lines within public administration communities and information systems community. Within the public administration community, maturity models is at odds with how public administration researcher work and more importantly what they study. The very idea that a nation or an organization can be more mature than another organization is controversial, to formulate it mild. Yet, rankings and classifications of cities, organizations, and

nations does occur and the increased focus on digitalization in government calls for more attention from public administration community to engage in the problems governments are facing with respect to using digitalization more.

Within the information systems literature the maturity models of digitalization in government does not capture the uniqueness of government and of this very reasons have limited forward role to play in formulating strategies for digitalization of government. Our ambition to enrich the work on maturity models with the work on ambidexterity by Jim March (1968) and the duality of exploitation and exploration. Based on a thoroughly literature review, we have developed four vignettes (efficiency, automation, engagement, and value creation) about maturity in a government setting and distributed along the two key dimensions of ambidexterity (exploitation and exploration). In Appendix A to the paper we have detailed how we performed the literature review, the coding, and generated the four vignettes.

While research has demonstrated that impacts of IT often occurs in areas where the impacts are not anticipated (Kraemer & King, 2015) and managers continuously have been “frustrated about computers” (Danziger, 1977),

In the US 1993 National Performance Review, Al Gore wrote in the introduction that more and better IT was key to create “... a government that worked better and cost less... As everyone knows, the computer revolution....do things faster and more cheaply than we ever had before” (Al Gore, 1993). Worldwide, government have launched transformation programs ranging from having ministers or e-envoys in charge of the policy formulation or having IT as an integrated part of the high-level ministries. While government policy actions are focused on AI, interconnected platforms, and ecosystems”, the legacy systems and daily operations are on “distinct users employing clearly distinguishable systems, in bounded contexts” (Winter et al. 2014).

Meta-reviews of first-hand empirical studies on impacts of IT on the public sector have pointed out that such transformative and positive impacts of IT actually have occurred and most clear with regards to improvement of capability. Thus, during the Golden Age of IT-adoption in the public sector, there has been major improvements of efficiency, effectiveness, and information quality (Danziger & Andersen, 1994, 2005, 2015).

Also, IT in government has been part of efforts to stimulate business growth by lowering administrative burdens (Arendsen, Peters, Heede, & van Dijk, 2014) and making government more transparent, accessible, accountable, open and inclusive, and lowering corruption (Kim, 2014). Furthermore, there has been formulated radical propositions of a government as a platform (UK Government Digital Service and Code for America) and digital-era governance replacing new public management governance (Dunleavy, Margetts & Bastow, 2006).

Barry Bozeman argued that all organizations are public that attributes on publicness possible associated with public sector (bureaucracy, in transparency, slow pace of work, etc.) occurs equally in the private organizations (Bozeman, 1987). Also, aligning digital infrastructures and transformation efforts towards in-house articulated needs rather than market and citizens preferences occurs in private and public sector settings. In the private sector the focus on existing customers have been proposed to pave the road for market driven disruption (Clayton Christensen, 20xx; ). In government, the digital infrastructures vary from situations where there is monopoly and no-competition to NPM-areas similar to the market focus in the private sector.

Public sector research has developed highly cited maturity models (i.e., Layne & Lee, 2001; Andersen & Henriksen, 2006). Whereas the Layne & Lee model maps the degree of integration

and the organizational complexity, the Andersen & Henriksen model outlines the degree to which the digital services are focused on bringing benefits to the citizens and their relation to the core activities of government. Whereas Layne and Lee (2001) provide an *internal view* of maturity, Andersen and Henriksen (2006) focus on an *external* and *outside-in* approach to maturity.

Since the publication of Layne & Lee (2001) and Andersen & Henriksen (2006) models, which combined have been quoted in more than 4,000 research papers, there has been a *methodological stream* of research which focuses on a more rigorous data analysis and the ability to account for multiple paths to maturity (Lasrado et al., 2016a; Lasrado et al., 2016b). Yet, the methodological stream is still dominated by top-down approaches, with few attempts to develop bottom-up approaches (Lahrmann et al., 2011). Also, a range of scholars have populated and refined the stages of the maturity models, outlining the path of entity towards maturation, including defining the stages and the *relationship between each of the stages* (e.g., Becker et al., 2009; Pöppelbuß et al., 2011).

Within IS, the research is enriched with IT capability maturity models (Nolan, 1973; Galliers and Sutherland, 1991; Humphrey, 1988). Generally, studies have been developed in empirical monolithic settings focusing on homogeneous bundles of technology. Furthermore, according to Poepelbuss et al. (2011), there is a lack of "...development and usage of theoretically sound maturity models in practice". Such scarcity of theoretical questioning and the empirical monolithic research culture might be due to the unwillingness among researchers of different persuasions to change the deeply entrenched meanings of their terms (Feyerabend, 1963).

Since Nolan (1973) introduced his Stages of Growth model, Galliers and Sutherland (1991) presented the Model of Stages of IT Growth, and the Carnegie Institute introduced the Capability Maturity Model (CMM) for software development in the late 1980s (Humphrey, 1988) the terms and their corresponding models of maturity and stages have had a strong foothold in the IS research and practice (Becker et al., 2010). To assess the variation in use and focus of the maturity models, we have conducted a systematic literature review focusing on the AIS Senior Scholar Basket of eight journals (Please consult Appendix A for details about the review).

A number of articles focus on system development methodologies and in particular the Capability Maturity Model (CMM). Some studies with direct reference to CMM relate specifically to software development and its suitability when implementing work practices (Mathiassen and Sørensen, 1996), software maintenance (Dekleva and Drehmer, 1997), and quality management (Work, 2002). Another branch in IS research referring to CMM takes a more organizational and market perspective. Studies include a focus on vendors' CMM rating (Bapna et al., 2016), the competitive significance of CMM appraisals (Filbeck et al., 2013), the potential efficiency derived from high CMM levels (Ramasubbu et al., 2008), and finally how the CMM levels' influence job attitudes and perceptions in software companies (Ply et al., 2012). Common for these studies is that the CMM levels are applied as a given classification scheme of the software companies. Some studies in our sample more sporadically refer to maturity or stages. Examples of this include reference to IT maturity as one of several constructs in determining B2B e-commerce readiness (Lin et al., 2007; Liang & Xue, 2004), the impact of operational maturity in relation to security performance and compliance (Kwon and Johnson, 2013), and change dynamics from a stage view caused by ERP adoption (Wei et al., 2005).

