



Digital Transformation, Governance, and Coordination in Times of Crisis: An Analysis of Australia, Denmark, and the Republic of Korea

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Australia, Denmark, and the Republic of Korea are front-runners in the public sector use of **Information Communication Technology (ICT)** globally, resulting in a high degree of digitisation of public services production and delivery. While a multitude of factors may account for their successes, what is the role played by their strategic approach to governance and inter-governmental cooperation? How have their approaches to governance and multi-stakeholder cooperation influenced the success of their digital transformation, boosted innovation, and enabled them to rapidly respond to the pandemic crisis?

The article's initial findings support past academic observations emphasising that the successful digital transformation of the public sector largely depends on strategic focus, a strong governance model, and a high level of intergovernmental cooperation. The analysis finds strong evidence that their existing governance and intergovernmental cooperation frameworks, in combination with their established service production and delivery ecosystems, have allowed the three countries to move towards real user-centric, integrated service production and delivery prior to the COVID-19 pandemic. The analysis also finds evidence of a relatively high level of public sector business continuity for service production and delivery in light of the COVID-19 pandemic and associated restrictions on mobility.

CCS Concepts: • **Information systems**; • **Applied computing** → **E-government**;

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1 INTRODUCTION

The role of governance and intergovernmental cooperation in the digital transformation of the public sector, and particularly service production and delivery, have been explored in various ways and in multiple national contexts since the 1990s [Brown and Magill 1994; Andersen and Henriksen 2006; Heeks and Bailur 2007; Millard et al. 2008; Huijboom et al. 2009; Bannister 2011; Cordella and Bonina 2012; Meyerhoff Nielsen 2017; Meyerhoff Nielsen 2017a]. Similarly, the role of technology in relation to emergency responses such as natural disasters has been a field of study [Gjørseter et al. 2018b; Lin Moe and Pathranarakul 2006; Palen et al. 2010; Palen and Vieweg 2008; Shklovski et al. 2008]. Emergencies such as the COVID-19 pandemic require the management of situations that expose people and/or infrastructure to damage, which are difficult to handle due to their complexity, size, number of stakeholders, and emergency evolution unpredictability [Kraus et al. 2012]. In this light, this article looks at whether the pre-pandemic approach to governance and intergovernmental cooperation in relation to digital transformation potentially boosted business continuity and facilitated rapid responses to the crisis.

To explore the core question, this article will focus on what elements and levers Australia, Denmark, and the Republic of Korea have drawn upon when utilising technology within their respective public sector sectors before, during, and after the COVID-19 outbreak. To do so, the article will first (Section 2) explore the existing literature on the use of digital technologies by governments to increase efficiency and effectiveness in terms of the production and delivery of user-centric public services. After outlining the methodology of the article and the rationale for, and background of, the three chosen countries (Section 3), the article will explore the digital foundations of the three countries (Section 4), including how they use ICT and national eGovernment strategies to drive public sector reform, efficiency, and effectiveness. This will be followed by an outline of the governance and intergovernmental cooperation models applied in the three countries (Section 5). In doing so, the article will analyse the role governance and intergovernmental cooperation played in COVID-19 emergency responses in the three countries studied. Of particular interest to the article's research question is the analysis of differences in the digital foundations, governance models, institutional frameworks, and digital infrastructure established in the three countries. In its conclusions, the article will compare and discuss the findings in relation to the research question, and potential future research avenues will be proposed (Section 6).

2 LITERATURE REVIEW

Digital technologies enable governments to function efficiently and effectively [Leitner 2003; Millard 2010; Savoldelli et al. 2014] and to provide more customer-oriented public services [European Commission 2012; Meyerhoff Nielsen 2020; Meyerhoff Nielsen and Krimmer 2015] and public value [Osborne 2018; Panagiotopoulos et al. 2019], but also to radically transform the way the public sector operates [Bannister Frank 2011; Cordella and Bonina 2012]. However, the increased pace of technological evolution, government budgetary constraints, changing demographics and the COVID 19 pandemic are posing both new challenges and opportunities for governments and service production and delivery [Kraus et al. 2012]. Changing citizen demand and expectations for more customer-oriented, personalised and value-added government services add to the challenges [Ozols and Meyerhoff Nielsen 2018]. An emergency like COVID-19 represents a substantial challenge for governments [Mazzucato and Kattel 2020], from ensuring continuity in public service delivery [UNDESA 2020] to providing innovative solutions in times of crisis, including the fight against the pandemic and its effects on healthcare, services, and society at large [Mazzucato and Kattel 2020; Meyerhoff and Kelly 2011; Shaw et al. 2020; Whitelaw et al. 2020]. In their research of European Emergency Management systems, Kraus et al. [2012] found that there was a need for standardisation of ICT solutions, including semantic interoperability, sharing, and reuse of data and user-centred design; findings also confirmed as important in public service delivery during a pandemic [Gjørseter et al. 2018; Mergel et al. 2018; Nielsen 1994; Nielsen 2019]. The use of **information and communications technology (ICT)** and national eGovernment strategies are often integral to broader public sector reform drives. Transformative digital government trends and the new role of governments are addressed in numerous recommendations and guidelines released by the likes of the **United Nations (UN)** [UNDESA 2012] and

the **Organisation of Economic Cooperation and Development (OECD)** [OECD 2014]. Both emphasise that successful digital initiatives are characterised by a shift from efficiency and productivity of public services to one of governance, openness, transparency, and engagement of private and non-governmental actors in collaborative co-creation of public value [Meyerhoff Nielsen 2016; Ozols and Meyerhoff Nielsen 2018]. This translates into data sharing, the once-only principle, joined-up administrations, interoperability standards, common ICT platforms [Arendsen et al. 2006; Arendsen et al. 2014], and the development of innovative services tailored to individual needs [Meyerhoff Nielsen and Krimmer 2015; Wirtz and Daiser 2015] or designed to reduce administrative burdens or services [Lopes et al. 2017; Meyerhoff Nielsen et al. 2017; Roseth et al. 2018], which are confirmed by multiple other authors [OECD 2014].

Research on the whole-of-government approach goes beyond technology, suggesting that it can be analysed on different levels, including policymaking and implementation. As such, the wholesale transformation of the public sector, as implied by the whole-of-government concept, does not form a coherent set of ideas and tools. At best, it can be seen as an umbrella term grouping a set of responses addressing the fragmentation of public sector and public service production with the intent to enhance coordination and collaboration [Brynjolfsson and Hitt 2000; Chandler and Emanuels 2002; Christensen and Lægheid 2007; Cullen 2010; Farias et al. 2016; Scholl 2005], including how similar strategies and infrastructural and socio-economic preconditions may lead to different outcomes [Eom 2013; Meyerhoff Nielsen 2016a, 2020]. Recommendations on national digital government strategies by, e.g., the OECD, reflect academic research by emphasising that the challenge is not merely the introduction of technologies and the wholesale transformation of the public sector, but rather the integration and use of certain technologies in public sector modernisation efforts. Major challenges highlighted include organisational fragmentation and limited readiness to create a broad political commitment or ownership for the integration of the digital government agenda into overall public sector reform [OECD 2014]. The OECD study also recognises that governments failing to make the transition to new digital environments can have important consequences, including poor service delivery, underperformance in spending, privacy and security breaches, and loss of citizens' trust.

