

HANDBOOK OF PUBLIC SERVICE DELIVERY

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Handbook of Public Service Delivery

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Cheltenham, UK • Northampton, MA, USA

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12. Information technology and public service delivery¹

Mete Yildiz, Lucille Tetley-Brown and Mercy Erhi Makpor

INTRODUCTION

Introducing almost every new technological development, such as the printing machine, telegram, and telephone, created profound changes in how governments were internally organized and provided public services (West, 2004; Bertot et al., 2012; Neuby, 2016). As the latest example of the influence of technological change on government, the impact of the application of information technologies (ITs) has caused multi-faceted transformations in public service delivery in terms of quantity and quality. This chapter examines this complex transformation from multiple fronts.

To this end, the chapter first tracks the evolutionary process of providing public services with the help of several technological platforms, such as websites, mobile platforms, and social media networks, on which governments provide, and various actors receive and use public services. The following section discusses who the main actors of this transition are. Apart from the apparent digital governance actors, such as government agencies at central and local levels, and citizens, a broad spectrum of other actors ranging from private IT firms, international organizations, think tanks, and more recently, non-citizens, such as legal and illegal residents, immigrants and refugees also become actors of public service delivery through technological channels.

The third section investigates how the process of public service provision has been transformed through time, primarily due to the significant changes in data collection and analysis. This section shows how the perception and use of data in government have changed the interaction between the providers and receivers of public services. This section also mentions the implementation problems and risks of this complex phenomenon.

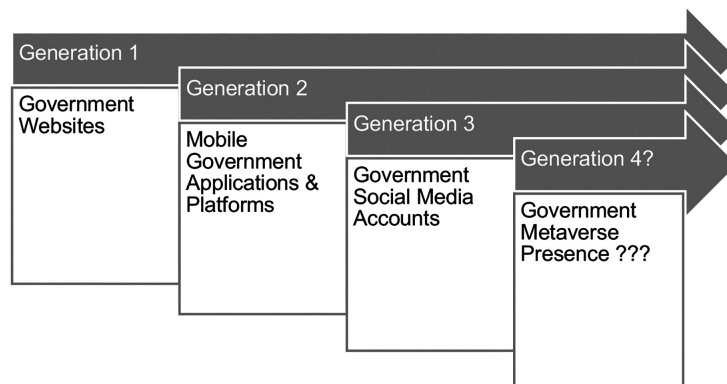
The final section discusses the examples and processes of applying new and emerging technologies, including but not limited to artificial intelligence, blockchain, open government data, and virtual reality/metaverse, to government service provision. This section also provides examples of government regulatory decisions and processes to maximize the benefits and minimize the risks of using these new and emerging technologies.

The chapter ends with some closing remarks on the overall impact of providing public services with the help of IT. This final section also discusses the challenges of using IT in public service provision. These challenges are the measurement challenge (measuring the results), the security challenge (ensuring the security of government information and protecting the privacy of personal information), the equality and fairness challenge (the digital divide problem), the prejudice challenge (the algorithmic bias problem), and the surveillance challenge. The chapter concludes by providing directions for future research, such as examining how international e-government benchmarking studies serve policy learning and knowledge transfer in online public service provision globally.

HOW HAVE DIFFERENT GENERATIONS OF IT APPLICATIONS INFLUENCED THE PROVISION OF PUBLIC SERVICES

Various technological platforms have been used for public service provision within the evolutionary process of using ITs to provide public services online. The primary examples of these technological platforms are government websites, mobile platforms, social media applications, and, more recently, the presence of government agencies on the metaverse. Each consecutive wave of these platforms' use has, after a while, also become a new public service provision standard. Government agencies that fail to rapidly adopt and effectively use these new technologies risk being perceived as either unable or unwilling to keep up with current technological developments and thus seen as obsolete. The users of public services also expect the government to adopt them in their service delivery systems in due time. These different and cumulative generations of digital government service provision platforms and stages are shown in Figure 12.1 below.

Creating these cumulative generations of digital government service provision platforms has been a mixed blessing. These new platforms created alternative service provision channels for the different public service user profiles and the ongoing traditional in-person, face-to-face public service provision system. For example, while an older person may prefer to visit the government agency building to receive public services in person, others may prefer to use agency websites or mobile government applications for convenience. For the government agencies that provide public services, however, this multiple-channel service provision system increases the cost and complexity of their operations. Studies of multiple-channel (both electronic and traditional) service provision (Reddick & Turner, 2012; Reddick & Anthopoulos, 2014) found that the digital divide, the nature of citizen interaction with government, public service values, and satisfaction with services received by citizens are essential factors that determine its success.