A number of studies have identified the levels of usage in IT implementation, applying the ideas of stages of growth. Examples include Duane and Finnegan (2003), who studied intranet implementation in HP and end-user computing in the health sector in Asia, and Swatman, Swatman, and Fowler (1994), who studied EDI implementation in Australia with a particular focus on identifying stage levels defined in the Galliers and Sutherland (1991) model. Only a few studies critique the stages of growth and maturity models and the empirical quantitative test of the model. Drury (1983) concluded that it was challenging to test the Nolan model (1973) empirically, and Galliers and Sutherland (1991) criticized the Nolan model and proposed the Model of Stages of IT Growth. Wastell and Swards (1995) highlight that they find that those models are of limited value. They argue that, in practice, stages are not clearly defined, organizations often possess elements of several stages, and benchmarks of technology and organizations are difficult to compare.

One perspective that had specific attention in the context of this study relates to the research that focuses on building taxonomies of maturity and stages. Burgess (2016) suggested a pyramid maturity model for assessment of level of web-site adoption. The other three examples provide more traditional matrix models with degrees of sophistication along an x-axis and a y-axis. Chen and colleagues (2010) assessed the effect of IT operational performance in organizations by focusing on CIO Demand-Side Leadership on the x-axis and CIO Supply-Side Leadership on the y-axis. Boughzala and De Vreede (2015) identify aspects that are important for measuring collaboration maturity, and Metha et al. (2007) define a five-stage knowledge maturity model for determining knowledge levels in organizations.

The IS studies are dominated by an empirical focus on private organizations. In the public sector domain, several empirical studies have been published on the digital maturity of municipalities (e.g., Norris & Moon, 2005; Scott, 2006) and cities (Fietkiewicz, Mainka, & Stock, 2017). These studies all conclude that the government has a long way to go in terms of the uptake of digital technologies. They point to the fact that a personalised web interface for customer processes, data mobility across organizations, application mobility across vendors, and the transfer of data ownership to customers has still not been implemented in the government. This suggests that governments are still predominately in the early stages of maturity; although they are aiming for data and system integration, they currently have limited fully integrated front-end services and essentially still have an intra- and intergovernmental view of the development and implementation of IT. This trajectory might, however, be completely different, for example, in areas in which the public sector, similar to those of third-world countries, takes a shortcut and simply skips some of the more cumbersome stages between low levels of integration and complete integration.

Summing up, our theoretical contribution is the proposition that maturity models in government unfolds in a radical different setting than private sector. The literature on maturity of IT in government falls can be captured by four different vignettes: efficiency, automation, engagement, and value creation.

Table 1. Four vignettes about maturity and ambidexterity

Vignette	Ambidexterity	
	Exploitation	Exploration
Efficiency	<p>Security performance and compliance (Kwon and Johnson, 2013)</p> <p>Technical integration and organizational complexity (Layne &amp; Lee, 2001)</p> <p>Big data analytics</p> <p>Data redundancy</p>	<p>digital maturity of municipalities (e.g., Norris &amp; Moon, 2005; Scott, 2006) and cities (Fietkiewicz, Mainka, &amp; Stock, 2017)</p> <p>Citizens and core activities (Andersen &amp; Henriksen, 2006)</p> <p>Social media analytics</p>
Automation	<p>Intranet &amp; end-user computing in the health sector in Asia, and Swatman, Swatman, and Fowler (1994)</p>	<p>Streamlining of back-office processes and interaction with citizens in munies (e.g., Norris &amp; Moon, 2005; Scott, 2006) and cities (Fietkiewicz, Mainka, &amp; Stock, 2017).</p> <p>Deployment of sensors and IoT to extent the span of organizational reach and control</p>
Engagement	<p>Job attitudes and perceptions (Ply et al., 2012)</p> <p>Boughzala and De Vreede (2015) identify aspects that are important for measuring collaboration maturity</p>	<p>Communication and interaction with citizens</p> <p>Relations rather than boundaries</p> <p>Social media use</p>
Value creation	<p>Metha et al. (2007) define a five-stage knowledge maturity model for determining knowledge levels in organizations.</p> <p>Internal innovation</p>	<p>Transfer of data ownership to citizens (Fietkiewicz, Mainka, &amp; Stock, 2017).</p> <p>Providing access to public data for commercial purposes</p> <p>Enabling new business models through open data</p> <p>Disruption of data ownership and access</p> <p>Ratings and competitiveness (Bapna et al., 2016; Filbeck et al., 2013)</p> <p>Job creation</p> <p>Enhancement of work</p>

In our proposed rethinking about maturity models, we propose to conceptualize the digitalization as balancing exploration and exploitation. The two dimensions can be expressed in a two by two matrix as shown in Table 2. The four vignettes are displayed in four quadrants of efficiency (low exploitation-low exploration), automation (high exploitation-low exploration), engagement (low exploitation-high exploration), and generation of external value (high exploitation-high exploration).