Globally, government responses during the rapid COVID-19 outbreak have varied [Robinson 2020; Shaw et al. 2020; UNDESA 2020]. Previous research has focused on how governments prepare and respond to various natural hazards [Zhang et al. 2018] and how highly centralized forms of network governance can have different outcomes based on a hierarchical approach and horizontal networking [Moynihan 2009]. Government response to the current pandemic has required a similar coordinated networked response [Robinson 2020], high levels of trusted communications and a clear hierarchy, as seen in previous natural or human-made emergencies [Moynihan 2009]. Elements of governance, multi-stakeholder cooperation, common standards and semantics are similarly emphasised in relation to ICT use in emergency management [Kapucu and Garayev 2013; Mendonça et al. 2007; Tveiten et al. 2012; Vogt et al. 2011].

Capacities and skills to handle the current crisis are therefore essential. The pandemic underlines the importance of government capacities to deal with emergencies, especially in the health sector [Mazzucato and Kattel 2020]. The capacity to effectively manage the COVID-19 crisis directly depends on past investments in the ability and capacities to manage and ensure continuity for both businesses [Kattel and Mazzucato 2018; Mazzucato and Kattel 2020] and public services [UNDESA 2020]. The current pandemic continues to illustrate that the readiness of governments and the ability of public servants to quickly adapt, re-design, and adjust the way in which information and public services are provided builds on pre-existing capacities, frameworks, and ICT ecosystems, as well as a readiness to adapt to changing circumstances [OECD 2020; UNDESA 2020].

Digital innovations to connect, alert, and educate the general population and specific communities through the web, mobile, and other technology applications have been launched worldwide [Jordanoski et al. 2020]. Solutions vary, from SMS notifications, simple but specialised information sites and apps to solutions enabling self-assessments, appointment scheduling, or curfew management [Noronha et al. 2020] to complex contact tracing apps [Berke et al. 2020; de Jong et al. 2019; Ferretti et al. 2020; Jordanoski et al. 2020].

Table 1. Broadband Subscriptions (per 100 People), Mobile Cellular Subscriptions (per 100 People) and Individuals using the Internet (% of Population) (Source ITU, 2010-2022)

	Fixed broadband subscriptions (per 100 people)			Mobile cellular subscriptions (per 100 people)			Individuals using the Internet (% of population)		
	2010	2014	2020	2010	2014	2020	2010	2014	2020
Australia	24.87	27.70	36	101.56	106.20	108	76.00	84.00	90
Denmark	38.03	41.34	45	115.59	126.41	125	88.72	95.99	99 (2021)
Republic of Korea	34.71	37.94	44	102.47	113.20	138	83.7	87.56	97

A basic assumption would be that the stronger and clearer the governance model, the faster the coordinated responsiveness and adaption and rollout of enablers, standards, and online services will be. The possibility of utilising existing governance and intergovernmental cooperation frameworks and building on existing service production and delivery ecosystems will enable continued access to public sector information and services, ensuring a minimum level of quality, security, and trust in new services developed in a rapidly changing environment. Similarly, the higher the level of cooperation, the more efficient and effective the response of the public sector ecosystem of online service production and delivery will be.

How has a pre-pandemic approach to governance and intergovernmental cooperation in relation to digital transformation potentially boosted business continuity and facilitated rapid responses to the crisis?

3 METHODOLOGY

To explore the research question, an exploratory, qualitative, three-case comparative study methodology is applied [Rohlfing 2012; Yin 2013]. Through within-case analysis, the aim is to identify the governance mechanisms in each selected case, thus enabling a cross-case comparison. The main goal is to determine the relationship (i.e., the more of Y, the more X) between a strong governance and intergovernmental cooperation framework (cause) and the level of business continuity (effect 1) and ability to respond to the pandemic (effect 2).

A **context, content, process model (CCP model)**, as adapted and applied by Meyerhoff Nielsen [2020] for analysis of public sector ICT use and online service delivery, is used. The adapted CCP model consists of four macro-dimensions: (1) background indicators; (2) the national approach to eGovernment; (3) the national governance and cooperation model; and (4) effect measurements and preconditions. Each of the dimensions analyses a key area that influences processes, decisions and outcomes in relation to technology in service production, delivery, and take-up. Using the framework, Australia, Denmark, and the Republic of Korea (in alphabetical order) are compared to identify the strengths and weaknesses of their experiences, governance and intergovernmental cooperation models, and any similarities or differences.

Primary sources for the article include analysis of the relevant national policy documents and international statistical sources (e.g., UNDESA's EGDI [UNDESA 2022], **International Telecommunication Union (ITU)** [ITU 2016], ICT Development Index [ITU 2017], World Economic Forum's Networked Readiness Index [Baller et al. 2016]), and a number of relevant academic, national, regional, and international references (e.g., UN, EU, OECD).

The cases of Australia, Denmark, and the Republic of Korea are chosen as they share similarities but are also different. All three countries are developed, high-income countries; members of OECD with similar levels of socio-economic development and infrastructure sophistication (Table 1). All three countries consistently rank highly on international benchmarks for life expectancy, healthcare quality, and attainment levels [UNDESA 2018] and are in the global vanguard when it comes to public sector innovation, transparency and technology use, e.g., in regards to UNDESA EGDI, World Bank Ease of Doing Business [World Bank 2019], or Transparency International's Perceived Cooperation Index [TI 2019].

Internet and communications infrastructure investments have ensured that all three countries have widely accessible online government services. All three countries are among the most connected countries globally with high rates of internet use through high-speed infrastructure - although Australia does have remote and

Table 2. Socio-economic Data (CIA - Central Intelligence Agency, 2021)

	Australia	Denmark	Republic of Korea
Population (July 2021 est.)	25,809,973	5,894,687	51,715,162
Territory (km ²)	7,741,220	43.094	99.720
Population density (individuals per km ² (2020)*	3.33	145.78	530.97
Official language	English	Danish	Korean
Life expectancy / median age	82.9 / 37.5	81.45 / 42	82.78 / 43.2
Urbanisation (%) of total population (2020)	86.2 % (2020)	88.1 % (2019)	81.4%
GDP (PPP) (USD, 2019 est.)	1,264 trillion	\$336.3 billion	2.211 trillion
GDP per capita (PPP) (USD, 2019 est.)	49,854	57,804	42,765
GDP growth rate (%) (2019 est.)	1.84%	2.85%	2.04%
Unemployment (2019 est.)	5.16 %	3.05 %	3.76 %
Imports (billion USD (2019 est.))	334.279	197.818	599.705
Exports (billion USD (2019 est.))	404.562	226.589	683.996

*World Bank (2020). Accessed 1-15 December 2021: https://data.worldbank.org/indicator/EN.POP.DNST?end=2020&locations=AU-KR-DK&most_recent_value_desc=true&start=1961&view=chart

rural areas with mainly mobile connectivity and, by domestic standards, relatively low up-and-download speeds. Urban areas in the Republic of Korea have superior technical infrastructure and connectivity levels compared to towns and cities in Australia and Denmark (Table 1). Past infrastructure investments have proven crucial during the pandemic. As governments in all three countries have imposed restrictions on mobility (i.e., various forms and degrees of lockdown), the quality and stability of internet infrastructure (fixed and mobile) have proven essential for the functioning of society and the public and private sectors as demand has risen, with work, private, and social activities moving online.