Source: Developed by the authors.

Figure 12.1 Evolution of different digital government service channels

ACTORS: HOW ITS INFLUENCED BOTH THE PROVIDERS AND RECEIVERS OF PUBLIC SERVICES

A broad spectrum of digital governance actors play essential roles in IT-based public service delivery processes. This section is about these different actors of public service delivery and how the digital transformation process has influenced the parties involved.

Information technologies strongly influence various aspects of digital governance – they serve government needs and help to solve its challenges, and they moderate citizens' interactions with government. Studies on IT adoption show that digital public services can be better designed and delivered through modern techniques, key regulations, and institutional activities to meet the needs of citizens (Osborne et al., 2013). Therefore, providers can reach citizens and empower them with public online services while understanding the interactions that drive the use of data in these processes (Alford & O'Flynn, 2012). Using data through online public services can influence and transform relations with citizens, resulting in various avenues to reach citizens digitally.

The above description may only apply in some cases, as providers and receivers naturally have different perceptions of the output of online public services (Benbunan-Fich et al., 2020). For instance, in rendering public services, technological factors, legislation, policy, and institutional practices have been questioned over time due to the use of data (Yang & Wu, 2014). Critical to technological and institutional factors is the ability of producers and receivers to engage one another smoothly through the IT interface. Thus, moving beyond the one-way government-to-citizen communication and engagement to a more systematic and two-way interaction approach is necessary (Benbunan-Fich et al., 2020; Kankanhalli et al., 2019).

Within this context, IT-mediated services are seen as a critical driving force that shapes and reshapes the public services landscape. Thus, IT has made public services more accessible to citizens while enabling increasing government interaction (Dudley et al., 2015). IT portals or "one-stop shops" and mobile applications enable users to access services from the comfort and confines of their homes, reducing the need for physical visits to government offices. The roles ITs play can not be over-emphasized, positively such as by fostering greater citizen participation and engagement; negatively, in influencing election outcomes via democratic process interference (from, e.g., mis-/disinformation and targeted mirco-campaigns); and, in a neutral sense, driving and mediating the daily activities of governments. Unlike traditional forms of communication, ITs promote interactions between stakeholders and present a significant forum for information dissemination, decision-making, deliberations, and political debates in highly technological societies (Welch, 2012). This can pave the way for a citizen-centric focus for governments, including the promise of better-integrating government digital services. Therefore, ITs have revolutionized the delivery and reception of services (Benbunan-Fich et al., 2020), with sensitivity to the risks of these new ways of enabling government work, such as in greater citizen surveillance.

Nowadays, the influence of ITs on providers and receivers shows a transformative force that presents opportunities and challenges. Public services have become more accessible to citizens through enhanced IT. Users can interact with providers through tax payments, renewing driver's licenses and citizen's cards, applying for benefits, and such. Receivers (citizens) expect more transparent, accessible, and responsive digital services from the public sector

(Bertot et al., 2016). All these advantages allow governments to design and deliver services that improve information-sharing and decision-making processes (Yildiz et al., 2021) and capabilities.

In addition to the governments and the citizens, many other actors contribute to and participate in the IT-based public service delivery process through technological channels. The most active of these other actors can be listed as private IT firms (such as Huawei, Siemens, or Honeywell), consultancy firms (such as Accenture and Ernst & Young), which help governments design and implement digital government policies, and IT-related NGOs at the national and international levels. These actors bring their agendas and (for instance, in the case of Big Tech, commercially aligned) preferences for public services design; however, governments must balance this with their crucial role in safeguarding the public good and meeting fundamental societal needs. Other actors are non-citizens, such as legal and illegal residents, immigrants, and refugees, who are also key stakeholders in this process.

Among these other actors, the increasing number of digital governance research centers presents an exciting trend. Some research centers are established within universities, even as fully-fledged departments. Some others are organized as a unit in think tanks within international organizations, such as the United Nations University Operating Unit on Policy-Driven Electronic Governance (UNU-EGOV). These centers conduct research, produce academic and practitioner-oriented publications, such as reports, articles, books, book chapters, and policy papers, provide capacity-building training sessions, and advise cities, regions, and countries on planning and implementing digital governance strategies and action plans. Some of these centers can even be considered as innovation labs. Table 12.1 below provides a partial global list of these digital governance research centers.