Table 1. Dimensions of ambidexterity and four vignettes about maturity (efficiency, automation, engagement, and value creation)

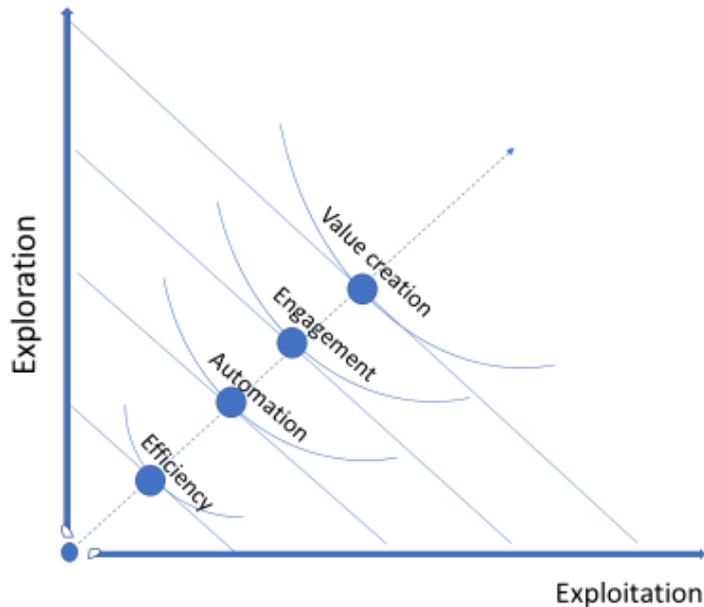
		Exploration	
		low	high
Exploitation	low	Efficiency	Engagement
	high	Automation	External value generation

Yet, balancing the two dimensions of ambidexterity also can be expressed by optimization of preference curves. Hence, our theoretical contribution is to also to supplement the conceptual approach of two-by-two matrix towards a more continuous and incorporate preference curves. While the preference curve terminology is origin from field of economics, we here use it to capture that the political preferences for how and where to deploy the technologies in government differs. Also, and often correlated with political preferences, is the budget allocated to IT-expenditures.

In Figure 1 we have organized the vignettes with the efficiency first followed by automation, engagement, and value creation. This “order” follows the conventional logic of maturity models in the literature.

The proposed framework differ from conventional maturity models by arguing that the stages are vignettes or stories, rather than constant and objectives. Secondly, the vignettes balance exploitation and exploration. Hence, in our framework there is not contradiction or a paradox between efficiency and exploration. Instead, the model depict this as a condition of how to operate in government. Third, the economic and technical low hanging fruits and solid business cases of IT deployment in government is captured by the framework to the degree that the preference curves exploiting technology to reduce man power in government, reduce running costs, or lower data redundancy would move the bullet (the vignettes) towards the horizontal axis. Similar, government with preferences for exploring new ways to deliver services, innovation in digital public health care, or sustainability would shift the vignettes towards the vertical axis.

Figure 1. Framework for conceptualizing maturity vignettes balancing efficiency and exploration dimensions in government



The efficiency and automation vignettes represent incremental transformation, with control nested in formal government boundaries and data safeguarded by government. The knowledge sharing is primarily within formal boundaries. At the other end of the spectrum, the engagement and value creation vignettes are part of a radical transformation of government. Key indicators of the radical transformation are the use of new technologies to create job enhancement and possibly create entire new job functions and new jobs outside the government.

While traditional maturity models would list efficiency, automation, engagement, and value creation as stages or levels of maturity, we have visualized these in a more fluid format. Depending on political priorities, for example, at a high level of domestic security and safety, the use of IT to support a relatively open organization sphere might have less merit, compared to a context in which the security is less of concern and issues of political transparency and ongoing engagement are on the agenda. In practice, there will be n-variations, but due to restrictions in space, Figure 1 displays only four variations of the vignettes.

### 3 Research design and collection of data

Standing on the shoulders of the maturity models developed in IS and public sector research, our research design aims to explore the patterns of use in the government. The research design explores the patterns of IT use in the organizational sphere, with a particular focus on the open/closed dimension and knowledge sharing in the government, with specific attention to the internal/external dimension.

Our research design aims at theorizing from the point of departure in case study research (Eisenhardt, 1989). The case study method is particular suitable for this study. First the study is about the how question, rather than why (Pan & Tan, 2011). Secondly, the paper is exploring

the processes of maturity and not contingency or impacts (Gummesson, 2000). Using an interpretive approach, our design aim for generating novel insights which will add knowledge and deepen current understanding of maturity models (Walsham, 2006).

While our ambition is to generate empirical knowledge and, through this pile of research, to conceptualise the use of digital technologies in governmental settings, we are not conducting a comparative case study per se (Bertlett & Vavrus, 2017) and do not aim to produce empirical or theoretical generalisation. The design of our research is to orchestrate two case studies and thereby aspire to enrich the IS field with knowledge that could be of valuable insight. Citing Thomas Kuhn, Flyvbjerg postulated that “a discipline without a large number of thoroughly executed case studies is a discipline without a systematic production of exemplars, and a discipline without exemplars is an ineffective one” (Flyvbjerg, 2006).

Our two case studies are extreme, opposite cases in terms of their geographical and cultural context. Having two extremely different countries covered in a research design has been suggested by, for example, Tan & Benbasat (2009), who covered Singapore and the US in their study of IT-mediated services in e-government. In contrast to their work, which classified websites, we visited each local site and conducted interviews in two extremely different contexts. This proved challenging not only in practical and linguistic terms, but also in terms of cultural and formal constraints. The gain from this method was the advancement of our ontological, epistemological, and methodological awareness.

The research design was developed through a concerted effort by the research teams from Korea and Denmark using on-site interviews, synthesis sessions in workshops, written documents, and observations as data sources. Also, we have accessed statistical data and various government reports on digital government use. The qualitative interviews with local government included civil servants and CIOs in Korea and Denmark. The research was conducted during 2014-2017 and, as advocated by Wolcott (1990), the research story was written as the research progressed.

In Korea, interviews were conducted with the director of the e-government unit, the Ministry of Interior, the CIO from the Jongno district office, the director of the KLID Kimpo District office, the director of the Smartopia, the CIO from Anyang City, and the CIO at the Sudaemun District office. In addition, we had meetings with the National Information Society Agency (NIA), Kibyoung Kim, Global e-Government, and Ministry of the Interior and Safety (May 2018). The research team held physical meetings in Seoul (May 2014, April 2017, and May 2018) and in Copenhagen (August 2014 and May 2017). In Denmark, the author’s team jointly conducted five semi-structured interviews with the CIOs from the municipalities. All interviews were conducted with municipalities in the greater Copenhagen area. Also, we conducted interviews with the Director of the National Agency of Digitalisation and the Copenhagen SmartCity Office.

We held two rounds of focus group interviews with the informants from the municipalities in which the first iteration of the analysis was presented, discussed, and refined. In the subsequent sections, we will present our findings from each country and then proceed to propose four vignettes we have formulated based on the findings from each country.