By contrast, the three countries vary in terms of territorial and population sizes, political systems and levels of decentralisation, and organisational, cultural, and linguistic traditions (Table 2). Australia is a large federal country with a largely Anglo-Saxon approach to government. Population density is low but has one of the highest urbanisation rates in the south-eastern coastal areas. Australia is ranked among the top 10 countries in terms of GDP per capita. Denmark is a comparatively small country with a centralised, continental European approach to strategic decisions but highly devolved local authorities. Denmark has a relatively high population density and urbanisation level. The Republic of Korea, often referred to as South Korea, is a relatively small country by territory with a high population density. The country's population is primarily concentrated in lowland areas, where density is quite high [Meyerhoff Nielsen and Jordanoski 2020].

While ambitious, the analysis of the three cases' contextual differences will help identify and isolate any shared features in their approach to digital and eGovernment, governance models, and intergovernmental cooperation since 1991. Additional quantitative measurements, like internet availability and use, eCommerce and eBanking, the availability of eIDs and a basket of selected eServices, as well as international benchmarks, are included to provide an empirical basis for the effects of the governance models in managing networked collaborations as critical success factors.

4 THE DIGITAL FOUNDATION

ICT has long been used in Australia, Denmark, and the Republic of Korea. However, the strategic focus varies due to different national contexts and backgrounds. A historical overview of their eGovernment focus is helpful for comparing their governance models.

The Federal Government of Australia is considered an early mover in terms of electronic and digital government initiatives, launching its first strategic documents in 1994. During 2000–2010, Australia successfully implemented three eGovernment strategies starting from the development of base infrastructure, comprehensive

integration and application of new technologies to government information, service delivery and administration, and switching from back-office productivity to one of the users' needs, and integrated and personalized service offers. The Public Service ICT Strategy (2012–2015) merged the narrower eGovernment focus into the broader digital transformation concept by emphasizing simplification and personalization of online services and establishing authentication standards for individuals, businesses, and governments. The focus of the fifth strategy, the Digital Transformation Strategy 2025 (Vision 2025) [DTA 2018], continues to be on online service delivery, back-office productivity and user-centricity but incorporates objectives of user-friendly, digital-by-default principles by 2025.

Like Australia, Denmark is an early mover in relation to eGovernment and digitisation. The country has consistently focused on ICT investments in the public sector [Meyerhoff Nielsen 2011, 2019]. The Danish digital strategies have also followed a traditional trajectory. That is the rollout of basic infrastructure (back office digitalization and digital identities and signatures), followed by a phase focusing on the development of common infrastructure, such as national portals (for citizens *borger.dk* and for business *virksom.dk*) communication platforms (Digital Post, SMS and single bank account solutions), and standards (e.g., Enterprise Architecture and Interoperability) [DIGST 2011; Meyerhoff Nielsen 2016b]. With a number of projects failing to realise the envisioned benefits, there was a shift towards active benefit realisation and risk minimisation. Building on existing digital infrastructures and creating channels, the 2011–2015 strategy period focused on mandatory online self-service for pedagogical and marketing purposes, known as digital-by-default. The cross-governmental strategy kicked off the phased transition to digital self-service and communication with a strategic goal of 80% of Danish citizens and 100% of entrepreneurs' communication with public authorities being digitally based by 2015. The fifth strategy, "A stronger and more secure Digital Denmark", currently being finalised and reviewed, focuses on the automation of public administrative procedures; further usability improvements; welfare and primary health care; data sharing and reuse (incl. once only principle); a more coherent eGovernment framework (i.e., breaking down silos and intergovernmental collaboration); continuous improvement of IT infrastructure; privacy and data protection (incl. cybersecurity); and improved management of IT projects, programmes (incl. minimizing the risk of failed IT projects) and joint development; and use of common infrastructure, components, and data [Meyerhoff Nielsen 2019; Ozols and Meyerhoff Nielsen 2018]. Although physical and call-centre channels remain for support and assistance, the vast majority of central and local government procedures are now more or less mandatory to use online, and 90+ per cent of all communication with citizens and businesses is now electronic [DIGST 2017; Meyerhoff Nielsen 2019; Ozols and Meyerhoff Nielsen 2018]. A unique feature of the Danish strategies and action plans is the joint and cross-governmental nature, i.e., the focus on both central, regional, and local government and the continued strategic emphasis on intergovernmental cooperation and efficient management [Meyerhoff Nielsen 2019].

The Korean approach has become a model for many countries. As a global leader in broadband internet infrastructure, public sector investment in, and use of, ICT consistently place the Republic of Korea amongst eGovernment leaders globally [Meyerhoff Nielsen and Jordanoski 2020]. During the first two stages (1987–2002), the focus was on establishing reliable ICT infrastructure, including a nationwide broadband network, digitising and operationalising national databases, integrating government information systems and rolling out key enablers. The full-scale promotion and roll-out of the eGovernment solutions in Korea began in 2001 with the adoption of the E-Government Act (entered into force on 1 July 2001) and the special E-Government Committee was established under the president's leadership and control [Ahn 2017; Chung et al. 2022]. The third and fourth stages (2003–2012) continued to focus on infrastructure improvement but also emphasised management and systems integration, innovative approaches to integrated user-centric service delivery by converting PC-based eGovernment solutions into mobile ones and creating smart, open and transparent government institutions [Eom and Kim 2014; Meyerhoff Nielsen and Jordanoski 2020]. The fifth strategy stage focuses on the broader digital transformation of the public sector (the so-called eGovernment 3.0) and includes a continued focus on upgrading existing infrastructure, further customization of online service offers, piloting new technology such as the

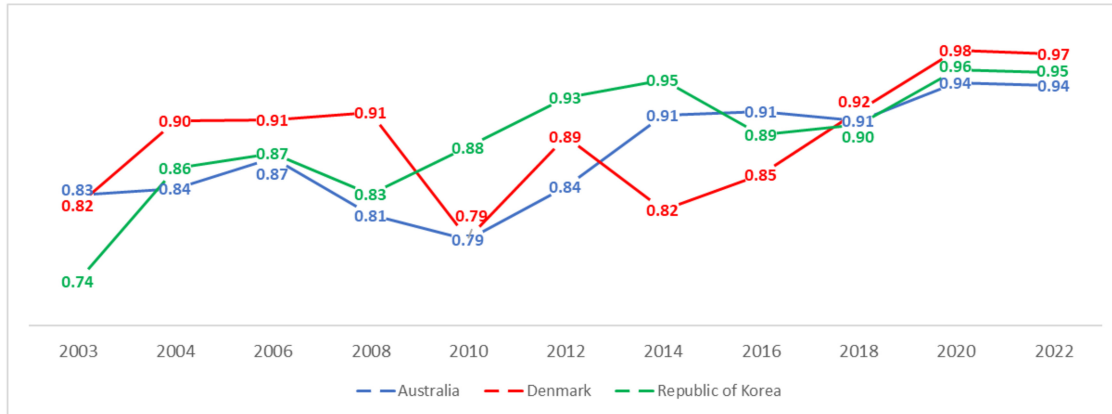


Fig. 1. E-Government Development Index scores (EGDI) from 2003 to 2022 for Australia, Denmark and the Republic of Korea (UNDESA 2022).