In recent years, the most notable addition to the list of actors in digital public service provision is the citizen-to-citizen (C2C) networks. In the last decade or so, the role of citizens has been changed from passive public service recipients to active seekers and even co-producers of public services. Such a transformation is enabled by the widespread use of social media platforms and the emergence of new ways of technology-enabled organizing systems such as crowdsourcing and crowdfunding. Saylam and Yildiz (2022) defined these C2C networks as electronic interactions among individuals/citizens that, directly or indirectly, positively or negatively influence digital transformation and digital government. The authors even argued that these C2C interactions form a new digital government interaction category in addition to the government-to-citizen (G2C), government-to-business (G2B), and government-to-government (G2G) interaction categories. Table 12.2 below provides the categories and examples of these digital government interactions.

These C2C interactions feed into e-government value chains and contribute to the betterment of electronic provision of government information or services or even the creation of new services. Two visualizations of how C2C interactions can be integrated into digital government value chains are depicted below in Figure 12.2.

Saylam and Yildiz (2022) provided examples of some benefits (such as aiding governments in making decisions, solving problems, and improving public services) and risks (such as distributing misinterpreted or manipulative information, causing uncertainty, and even digital vigilantism) of these C2C interactions. Acknowledging the need to regulate these C2C interactions, the authors presented different scenarios of government regulation based either on trust and cooperation or mistrust and competition between the government and C2C networks (Saylam and Yildiz, 2022).

Table 12.1 Some selected digital governance research centers

Name of The Unit	Country/ Establishment	URL	Organization/ University
Centre for Digital Governance	Germany	https://www.hertie-school.org/en/centre-for-digital-governance	Hertie School of Government
eGovlab Centre for Excellence in e-Governance Studies	Sweden	https://egovlab.eu/	Stockholm University
The Hague Centre for Digital Governance	Holland	https://www.universiteitleiden.nl/en/governance-and-global-affairs/institute-of-public-administration/the-hague-centre-for-digital-governance	Universiteit Leiden
Center for Technology in Government (CTG)	USA, 1993	https://www.ctg.albany.edu/	State University of New York (SUNY) at Albany
National Center for Digital Government	USA, 2002	https://www.umass.edu/sbs/research/research-centers/national-center-digital-government	U. of Mass at Amherst
Research group eGovernment at the Institute for Information Systems Research	Germany, 2005	https://www.uni-koblenz-landau.de/en/campus-koblenz/fb4/wwi/aggvinf	Koblenz University
APEC Digital Government Research Center	Japan, 2005	https://itdg-waseda.jp/apec/index.htm	Waseda University

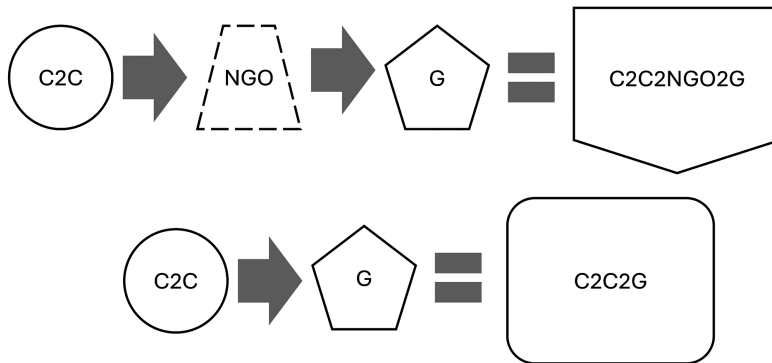
Name of The Unit	Country/ Establishment	URL	Organization/ University
e-Government Center	Russia, 2009	https://en.itmo.ru/en/department/406/E-Governance_Center.htm	St. Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO University)
UNU-EGOV, United Nations University Operating Unit on Policy-Driven Electronic Governance	Portugal, 2014	https://egov.unu.edu/	UN & U. of Minho
ERA Chair of e-governance and digital public services, Center for IT Impact Studies (CITIS), Johan Skytte Institute of Political Studies	Estonia, 2015	https://ecepts.ut.ee/	University of Tartu

Source: Yildiz, Soares and Barbosa, 2023.