## 4 Findings

### 4.1 Korea

The Republic of Korea (South Korea) has about 50 million inhabitants, ten times the size of Denmark. With 25 million inhabitants, Seoul is the sixth largest metropolis in the world and home to about 50% of the Korean population. Korea has 17 regional and 226 local governments (Namkoong, Cho, & Kim, 2018).

The Korean government is a relatively small part of the economy. The general government's spending amounted to about one-third of the GDP in 2015 (32.3% of GDP). South Korea is a relatively new democracy (about 30 years old). In Transparency International's corruption index, Korea ranks 52th of 176 countries ([www.transparency.org/](http://www.transparency.org/)). An indicator of the ongoing challenges faced by this democracy is the 2016 impeachment of President Park Geun-hye (Washington Post, 2017 March 9). In general, privacy and trust in government is an ongoing issue in Korea (Jho, 2005; Kim, 2010) and digitalization is seen as a potential enabler of increasing legitimacy.

South Korea is viewed as a role model for synergy between innovation and competitiveness and is often cited in these terms as the most innovative country. The Korean economy is dominated by strong, international companies, with high synergy between the ICT sector, job creation, and exports. Korea is home to companies such as Samsung, LG, and Hyundai-Kira. South Korea is internationally recognised for its high-speed broadband and 4G LTE coverage.

Korea has deployed massive efforts in e-infrastructure investment for industrial development during the information revolution era in '90s and '00s:

*“Since 1967 when the Economic Planning Board first introduced a mainframe computer to process census data, Korea has positioned itself as the world's true e-Government pioneer, with more than 18,000 information systems developed” (Ministry of the Interior and Safety, 2018a).*

With the help of this infrastructural development along with tremendous investments on database and information systems for government operations as well as citizen services, Korea has been ranked as number one in e-government development by the UN several times.

Korea was not only the first country in the world to enjoy a fully high-speed connection, it is also the only country in the world in which the majority of the population has more than 50 MB upload capacity (ITU, 2016). Korea is both a place of display for and a source of new technologies. In government, this is prevalent in the Korea 3.0 paradigm on ICBM (IoT, Cloud, Big Data, and Mobile technologies). This is present, for example, in many smart city projects such as waste management (smart bins) as well as new initiatives on bringing artificial intelligence into government digitalization. In the Korean context, we have made four central observations related to shifts in knowledge sharing and the organizational sphere.

The first observation is that the Korean government links the strategies of e-government with export of advanced e-government solutions. Korea develops and exports hardware and software as well as provides the expertise developed through its own e-government projects. Korea is highly engaged in exporting e-government solutions such as the mobile civil complaint report system (exported to India) and the electronic national tax system (exported to Sri Lanka & Mongolia) (Ministry of the Interior and Safety, 2018b). The export focus is also prevalent with regard to training through ongoing e-government policy management courses for a range of countries. For example, in May 2018, 15 countries took part in digital government training

activities in Seoul. The training topics were big data, government innovation plan, handling of statistics, etc. (Ministry of the Interior and Safety, 2018b).

A captivating observation from Korea is the link between IT maturity in the government and the export sector:

*We think of China as part of our domestic market, because China is geographically close to Gimpo, and flying back and forth between Gimpo and China is very convenient. Thus, we are teaching Gimpo's public servants Chinese and sending them to Beijing, Shanghai, Chongqing, and Xian on training trips. We need to make a play for business opportunities arising from China's east coast and inland cities in west China.*

*The Chinese government has announced its national smart city plan, aimed at turning nearly 320 cities into smart ones by 2015, thus giving a fresh impetus to the information policies that had been pursued separately by local governments.*

*This has prompted us to mull over ways to efficiently access smart city projects in China, which is fast becoming the world's ICT arena. If we gain ground in the Chinese smart city market by tapping into our smart city experiences, we can obtain a new economic growth engine (Korean Times, 2016).*

In this regard, South Korea is also making great efforts to establish international connections and organizing international organizations as well as running overseas aid programs along with e-government export. In 2016, the South Korean government initiated the Digital 5 (D5), an intergovernmental international network of like-minded governments working on the digital transformation of public services who have demonstrated a commitment to design services focused around users' needs and share open-source solutions with other nations. The D5 was founded by five member nations: the United Kingdom, South Korea, Estonia, Israel, and New Zealand (UK, 2016; NZ, 2016). It has been expanded to D7 by approving Canada and Uruguay as member nations in 2018, and discussions are ongoing to include Mexico and Portugal.

The Korean government has also begun to establish the e-government collaboration centres in developing countries such as Indonesia, Peru, and Kenya. In these collaboration centres, consulting services for e-government development are conducted, such as for national enterprise architecture and new service provisions.

Digitalization efforts for government are not only the responsibility of the central government but also of local and regional governments to make individual and group efforts to digitalize their government processes and citizen services (Im & Seo, 2005). Since 2011, the City of Seoul has taken a leading role to form a global collaboration called World Sustainable Cities and Organizations (WeGO) and has been offering, as the president city, the popular Seoul Program, an e-Government training program in partnership with the Seoul Human Resource Development Center in Seoul, Korea. The Seoul Program consists of diverse lectures introducing the e-government practices and policies, interactive discussion sessions, and site visits to e-government facilities as well as cultural excursions. Seoul is still assuming leadership in WeGO, and the organization has now grown to include more than 60 member cities across the globe (<http://we-gov.org>).

The second central observation is the strategic shift in Korea driven by a next generation of technologies. Most stage models for e-government place the integration stage as the final stage of technical dimensions. The question among Korean bureaucrats involved in e-government focuses on what is next. In this regard, a shift of focus is observed throughout the interviews.