Internet of Things (IoT) and smart city concepts, cloud computing, and Big Data for innovative and ICT-enabled growth and jobs [Karippacheril et al. 2016]. The current ICT Master plan 2018–2022 and the eGovernment Master Plan 2016–2020 will facilitate the country’s transition into a hyper-connected intelligent networked service society built on **Artificial Intelligence (AI)**, Big Data, IoT, and cloud computing. It is expected that services will be continuously improved through the utilisation of hyper-connected intelligence while improving the productivity and vitality of the national economy, with technology being the engine for economic growth and job creation [NIA 2018]. As a complement, the eGovernment Master Plan 2020 focuses on five key objectives, including the re-design of government services, establishing a cognition and prediction-based intelligent public sector, and creating a new eGovernment ecosystem based on an expanded trust-based and future-oriented infrastructure co-existing with the private sector [MOIS; NIA 2016].

As a result of their strategic focus, the three countries are among the global leaders in the provision of online government services and information, as reflected in the 2003–2022 **E-Government Development (EGDI)** surveys (Figure 1) surveys [UNDESA 2022]. Denmark, the country that holds the first place on the last three EGDI Surveys (2018, 2020, and 2022) have, except for 2014 when the country ranked 16th, consistently been amongst the Top-10 countries assessed by the UNDESA EGDI. Australia, currently holding the 7th position on the EGDI 2022 ranking is also among Top-10 ranking countries on EGDI, bar 2012 when the country was ranked on the 12th position. By comparison the Republic of Korea currently ranks third but had the highest EGDI score for three consecutive surveys, in 2010, 2012, and 2014. With the exemption for the first 2003 survey, the Republic of Korea have been on the among the Top-10 ranked countries on EGDI.

With respect to the **Online Service Index (OSI)**, the three countries are generally at the forefront of global developments often setting the bar for service availability, use and usability. The OSI is particularly volatile, not least in relation to of national performance. Figure 2 shows the OSI development for the 2003–2022 period. While all three countries have all had consistently high OSI scores, all of them experienced significant drops over the past 20 years. While Denmark saw significant drops in its OSI scores between 2010 and 2014, Australia and Korea also experienced significant drops in 2008 the other two countries have all had consistently high OSI scores.

5 GOVERNANCE MODELS

The governance model, alongside institutional capacities for intergovernmental cooperation, is an often-overlooked key factor for the successful digital transformation of public service production and delivery ecosystems. In light of the research question, understanding the role played by governance and institutional frameworks

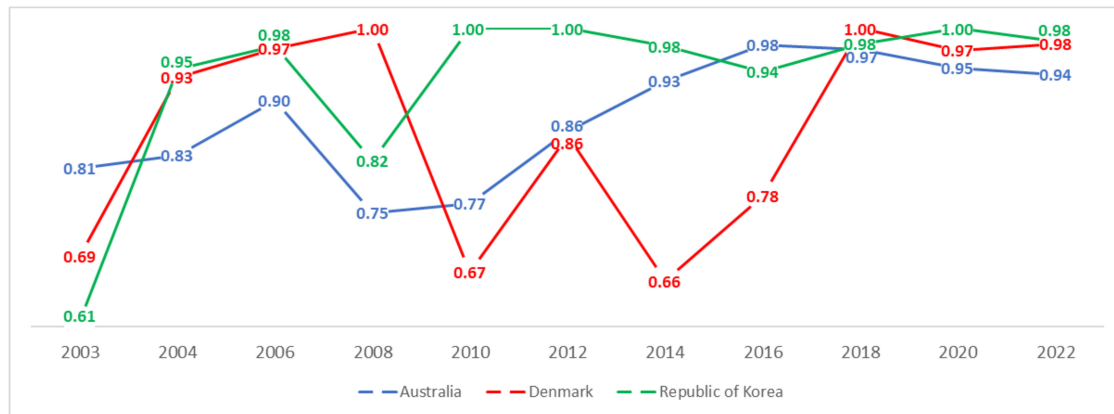


Fig. 2. Online Service Index scores (OSI) from 2003 to 2022 for Australia, Denmark, and the Republic of Korea [UNDESA 2022].

and the approach to cooperation is of particular interest. Not least, whether pre-pandemic approaches have been beneficial in ensuring a degree of business continuity and the pace of the crisis management response.

5.1 Australia

Australia has, compared to Denmark and the Republic of Korea, a relatively complex governance model due to the federal model in place. The power is divided between the Commonwealth, or federal government, six state governments, and ten territorial authorities. Federal and state authorities provide the majority of services. The 537 local authorities (councils) are all **Australian Local Government Association (ALGA)** members. Councils' services are largely limited to local infrastructure, urban planning, waste collection, and social services such as meals-on-wheels for senior citizens [Meyerhoff Nielsen and Jordanoski 2020].

The key to Australia's success lies in the coordination and cooperation between all levels of government. The Federal Government is responsible for developing and implementing a digital transformation strategy on the national level, with each of the six states and two mainland territories responsible for their respective eGovernment strategies and models for governance and intergovernmental cooperation. The ALGA has, in turn, developed a Strategic Plan for 2017-2020 to strengthen innovation and digital transformation in local government [Meyerhoff Nielsen and Jordanoski 2020].

The Federal Department of the **Prime Minister and the Cabinet (PM&C)** is the main driver for defining the strategic initiatives and objectives for eGovernment and digital transformation. The Department hosts the Digital Transformation and Public Sector Modernization Committee, which is mandated to oversee the Digital Transformation Agenda, improve the user experience for interacting with the public sector and drive service delivery reform, as well as transform, simplify, and drive value-creation in the Commonwealth ICT use and the overall modernization of the Australian public sector. The PM&C hosts the **Australian Digital Council (ADC)** secretariat, which in turn is mandated to oversee the development of Australia's digital capability and ensure cross-governmental collaboration on digital transformation, particularly between the federal and state levels actors. The ADC is supported by a Senior Officials Working Group, while the Deputy Senior Officials Working Group on Data Collaboration and the Commonwealth-State CIO forum supports the delivery of projects agreed upon by Ministers in the ADC. In 2016 the Commonwealth Government (i.e., the Federal government) established the Digital Transformation Advisory Board as a forum of public and private sector experts who provide practical advice and insights to the PM&C on the digital transformation of the public sector and society at large [Meyerhoff Nielsen and Jordanoski 2020].

At the operational level, the specialized **Digital Transformation Agency (DTA)** was established in 2016 (as a **Digital Transformation Office - DTO**) as an executive agency within the PM&C portfolio to strengthen the level of coordination and, especially, cooperation between different entities and levels of government. The DTA is responsible for coordinating the implementation of the national Digital Transformation Strategy and the other related strategies. The DTA is mandated to provide strategic leadership on the whole-of-government topic and shared ICT and digital services, including financing and capability development; deliver policies, standards, and platforms for whole-of-government and shared ICT and digital service delivery; oversee significant ICT and digital investments, assurance policies and frameworks, and the whole-of-government digital portfolio, and so on [DTA 2020]. To facilitate this, the DTA works closely with Federal agencies, key stakeholders and partners, mostly from the private sector and academia. While some cooperation exists with States and territories, the Federal nature of Australia means that this is largely based on an opt-in basis. Key exemptions are legal and regulatory issues for areas such as data protection and privacy.

5.2 Denmark

Denmark has a three-tier public sector, consisting of a set of central government authorities, five regions, and 98 municipalities. Regions are responsible for hospitals, emergency services, and some infrastructure projects (e.g., highways). Regions and local authorities enjoy a high level of autonomy, decision making, and service delivery responsibilities [Meyerhoff Nielsen 2016b; Ozols and Meyerhoff Nielsen 2018]. Municipalities are responsible for some 70–80% of citizen-orientated service provision, including primary and secondary care, day-care, primary and secondary education, building permits, urban planning and local infrastructure maintenance, and so on. Service responsibilities were decentralised through a process of structural reform and act as service access points for central authorities, e.g., passports, driver licences, national health insurance cards, issuing of eIDs, and so on [DIGST 2019; Meyerhoff Nielsen 2019]. While a centralised governance model, these three levels of government match those seen in Australia. The key differences are the mandate of the central government to outline and ensure compliance with national strategies, legislation, regulations and standards, as well as the high degree to which service delivery is devolved to local authorities.

Denmark has established functional governance and an intergovernmental cooperation model with clear mandates for all institutions. On the strategic level, the Ministry of Finance is the main initiator of strategies, policies, and standards related to classical eGovernment and the broader digital transformation of the public sector. In practice, the specialised **Danish Agency for Digitisation (DIGST)** is mandated to act on behalf of the Ministry of Finance. DIGST develops initiatives concerning administration, public leadership, and digitalization to improve efficiency in public administration [DIGST 2019; Meyerhoff Nielsen 2019]. Compared to Australia, the specialised agencies have similar mandates, except that DIGST and the Ministry of Finance set the strategic direction of all three levels of government and coordinate and ensure compliance across all of government.

As the main driver of cross-governmental strategies, DIGST is responsible for the consultation on and collection of contributions to any cross-governmental vision, its strategic objectives and associated action plan. Consultation and contributions cover all three government levels, the private sector, and academia. It is also the main institution behind eGovernment strategies from idea generation to conceptualization, approval and actual implementation, and benefits-realization post-implementation [Meyerhoff Nielsen and Yasouka 2014; Ozols and Meyerhoff Nielsen 2018]. Australia's DTA and DIGST play very similar roles concerning coordination, except for the latter for all three levels of government. Another important difference is the supra-natural nature of the European Union which means Denmark is heavily influenced by European Commission directives, regulations (e.g., GDPR) and standards (e.g., IOP, IADAS) and cross-border collaboration with its European counterparts.

5.3 Republic of Korea

The Republic of Korea, like Denmark, has a centralized three-tier governance model comprising 17 regional and 227 municipal governments. Regional authorities essentially serve as intermediaries between the central and

local levels, with municipalities delivering the majority of their services through administrative districts within the municipality boundaries [GlobalSecurity.org 2020]. Despite ongoing decentralization reforms (or devolution of service delivery), the majority of executive and legislative powers vis-a-vis policy creation, decision-making and service delivery continue to rest with the central government [Meyerhoff Nielsen and Jordanoski 2020], while the regional and municipal governments are rarely involved in policy formulation. Compared to Australia and Denmark, the role of central authorities is similar; but compared to the level of service delivery at the local level, Denmark and the Republic of Korea - where a majority of services are delivered by municipalities - have more in common than they do with Australia where most is delivered by central and regional government entities.

The key to Korea's success in the digital government is the ICT governance model embodied at the president's agenda and leadership [Chung 2020; Chung et al. 2022]. As a presidential system with a single five-year term, the president's leadership has a great impact on the ICT governance in the country. The strategic focus the past two decades illustrates the early recognition of Korea's leadership of importance of the ICT for government innovation and digital transformation [Chung 2020].

The Korean governance model consists of a multitude of intergovernmental bodies and institutions at the strategic, operational, and implementation levels. Institutionally, the key actors include the **Ministry of the Interior and Safety (MOIS)**, the Ministry for Science and ICT on strategy, the **National Information Society Agency (NIA)**, the **Korean Internet and Security Agency (KISA)**, and the **National Information Resource Center (NIRS)** [Meyerhoff Nielsen and Jordanoski 2020]. The Ministry for Science and ICT is largely responsible for coordinating and monitoring the implementation of the National ICT Master Plan and the sectoral action plans. At an operational level, the Ministry's Intelligent Information Society Bureau is responsible for drafting and reviewing the annual master plans for the intelligent information society as well as any mid-to-long-term strategies in this area. This is complemented by the **Ministry of the Interior and Safety (MOIS)**, the main institution responsible for strategic planning and implementation of the eGovernment Master Plan. MOIS is also mandated to formulate policy and strategic development of government organizational set-up, innovation, administrative efficiency, and eGovernment, including privacy and data protection. The eGovernment Bureau and the Government Innovation and Organization Management Office, as specialised units within MOIS, are important actors at the strategic and operational level [Meyerhoff Nielsen and Jordanoski 2020].

Operationally, the NIA is the specialised core agency of informatization,¹ providing policies and technical advice on eGovernment initiatives and ICT-enabled service delivery to all national, regional and local government entities. The NIRS, in turn, constitutes the backbone of the integrated Korean Digital Government program and is responsible for managing both integrated data centres in Daejeon and Gwangju. The KISA also plays a significant role in establishing a sustainable and safe internet environment for developing eGovernment and the successful digital transformation of the Korean public sector at large [Meyerhoff Nielsen and Jordanoski 2020].