Namely and clearly, Korea is agonizing over the shift from a technological focus of e-government to a broader scoping of government digitalization which may include the transformation of government processes and strategies:

*“e-Government is focused on improving the efficiency level of internal governmental administration process by utilising information and communication technologies (ICT). Meanwhile, Digital Government is more focused on the sustainable development for the next generation via utilising digital technologies and data (such as Big Data Analytics) .... In this sense, the vision and strategies and core resources/major actors would be changed. The influence of citizens and markets increases and collaborative governance and decision-making processes could be changed into more democratic ways” (Kim et al., 2015).*

This shift of focus is, in some sense, triggered by the maturing information technologies compared to that of the '90s and '00s. When e-government stage models were being presented in academic journals and international organizations in the 2000s, issues in information technology and systems were the utilization of the Internet and related online services. Now, technocrats are discussing loading systems on the computing cloud, using the Internet of Things to provide services, analysing Big Data to find details of citizen demands, and dealing with the social and mobile computing proliferating among citizens and service providers. Technologies that we can use are more likely platform-based, which might be a subtle way of describing the integrated stage which most stage models are targeting.

Now, in this platform-based environment in which most government data are linkable to each other and possibly open to the public (via APIs), we are dealing with diversified context with a variety of demands and needs. It would not be easy to define the next stages without referring to the softer side of technological evolution. For example, the Korean e-government office has come up with a catchphrase targeting the creation of value for citizens, which contain completely different connotations than vertical and horizontal integration.

Our third observation in Korea is the burgeoning of different services across different functions and levels of government. For example, whereas CCTV is often associated with surveillance, the Koreans have introduced two-way CCTV, in which the real-time transmission of visual images is combined with audio from CCTV centers *and* audio from the location of the individual CCTV stand. Government provides APIs and engages citizens and companies to build apps on top of the data, pushing CCTV away from the closed, Big Brother image of the past. Police and intelligence services do conduct surveillance, but this is also combined with traffic management and safety. People can communicate with a response unit, and they have developed an app that allows users to find a safer route, depending on data from CCTV footage:

*“Safecity is a key focus of CCTV, not so much smartcity. People like safety... using the CCTV, we can guide for example women through a safe route avoiding groups of potential danger... if our cameras spot a group, the app can route her to avoid the group and arrive safely... also, the app can show locations with the nearest CCTV where cameras, voice, and speakers can help out.”*

Apps have been developed using open APIs in the CCTV. If a phone is shaken, the police will be notified and will be able to respond quickly at the right location with video guidance. The statistics show massive growth in the number of closed-circuit television (CCTV) cameras installed by the government in public places in South Korea from 2013 to 2016. In 2016, there were 845,136 CCTV cameras installed in the public in South Korea, demonstrating an increase of 14.3 percent compared to 2015.

Also, the mobile bus-app allows citizens and commuters to Anyang City from the Seoul city centre to know the exact location of their bus and the time it will arrive. This is changing the scheduling info system from static to dynamic and from panel displays at bus stops with minute-long intervals and delays to citizen-centric information.

The fourth observation relates to changed patterns of work within the government. Government jobs in Korea are prestigious, but job enhancement and career opportunities are not linked to the use of digital technologies. In central government, experiments with smartwork have materialized smartoffices, allowing employees to work in cubic work spaces in Seoul, hence avoiding commuting to the main office. For example, the Ministry of Interior was moved from a central location in Seoul to a city about two hours away in commuting time. Although many workers relocated physically (moved), others kept their housing in Seoul and commuted to the office. The smartoffice allowed them to work one day during the week in Seoul. They are not allowed to work from home, partly due to security concerns:

*“Government data lines are separated from open internet access... this is due to security... all governments are connected by dedicated lines to be accessed from the office environment only. Employees can not remotely access core government information systems”*

The structural boundaries of work in the local government are relatively conventional, with employees showing up for work at 9 AM and leaving the office at 6 PM. There is a lunch break of one hour. Employees are not permitted to use social media and the Internet for personal purposes during work hours. These restrictions are enforced due to the risk of security breaches. All communication is transmitted through a dedicated, closed network. Yet, social media is widely used for internal government purposes. Such internal uses include BAND for synchronous communication, distribution of meeting agendas, minutes from meetings, and scheduling. In addition, the key motivation for the uptake of social media in the South Korean local government is the involvement of citizens. In local government, recording studios are mushrooming to enable local production of media content for Internet broadcasting.

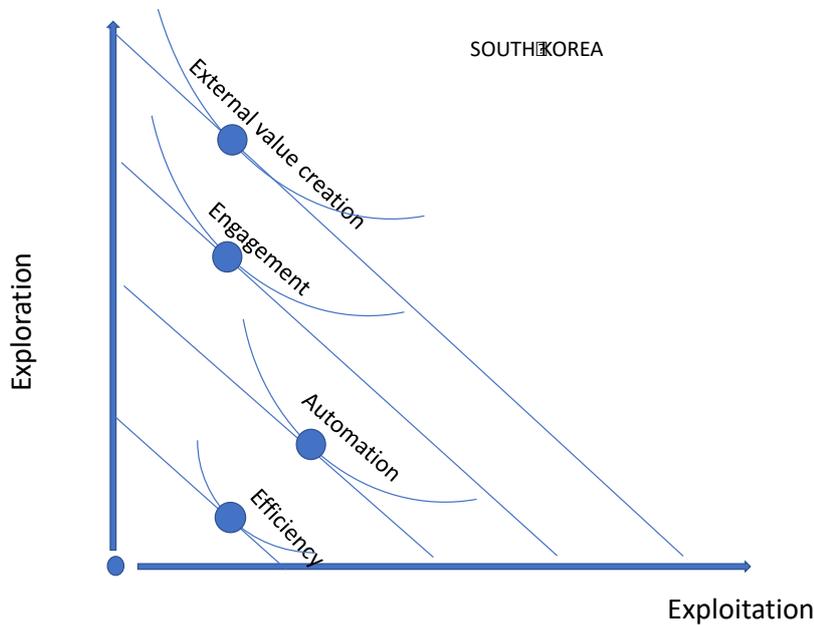
A more radical change in work relates to involving citizens in communication activities concerning public activities. The social media is utilised proactively, for example, by the Jongno district office, where Ms. Hwang is in charge of the social media initiative. She recruits citizens from the district to produce content on social media. She recruits citizens with the highest number of followers on social media and who possess good writing and communication skills. She has currently hired about 20 citizens as content providers. When asked for the need for moderation in Kakao-talk with citizens, Ms. Hwang stated:

*“No, moderation is not needed. Because it is not necessary. Citizens only respond in a neutral fashion and do not start new threads.”*

This suggests that local governments are becoming communication players, using rich media such as video/podcasting and interactive chatting. This is in part motivating by efforts to increase trust in government (Porumbescu, 2016; Shim et al., 2013). This is a remarkable shift from being a paper-shuffling unit that, during the first rounds of digitalisation, was facing challenges of integrating data in-house in order to support the download of digital templates of forms and hubs of online self-services.