In addition to the specialised entities, the Republic of Korea has established several cross-government bodies. The Strategic Committee for ICT (which will be transformed into the "Intelligent Information Society Strategy Committee"), established under the Prime Minister's jurisdiction, is responsible for driving the overall strategic ICT and eGovernment processes. Operationally, the work of the Committee is supported by the Working Committee for the Promotion of Vitalization of ICT (which will be transformed into the "Strategic Committee"). The new Strategic Committee will have four sub-committees, that is: for planning and supervision, industries and services, society, and technology. The sub-committees will be composed of members from all levels of government, the private sector, industry and academia. [Meyerhoff Nielsen and Jordanoski 2020]. Compared to the single specialised agency approach seen in Australia and Denmark, the Republic of Korea has established a set of specialised and complementary agencies. While the Korean organigram on the surface looks more complex

¹Note that "informatization" or "informatization" in the Korean contexts refer to the extent by which a geographical area, an economy or a society is becoming information-based, i.e., increase in size of its information labor force, see also <https://www.definitions.net/definition/informatization>.

than those seen in Australia and Denmark, the areas covered and the mandates in place collectively are very similar to those enjoyed by DTA and DIGST. An interesting observation is that the specialised Korean agencies and strategies, e.g., eGovernment, broadband and telecommunication infrastructure, cyber security, and data protection, are similarly reflected by specialised strategies, units, committees and working groups within DTA and DIGST, or the Danish division of responsibilities between citizen and business services and strategies (i.e., between DIGST and the Danish Business Authority).

6 COMPARATIVE ANALYSIS AND DISCUSSION

How has the pre-pandemic approach to governance and intergovernmental cooperation in relation to digital transformation potentially boosted business continuity and facilitated rapid responses to the crisis? The short answer seems to be positive. In relation to the initial pandemic response and lockdowns, the digital foundations, governance models, and institutional capacities for intergovernmental cooperation have proved to be positive in the three countries.

The analysis indicates that past strategic initiatives have allowed the governments of all three countries to adjust to the current pandemic in terms of business and service continuity by utilising their existing ecosystems for online or virtual service production and service delivery. Not only have the back offices continued to function during periods of lockdown as employees could log in remotely, but the specialised agencies have been able to launch new internal protocols and guidelines to benefit all government entities and levels. As such, the specialised agencies have adjusted to the changing circumstances and illustrated a level of resilience seen in classical emergency response literature [Kapucu and Garayev 2013; Kraus et al. 2012; Tveiten et al. 2012]. The well-established online service production and delivery ecosystems in Australia and Denmark have allowed for quick responses to crises and relatively fast adaptation of service production and delivery. With flexitime and work-from-home options being established practices in many public sector entities, remote access and equipment like laptops and mobile phones were already available to many civil servants. Health and education systems and communication platforms were established and could be adapted to new delivery modes, such as teleworking, distance learning, and telemedicine. The Republic of Korea has also proved its capacities and readiness for quick response and fast-track services. The well-established whole-of-government system allowed the three countries to manage the crisis and ensure business and service continuity while reducing physical interaction.

In terms of governance models, all three countries have been able to utilise their pre-pandemic governance and intergovernmental frameworks to optimise the use of existing ICT infrastructure and solutions in their pandemic crisis responses. The pre-existing steering committees, collaborative forums, and networks have helped reduce the negative impact of the pandemic to some extent, particularly in relation to public sector business continuity and continuous decision making, thus addressing the key challenges of resilience, flexibility, and stakeholder coordination required for effective emergency response [Kapucu and Garayev 2013; Mendonça et al. 2007]. Cross-sectoral collaboration has helped ensure that all affected sectors (e.g., health, education, social services, transport, finance, etc.) have optimised the use of existing ICT to help shorten response time and fast-track new online solutions and services [Chui et al. 2016; OECD 2020; Olganier and Mogensen 2020; Rigillo and Buttler 2021; You 2020]. This has allowed the three countries' governments to coordinate their initiatives, lower the risk of conflicting and confusing communication, and minimise the number of overlapping websites and service solutions for pandemic communication, information, and services. Australia has had a high level of coordination between Federal and State authorities in particular and has actively used the Federal Centrelink portal and call-centre communication and service delivery channel to reach recipients of social services and distribute pandemic-related grants and benefits [Child et al. 2020; OECD 2020]. The Danish citizen and business portals quickly pushed out COVID-19-related information, and the Ministry of Foreign Affairs adopted its existing app for Danes Abroad to proactively inform Danish citizens of the pandemic in Denmark and the countries in which the app was accessed. Danish authorities also partnered with telecoms, banks, and insurance companies to proactively push COVID-19-related recommendations, restrictions, and repatriation information to all Danes

abroad (based on mobile GPS information and credit card usage) [OECD 2020; Rigillo and Buttler 2021]. Similarly, Korean authorities' adaptability and resilience, in a relatively short period, slowed the spread of Covid-19 [Hsiang et al. 2020; You 2020], and utilised existing governance and collaboration forums to ensure its pandemic response, information sharing, and business and service continuity while reducing physical interactions to a minimum [Hsiang et al. 2020; OECD 2020; You 2020].

In relation to the article's research questions, the analysis finds that all three countries have actively utilised their existing governance and intergovernmental cooperation frameworks at three levels: the strategic, operational, and implementation levels. At the **strategic level**, in Australia, the responsibility of strategy and policy development lies with the Prime Minister's office, while Denmark and the Republic of Korea delegated this function to the ministerial level and designated national committees for ICT. Australia and Denmark have specialised agencies mandated to implement national digital strategies driving strategy development, implementation and vertical and horizontal coordination. The Republic of Korea deviates from this approach by having several key institutions responsible for digital transformation and eGovernment, including the Ministry for Science and ICT and the Intelligent Information Society Bureau (part of the Ministry); MOIS and the eGovernment Bureau (part of the MOIS); and the NIA (specialized agency for ICT related projects).

At the **operational level**, the initial analysis implies that the three countries have different institutional set-ups. The Australian DTA has a strong, clear mandate operating at the strategic and operational level. On the operational level, DTA works closely with the DTPSMC, DTC, and other partner government agencies to ensure proper implementation of the Digital Transformation Strategy and other strategic documents and roadmaps. Denmark's DIGST has a significant mandate and recognizable role, operating on the strategic and operational level but also across three levels of government. On the operational level, DIGST works with the PSC, which includes representatives from all levels of government, and with the formalized steering committees. In the Republic of Korea, the Ministry for Science and ICT and the MOIS, with the support of the NIA, are recognized as the main drivers for the digital transformation of the public sector. Common to all three institutional approaches is the coordination of strategic initiatives by a specialised entity in the central government. In all three countries, their specialised agency has multidisciplinary staff, strong management to initiate, guide, and ensure compliance with strategic initiatives and action plans, and technical and legal standards on the operational level. The key difference is that the federal nature of Australia means that the DTA operates at the central level, with states and territories opting in.

Similarly, the **cooperation model** at first glance differs in all three countries. The Australian Digital Council, composed of the Federal Minister for Government Services and ministers responsible for digital transformation from all six states and two mainland territories, ensures cross-governmental cooperation and coordination. The broader coordination model is ensured by the Digital Transformation Advisory Board, composed of experts from the private and public sectors. In Denmark, the PSC is mandated to act on a strategic and operational level and includes representatives from all government levels. Notably, the Korean intergovernmental cooperation and coordination model is more inclusive with representatives from other ministries, local government, private sector, ICT industry, and academia. The composition of the SCISC, the Working Group, specialized committees, and the Consultative Council ensures high inclusiveness in the strategic development and implementation of related ICT policies and initiatives of all government levels and relevant stakeholders. Common to the three approaches is again the centralised responsibility for cross-governmental consultation and coordination. A degree of consensus-seeking seems to be applied in relation to strategic decisions and strategy development, although the degree to which this is the case would require additional research.

In a similar vein, while the governance models applied at the **implementation level** initially seem to differ in the three countries, a set of common features can be identified. In Australia, each of the government agencies is responsible for the implementation of their sectoral initiatives. The implementation of the projects approved by the ADC is supported by the Senior Officials Working Group and Deputy Senior Officials Working Group on Data Collaboration and the Commonwealth-State CIO forum. However, the new Digital Service Platform

Table 3. Availability of the Key Enablers in Australia, Denmark, and the Republic of Korea (Source: Authors 2022)

	Australia	Denmark	Republic of Korea
eID	Digital Identity Federation and the Trusted Digital Identity Framework. (Single eID provider, the Federal Government myGovID).	NemID (EasyID) and digital signatures have been mandatory for companies since 2012 and for citizens since 2013.	I-PIN authentication. Several other types of eID exist (Accredited Certificate+PW, SMS OTP, Mobile APP Easy Authentication, APP Card Easy Authentication, ARS Authentication)
PKI and ID Schemes	Gatekeeper PKI Framework and accreditation program	Used across public and private sectors. Digital-by-default since 2013, with active opt-out possible.	National PKI for the general public and Government PKI for government personnel.
National data exchange platform	Digital Service Platforms Strategy (all government platforms must be interoperable by design)	Danish Basic Data Programme (data distributor to facilitate the once-only principle)	Government Backbone Network K-Net and Government Network Service (GNS)
Digital post	notify.gov.au	Yes. Digital post	yes
Single Sign-On	myGovID	NemLog-in	yes

Strategy establishes a platform steering committee for each national platform, coordinated by the Digital Leadership Group and DTA. While similar principles of decentralised implementation are applied in both Danish and Korean contexts, Denmark has formalised cross-sectoral coordination by establishing several permanent steering committees, resulting in each strategic initiative in the action plan having a designated steering committee. The Republic of Korea applies a similar approach to the Danes, with a specialised agency supervising and supporting the various working groups and specialized committees.

To understand the correlation between the pre-pandemic approach to governance and intergovernmental cooperation in relation to continuing digital transformation, business continuity and the rapid response to the crisis, further comparative analysis of the key eGovernment enablers and eServices, and their use and impact in the three countries is required, not least in relation to key enablers, online service availability, and use and impact.

The availability and rollout of the key enablers for eGovernment, such as electronic identification, digital signatures, digital posts, and other infrastructure components vary across the three countries. While the backend service production ecosystems are largely in place in all three countries, certain key registers such as population registries and address databases are not. Similarly, the approach to frontend service delivery ecosystems and the take-up of key enablers required to securely unlock online public service offers, such as eID and eSignatures vary. This implies that the three countries have different abilities and capabilities to move service delivery and communication online in response to the COVID-19 pandemic.

Pre-pandemic, all three countries had achieved significant success in the rollout of key enablers. Each has implemented national eID solutions. In Australia, multiple voluntary eID solutions exist, while Denmark has a unified solution for both public and private sector usage, and the Republic of Korea has implemented a mix of both of these. All three countries have introduced the necessary Public Key Infrastructure required for the large-scale digital transformation and development of eServices, eCommerce and eBanking. Similarly, all three countries have developed platforms and channels allowing for both one and two-way digital communication between the public sector, individuals and businesses. This includes text and e-mail messaging infrastructure, encrypted digital post, and various other forms of electronic communication to increase the cost efficiency and effectiveness of public sector services production and delivery (Table 3) [Meyerhoff Nielsen and Jordanoski 2020]. As a crisis management response, these key enablers have proven beneficial in all three countries analysed.

First, existing work-from-home offers have been expanded to government employees in all three countries as mobility has been restricted due to the pandemic. Back-office functions have been adapted, with protocols and processes being introduced or adjusted for secure and remote access, thus allowing for the expansion of teleworking opportunities to other employee categories [Child et al. 2020; OECD 2020; Olagnier and Mogensen 2020; Rigillo and Buttler 2021; UNDESA 2020].

Second, frontend functions have been adjusted with existing online and call centre channels being strengthened through the development of new tools (e.g., AI-supported chatbots, video conferences, etc.) and proactive communication promoted as physical access points have been closed or had limited accessibility. National portals and call centres such as Australia's Centrelink and austalia.gov.au, the Danish portals for health (sundhed.dk), citizens (borger.dk), and businesses (virk.dk), and the Korean gov.kr portal are all examples of this approach [Child et al. 2020; OECD 2020; Rigillo and Buttler 2021; You 2020].

The ability and ease of the pandemic-enforced transition to digital service channels are nonetheless dependent on past channel strategies and the perceived usability of online service offers. Prior to the pandemic, all three countries have achieved various degrees of success in the digital transformation of public sector service offers. Their respective results are related to three interconnected elements: First, the channel strategy pursued; second, the extent of the online service delivery ecosystem, and; third, the user experience, that is, the combination of service design, user satisfaction, and degree of digitisation (i.e., the relative volume of service requests online to total volume) [Meyerhoff Nielsen and Jordanoski 2020; Wirtz and Daiser 2015].

All three countries have established operational and functional national one-stop-shop portal services. Australia.gov.au is a central platform for linking to information and services provided by Australian federal government agencies, states, territories, and local governments. In Denmark, borger.dk (for citizens and residents) and virk.dk (targeting businesses) integrate information and transactional services from all levels of government. The Korean gov.kr portal provides information and transactional services of the central government, public institutions, and local governments in the Republic of Korea [MOIS 2021].

In addition to the specialised citizen and business portals, the online service delivery ecosystem consists of a number of specialised and complementary platforms and portals (e.g., tax, open data, legislation register, public procurements, health, patents, customs, etc.) in each of the three countries. These portals have proven beneficial and served as central hubs for providing reliable, trusted, and on-time information in relation to the pandemic. As the overall volume of information and transactional service requests have increased as a result of the pandemic and the associated economic uncertainties and been combined with restricted access to physical service points, these platforms have been essential to ensuring business continuity and access to the public sector [Chui et al. 2016; Rigillo and Buttler 2021; You 2020]. Whereas the mere provision of online service offers did not guarantee their use in a pre-pandemic world [Meyerhoff Nielsen 2017], established online service offers and call centres are now the primary access points. An important pre-pandemic effect of the digital transformation is the level of take-up and the proportion of individuals using online banking (eBanking), online purchases (eCommerce), and the general level of interaction with public authorities online (Table 4). Despite the data for online interaction with public authorities and use of eServices only being available for Denmark, the high ranking of Australia and the Republic of Korea at the EGDI 2020 shows that they are not far behind the world leader, Denmark.