Figure 2 we have visualized the four vignettes from Korea along the two dimensions of ambidexterity. The Korean approach is very much about exploration and innovation and about value creation through export earnings. Also, the use of digitalization to stimulate engagement in innovative ways stands out.

Figure 2. Visualization of the four vignettes from Korea



## 4.2 Denmark

With 5.4 million citizens, Denmark belongs to a group of mid-sized countries in Europe. The capital (Copenhagen) has about 1.5 million citizens. Denmark is a relatively old democracy (its constitution is from 1849). Government and politicians enjoy a high level of trust from citizens ([www.transparency.org/](http://www.transparency.org/)), and digitalization has therefore not been seen as a driver towards increased trust or transparency.

Denmark is part of the *Nordic model*, with universal welfare benefits and extensive health care and educational services. The public sector takes a large role in the economy, as 54.8% of the GDP is spent by government (OECD, 2017). The final government consumption is 25.4% of GDP. Denmark has a three-layered structure with central government, regions (5), and municipalities (98). The 98 municipalities are in charge of homecare, schools, childcare, and local cultural activities, whereas the five counties' primary domain is public health care.

While Denmark is home to strong international and well-branded companies such as Lego, Carlsberg, Maersk, and Novo Nordisk, the business landscape is dominated by small- and medium-sized companies. While there are several regionally and domestically focused IT companies, Denmark is not home to major international IT software or hardware companies. Denmark has attracted several hyper scale data centers from leading companies such as Facebook and Apple, which have located their Northern European data centers in Denmark due to the high speed trans-Atlantic submarine cables and close to 100% power grid uptime.

With more than 80% of the population using the Internet to interact with public authorities, Denmark has a top-level ranking in international benchmark studies from the EU, UN, and OECD (UN, 2009-2018; OECD, 2009-2017; Eurostat, 2009-2017). In 2009, the percentage of Europeans interacting over the Internet within the public sector was 37%. This increased to 40% in 2015 (Eurostat, 2016). Denmark ranks consistently over the years among the top three

in international transparency index ([www.transparency.org/](http://www.transparency.org/)), and access to online documents, parliamentary documents, etc., is a key indicator of the relative openness and the citizens' perception of transparency. In the Danish context, we made three central observations related to shifts in knowledge sharing and the organizational sphere.

The first observation is the use of technology as a means for centralizing tasks. IT in the local government has shifted from being a decentralised service to a centralised and shared service model (Greve, 2015). Pension schemes and welfare services, such as social security and payment services, have all been placed under a central organization (UDK), and the shared portal for central and local government served has been shifted to a national portal ([borger.dk](http://borger.dk)). While the Danish strategy has enabled front-end services and end-to-end solutions, the digitalization has been driven by an efficiency agenda with horizontal and vertical system integration and exchange of sensitive data across public agencies and the local government.

A particular example which was highlighted in all cases relates to the specific role civil servants have undertaken due to the introduction of shared service centres for the payment of social benefits and tax. Municipalities no longer have control over the processes, but this makes little sense to citizens. They still expect the local municipality to be in control.

*"...in 2005, when the tax administration was moved away from the municipalities, it took years before we actually didn't have that much to do. They took over all the work, but all the citizens still came."*

This type of digitisation has turned out to be a major challenge, especially in terms of convincing citizens of its benefits, as citizens feel they hit a wall when approaching the municipality. Employees, on the other hand, experience a loss of capability due to the delegation of activities to shared service centres.

The second observation is the legally enforced adoption of digital self-services. This digital service offering has shifted from being a design and convenience strategy to a business case and mandatory use strategy. This shift represents a unique strategy according to international perspective; it started in 2005 with the first mandatory use of digital channels (e-invoice) and now includes yet more areas in which the use of digital channels is now mandatory (e.g. national e-ID and obligatory digital post; see, for example, Henriksen, 2016).

Employees have to adapt accordingly and be ready to provide help and support when citizens are struggling with the e-services, often having to act both as IT-super-users and case-handlers. This quote refers to employees having to train citizens on the spot in terms of handling e-services.

*"...we always try to take people to a computer somewhere in the room."*

Another informant referred to the same trend, stating

*"...we have tried to educate employees along with educating citizens. And I actually think that is a big part of the question, why did we move so fast, because we just forced employers to do some of the things that we demanded citizens do."*

This change of tasks has been identified as a source of frustration and discomfort for public employees (Berger and Hertzum, 2014). The role of IT-supported case-handling is familiar and part of the skills developed over time for the use of expert systems, whereas the required IT competency is unknown territory for employees who, in many cases, only master the more mundane internet skills, similar to the rest of the population.

The online service provision has led to a radical shift in the physical proximity of local government. Such a shift could eventually lead to the abandonment of city halls and a more distributed physical proximity in which public spaces in libraries are utilised along with a virtualisation of digital services. Parallel to a reduction in city hall office hours, longer opening hours have been provided for the new hubs for citizens' services. The new hubs include libraries that offer limited digital government services, including training in navigating the self-service universe, centred particularly on the elderly. Accordingly, citizens can go to public libraries and get help and advice on how to navigate the mandatory virtual digitised solutions.

A third observation is the multifaceted use of social media. The most controversial perspective we observed related to the use of social media for control. Whereas social media is often thought of as a two-way, synchronous communication enabler, our analysis of the Danish case suggests that the most profound change is the shift towards detection of citizens' possible fraud and violation of social security benefit requirements. Social media plays a central role in the control of citizens' behaviour, which traditionally has been beyond access to the public employee who works in large administrative units in which direct and personal contact is no longer the norm. Thus, social media in Denmark is a technology for inclusion but equally for surveillance and control. Governments have established units in which civil servants have become fraud detectors:

*"We have a small unit with two and a half persons who are constantly looking out for it." [...] I think I can say they are not very proud of having such a unit. We don't talk about it loudly."*

The informants were generally pointing to the importance of employees using social media as a learning process and a competence building medium. Informants therefore accepted and even encouraged employees to explore social media during work hours.