That said, in the Danish context, where the vast majority of service delivery and communication was already digital pre-pandemic, the focus has been mainly on ensuring business continuity and rollout of new services for test appointments, vaccinations, quarantine-related permits, application for government benefits, and so on. This differs to some extent from Australia,² where the digital-by-default strategy has not reached the same level of online service use [Meyerhoff Nielsen and Jordanoski 2020]. As a result, Australian authorities have had to

²It should be noted that the pandemic related lockdown in Australia has not been as severe and prolonged as in Denmark and the Republic of Korea, as the pandemic arrived relatively later to Australia and the government was early to enforce strict quarantine regimes to the island continent.

Table 4. Citizens' use of eBanking, eCommerce, and Interaction with Public Authorities Online 2016–2020
(Source: OECD 2020)

	Australia	Denmark	Republic of Korea	Australia	Denmark	Republic of Korea
	2016			2020		
Online banking	*73.49 %	87.86 %	*56.56 %	–	94.32 %	*79.31 %
Online commerce	*66.71 %	81.52 %	54.98 %	–	89.31 %	69.80 %
Interacted with government online	–	88.32 %	–	–	90.69 %	–
Obtained information from a government website	–	85.13 %	–	–	88.63 %	–
Submitted a complete form (eService)	–	70.89 %	–	–	67.80 %	–

Note: *Online banking and commerce figures are based on a different collection methodology from 2016 and 2020 (OECD 2021).

use relatively more resources to increase the awareness of online service options. Similarly, the voluntary opt-in strategy pursued in relation to eID and eSignatures have required resources and time to issue such credentials, thus enabling the secure login and use of existing eServices – something Danish and Korean authorities have not had to do.

In an emergency, simple everyday language use and intuitive service design are of additional value as it eases communication and leads to fewer requests for help. All three countries have minimum usability standards and pre-pandemic requirements of uniformity across government online. A common approach in all three countries has been to push for less siloed service offers in favour of a more personalized and proactive service design. The usability guidelines and standards aim to facilitate this through good practice examples, but it is also promoted through process recommendations.

In Australia, the DTA Digital Service Standard is mandatory for all Australian government services. The aim is to improve both back-office efficiency and deliver high-quality and value-adding service experiences. The Digital Service Standard contains 13 criteria for government services. It requires services to be accessible to all users regardless of their ability and environment (criteria 9), that agencies design and build online services using an agile and user-centred approach (criteria 3), and that agencies identify the data and information the service will use or create, and put appropriate legal, privacy, and security measures in place (criteria 5) [DTA 2019].

The Danish usability guide was initially developed as part of the eGovernment strategy 2012–2015, originally containing 25 measurable minimum requirements. It was mandatory for the roughly 70 high-frequency, high-volume government websites and eServices made mandatory for online self-service, while remaining voluntary for other service areas. While subsequently updated, the usability guide remains mandatory for all central, regional, and local authorities.³ Similarly, the Korean eGovernment Standard Framework (or eGovFrame) is a standardized set of software tools for developing and running eGovernment applications. Before the pandemic, eGovFrame had been applied to 702 eGovernment projects and is recognized as a backbone of the Korean eGovernment interoperability standard [MOIS; NIA 2020].

As a result of their different socio-economic contexts and historical experiences, the three countries have had varied strategic approaches and focuses over time and have adopted different governance and intergovernmental cooperation models between central government authorities, local government, stakeholders from the private sector, and civil society. That said, all three continue to emphasise the importance of clear mandates and roles on three levels of governance and cooperation, including policy formulation at the strategic, operational, and

³Denmark launched a new usability guide for the new mandatory design for the business portal virk.dk and citizen portal borger.dk requirements in April 2019.

implementation levels. Importantly, all three countries have established clear mechanisms for cooperation, with the participation of all levels of government, and stakeholders from the private sector, civil society, and NGOs on all institutional levels. The cooperation model and formal and informal public-private partnerships are seen as important factors for maximizing the benefits of digital transformation and public service production and delivery pre-pandemic and have enabled the countries to respond relatively quickly to the pandemic. This is not only by utilising existing ICT-enabled service production and delivery systems to divert requests online (and to call centres) and enable back-office staff to work remotely but also by utilising existing governance and corporation frameworks for decision-making and coordination.

7 CONCLUSION

The analysis finds that a strong governance model with clear roles and responsibilities of all institutions, complementing formal cross-sectoral bodies for decision-making and ensuring inter-governmental coordination and cooperation, are essential for successful digital transformation and enable quicker responses and more effective emergency management. High levels of inclusiveness across all levels of government and end-users and society already engaging digitally with the government are identified as two positive factors in all three countries studied. The analysis finds evidence that their existing governance and intergovernmental frameworks, in combination with their established service production and delivery ecosystems, have allowed the three countries to ensure high levels of public sector business continuity despite the COVID-19 pandemic and associated restrictions on mobility. This three-country analysis thus supports past research and recommendations by the likes of the UN and OECD that governance and intergovernmental cooperation are key enablers of the successful digital transformation of public service production and delivery, but also that these may form part of an effective emergency response such as a global pandemic. The analysis finds linkages between the governance model, institutional capacities for intergovernmental cooperation, and coordination are key elements for successful digital transformation, functional whole-of-government concepts, and appropriate and effective rapid response in crisis in all three cases.

The analysis also finds evidence of a relatively high level of public sector business continuity vis-à-vis no health-related service delivery in light of the COVID-19 pandemic and the associated restrictions on mobility. Compared to international peers, past strategies have enabled the three countries to utilise existing ICT infrastructure, interoperable systems, registries and data exchange to continue or increase the volume of online service delivery. Combined with existing coordination and cooperation frameworks, technical and legal standards have enabled them to adapt and develop solutions to monitor, manage, and address the pandemic, as well as target support to businesses and individuals in the associated economic downturn.

To explore the findings of this article further, it would be beneficial to the resilience of digital governance and intergovernmental cooperation frameworks in relation to more physical emergencies like natural disasters or cyber-security threats to see if the frameworks are equally capable of operating if digital infrastructure or key ICT elements of the service production and delivery ecosystems collapse, or are inaccessible to the general public and/or government employees. It would also be of interest to explore the pandemic responses of a set of “leap-frogging” countries in a similar manner. That is, those countries are distinguished and analysed in terms of their governance and intergovernmental cooperation models to see if key drivers found in this paper are also found in others. Countries that could be considered eGovernment “leap-froggers” are those in the EGDI Top-40 (by rank, in the 2018 edition), which have shown the most relative progress between 2003 and 2020. The countries qualified (by rank in 2018) are Spain, UAE, Liechtenstein, Bahrain, Monaco, Russia, Uruguay, Cyprus, Belarus, and Kazakhstan [Martins et al. 2019].

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