*"I urge them to use the Internet, that's one of the best sources to get more information about what's going on around."*

*"...they search a lot. We trying actually to build up our own database with everything you need to know to serve a citizen."*

The strategic approach to the adoption of social media in the organizational room follows a pattern that indicates a radical shift in digital transformation towards a more explorative and risk-taking approach:

*"So we're trying to have some small projects to find out what Twitter is good for, what Facebook is good for, what Instagram is good for. So, instead of making one big project where we do everything or everybody does the same thing, we are trying to conduct some small projects to find out: is this the right place and is this the right way to do it?"*

Another remarkable channel transformation is the abandoning of e-mail and the introduction of a proprietary, web-based digital post system to be used throughout the public sector. Consequently, all physical letters and associated postage costs have been discontinued at the central, regional, and local level of government. Social media has been adopted, but mainly as a control channel to check for citizen/social fraud

*"One of the things that we are working with is that if, in a crisis situation, a person needs to get in contact with a social worker, then it means a lot that this social worker can see the eyes of this person."*

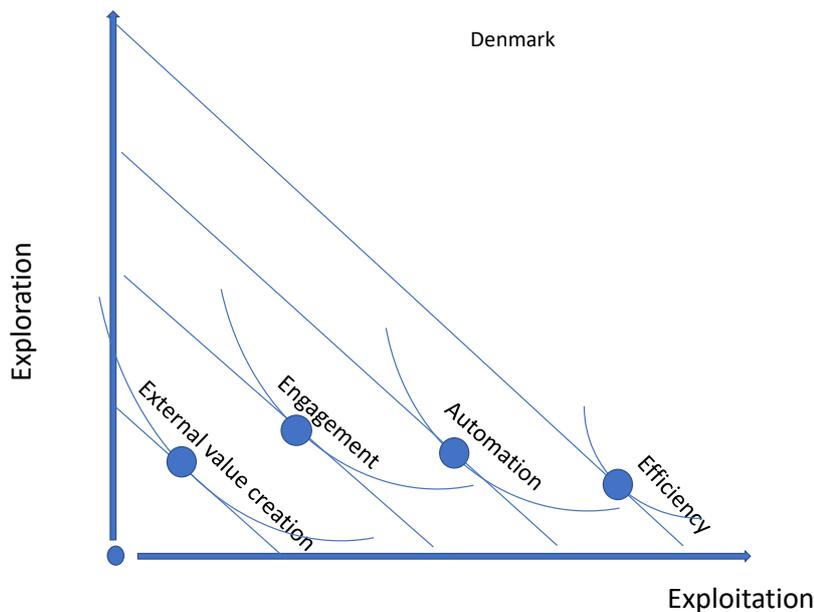
*“I think we are a conservative municipality, a bit old school sometimes. Facebook was sort of new. We had to see what’s happening in other municipalities before we started here. But we started in June. I don’t think we have reached 1,000 followers yet.”*

Also, the social media channel is used as a tool for the branding and image creation of the municipality

*“[we...] urge everybody to deliver stories to publish on Facebook. I think, here, we are still at the start, and they are a bit anxious about what they are going to publish. At the start, it must be good pictures.”*

The civil servants have to fulfil editorial and judgment roles when monitoring citizen-generated content. What may appear to be an innocent Facebook activity turns out to be a demanding task which potentially can generate negative connotations for the municipality.

Figure 3. Visualization of the four vignettes from Denmark



## 5 Discussion

While the Korean approach is closely linked to security challenges and a world-class electronics manufacturing sector, the Danish approach is linked to the law-enforced adoption and the benefits of centralized digitalisation. The two cases illustrated eminently how malleable technology is and how this plays out in extreme different government contexts. The Danish and Korean cases are captivating in illustrating how the use of the same technology can be linked to very different objectives and outcomes (e.g., social media as a service and safety enabler versus

surveillance and control) and how different technologies can be deployed to serve the same objective (e.g., smart offices versus smart work).

We label the Danish efficiency approach as Nordic Noir, contrasting the dynamic technology-centric approach followed in Korea. While the approaches in the two countries are a world apart, both have secured their countries a top spot in the international rankings (UN, 2018). In the previous sections, we detailed our findings for Korea and Denmark. The findings were analyzed on two dimensions related to knowledge sharing (internal versus external) and the locus of the organizational sphere (closed versus open). In this section, we will abstract our findings and put forward their possible contribution to the more general understanding of how government is being transformed. Pursuing this objective, we propose four vignettes: efficiency, automation, engagement, and value creation.

The *efficiency vignette* is prevalent in both contexts. However, it differs distinctly in its visibility and consequence towards citizens. In Denmark, we found social media being employed as a means to detect fraud. The centralisation of services featured a strong element in the efficiency vignette. Apart from increasing the efficiency of fraud detection, the utilisation of social media tools has changed the role of the public employee from a case handler to a detective. Social media tools provide a new level of transparency in terms of citizens' behaviour and serve as an efficient tool for observation, especially if self-reported information disaligns with actual behaviour. For example, social media are used in the Danish government to determine whether a parent is single or in a relationship, which influences the amount of social benefit they are eligible to receive. In Korea, efficiency evolved around an increased utilisation of CCTV data for the management of public spaces. The CCTV deployed was argued to function in terms of manifest gains to both economic and security efficiency. Due to the magnitude of the monitoring, emergency response units can reach areas much faster, and traffic congestion can be solved through adjusting traffic lights.

The *automation vignette* is fuelled by the deskilling of administrative work functions, a process of centralisation and *automation*. We make the proposition that the use of new technologies within both the efficiency and automation stages is associated with a higher degree of control over workers' performance and a potential process of deskilling, especially in cases in which workers are deemed as second in importance to artificial intelligence (AI) and the enforcement of self-service solutions results in fewer case workers. Case workers then spend more time handling exemptions and working with clients that are not at ease with IT. For some of the workers, their work is being transformed to be IT supporters. In Korea, the SmartCity contained several automation elements, and subsequent efforts were being directed toward large-scale data analytics of traffic monitoring and an organizational expansion and conquering of both households and public spaces. Thus, the deployment of IoT and sensors as well as the associated automatic data transfer of, for example, trash in the smartbin or energy consumption has effectively expanded the organizational sphere and span of geographical control.

The *engagement vignette* captures the use of technologies that bring citizens on board as producers of content for local government social media platforms. Social media is thus actively being used to interact with citizens beyond the communication of traditional government activities. By providing a broad variety of social media platforms to citizens, governments also gain channels for mutual interaction. In the Danish context, social media engagement is primarily done via Twitter and Facebook. The public employees were painfully aware of the power of social media as a tool for communication and gaining access to citizens. The social media channels were, however, utilised for the promotion of cultural events and initiatives and to engage

citizens in public activities. Korea is keen on offering a broad palette of tools and making it a mark of active citizenship to be present on social media platforms such as KakaoTalk, Twitter, and Facebook. This move is changing the locus of government and enabling a more polycentric model as well as new partnership models. In the Korean context, we find this to be a particularly strong tendency. However, this is somehow also a paradoxical development, given that the general difference in work culture has been described as traditional and void of the possibility of, for example, using social media for direct employee-to-citizen contact.

The *value creation vignette* captures both new business models and the shift towards expansion and innovation beyond business case logic. Also, in particular, the Korean case is observed to open up APIs to data from technologies such as CCTV, which allows private companies to develop apps and services. Thus, by providing access to public sector data, the value creation vignette comprises a greater degree of risk-taking and more radical approaches. The main transformation of work occurs in this vignette: the public employee is more of a créateur and business strategy developer than compliant with an overall government strategy. Although, in many cases, digital citizen services are more advanced in Denmark, the value creation role is a lot more present in the Korean case. In Korea, we observed a close link with industry and strategic thinking on how digital government can also be a path to the export of technology and knowhow, and thereby a means to the creation of jobs; this is more distinct in the Korean context. We observed how the Korean government focuses on designing software and services suitable for international export.

Whereas the efficiency and automation vignettes are low-risk paths for governments, some workers will consequently experience a deskilling of their work and an enforcement of formal organizational boundaries as well as work hours. Also, focus on efficiency and automation is associated with a managerial focus on how digitalization can contribute to budget savings and incremental changes in the organizational sphere. By contrast, the engagement and value creation approaches are more disruptive and high risk. In Denmark, for example, the transfer of service tasks from the local government to newly created central units has paved the way for job enhancement and potentially blurry boundaries between the private and public sectors running a digital government. The widespread use of CCTV in Korea involves much more than the implementation of surveillance techniques. CCTV is also about the creation of new nodes in terms of business partnerships and relations. Thus, paradoxically, the technologies associated with control and a formal system hold the potential to radically transform knowledge sharing and the organizational sphere. A government gets access to the private sphere and various dynamic modes of interaction, while workers employ the use of algorithms, big data, and social media predictive analytics, not discretion, e-mailing, and face-to-face interaction.

Table 1. Cross-case observations of ambidexterity

Vignette	Exploitation	Exploration
Efficiency	Mainly within formal organizational boundaries, although <i>virtual expansion</i> through co-sourcing and centralisation and CCTV	Detection and control Strategy compliance
Automation	Streamlining of back-office processes and interaction with citizens Deployment of sensors and IoT to extent the span of the organizational reach and control	Deskilling of work Observant of work processing Big data analytics
Engagement	Communication and interaction with citizens Relations rather than boundaries	Communication expert Enhancement of work Social media analytics
Value creation	Providing access to public data for commercial purposes Blurry organizational boundaries Disruption of data ownership and access	Business strategy developer and créateur (creator) Job creation

## 6 Conclusion

This paper offers valuable methodological, substantial, theoretical, and possible implications for practice. Its key methodological contribution is the proposition to challenge the paradigms and applying the physical settings of research to extremely different contexts (Korea and Denmark). This daring qualitative approach generates conceptual dimensions of maturity in which they were not expected. Serious safety and security challenges in the Korean peninsula did not resonate with suggestions of making governments citizen centric and adopting them as the core objectives driving technologies forward in government. Yet, our proposed framework do not rank one better than other or one stage being more advanced than other. By minimizing the bias of favouring certain democratic models and risking ignoring vital context condition, the incorporation of preferences in the model makes the framework adoptable in different political contexts,

The proposition to approach IT use as vignettes and the associated incorporation of (political) preferences is enriching the IS field with a novel and daring approach to capture IT use and is an alternative to conventional maturity model approaches.

While the dynamics of computing can be more visible and more glamorous and possibly take longer leaps forward in the private sector, the government scene of IT use has been shifting as well, and theory and practice are short of knowledge, whether there is a possible unified pattern or a myriad of changes. While government managers were equally uncertain about the nature of changes and how to respond to use of “office” technologies in the 1970s (Danziger, 1977), the uncertainty of technologies 50 years later encompasses a plethora of technologies (social media, AI, sensors, and data analytics), with citizens, companies, and politicians using what was previously considered expert technologies.

Acknowledging that stage models do have a mission to fulfil in practice, we argue that our proposed framework with vignettes and preference curves provide a conceptual contribution to theory and practice by allowing the model to factor in for example variance in budget, security issues, job enhancement and engagement.

Navigating in culturally extreme different countries as Korea and Denmark is challenging and puts natural limitations on the robustness of our analysis and conclusions. We have put forward the proposition that the organizational room is changing and that governments are deploying technologies for efficiency gains and automation, but also for benefits outside the traditional boundaries of government. We call for research on why this is occurring and who is benefitting from this uptake. The driving forces might be issues of power, politics, and institutional factors (Danziger et al., 1982; Fountain, 2004), and we encourage research on how these factors possibly materialise in terms of changes in knowledge sharing and the organizational sphere, as observed in Korea and Denmark.

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