Table 12.2 Digital government interaction categories

Category	Example
Government to Government (G2G)	Information and services are shared among government agencies via technology, such as database sharing.
Government to Citizen (G2C)	Government agencies provide citizens with online government information and services, such as online property tax payments to a municipality.
Government to Business (G2B)	Government agencies provide online government information and services to the private sector, such as online bids and tenders on government agency websites.
Citizen to Citizen (C2C)	A social media message sent from a person trapped under the rubble after an earthquake to another person can then be transferred to an NGO and then to a government agency, triggering a search and rescue operation.

Source: Adapted from Saylam and Yildiz, 2022.



Source: Developed based on Saylam and Yildiz, 2022.

Figure 12.2 Digital government value chains and C2C networks

Finally, more recently, non-citizens, such as legal and illegal residents, immigrants, and refugees, have also become actors in IT-based public service delivery processes. Due to the disadvantages of these groups of individuals in terms of digital literacy, linguistic proficiency, and ownership of technological devices, they may need special assistance in accessing online public services. Gorham et al. (2013) examined the roles of public libraries and librarians in helping immigrants in the USA to use online public services, such as navigating the citizenship process and establishing residency. Wang & Chen (2012) document a similar process within the context of migrant farmer workers in China. As the numbers of refugees targeting the countries in the Global North are expected to increase exponentially due to wars, famine,

and, most importantly, global warming and environmental degradation, the need for these refugees to use online public services in their target country is also expected to increase (AbuJarour et al., 2019; Alsaeed et al., 2017; Angelidou & Mousena, 2021).

PROCESS: HOW ITS AND DATA ARE CHANGING PUBLIC SERVICE PROVISION

This section covers changes in the role of data from e-government at the turn of the century through more recent trends of open data, big data, and operational day-to-day data for governments' delivery of essential public services. The role of partnership with the private sector (or others) is also addressed. The section includes reference to the definitions of data that see it categorized and viewed as a discrete material resource, apparent in the "publication" perspective/metaphor (Parsons and Fox, 2013).

Views of data as tangible and under-used resources are evident through the past decade's proliferation of data repositories (open or not). In addition, expectations of benefits from data are apparent in the elevation of topics that purport to enable data's better use. Attention is paid to objective attributes of data quality (accuracy, completeness, timeliness) and broad readiness-for-use topics across industry and academia, such as the need to develop interoperable public services systems, ensure robust metadata, and working locations for data (e.g., Trusted Research Environments) to satisfy legal and ethical requirements. The European General Data Protection Regulation (GDPR) rules are a major legislative development, and many other legal instruments and ethical best practice principles concern appropriate use (e.g., of genomic data or other personal data associated with administrative records, of which governments hold many). However, the sociomateriality of data (Orlikowski & Scott, 2008) and public services provided by the government as complex adaptive systems (McBride & Draheim, 2020) invite more significant consideration of the parameters that facilitate data usage in specific service/s support beyond data publication and elevate the significance of value in use (Redman, 2013).

When we look at the early days of data used in government, it is shown how the past decade catalyzed the proliferation of data, stemming from advances in computing (including miniaturization) and increased application of "smart" technologies which produce data in the delivery of their functions; termed "datafication" (Van Dijck, 2014). During the past decade following the G8 Open Data Charter (Castro & Korte, 2015), after early open government and associated data "push" from the United States of America during the Obama administration, a clear trend of opening up data is observable. The reasons are multiple, including purposes of accountability and transparency, as well as following the global view of data as a massive source of new insights, societal value, and direct economic benefit (Mayer-Schönberger & Cukier, 2013).

Following the global Covid-19 pandemic, data's vital usefulness was confirmed. However, there was a marked shift in the fully "open" view since specific data sought to be quickly shared and used during the pandemic – to better understand the spread of the virus and interventions to limit the spread, as well as rush to develop a vaccine – was highly sensitive, personal (medical) data. Following the pandemic, the OECD adjusted its 2006 recommendation on Access to Research Data from Public Funding (OECD, 2021) and subscribed to a stance of: "as open as possible, as closed / secure as necessary." Making data as open as possible for science is the optimal way to address global challenges. Still, there is greater recognition of

nuances in data work, safeguarding data, ensuring trust from data providers, and public support of data uses (ascribing to legal and ethical considerations). Furthermore, the emergency nature of the pandemic added a greater urgency to data sharing and necessary, appropriate uses at that time (for deeper reflection, see Ross, 2021). Four years later, how data is handled and suitably applied for onward uses is still being negotiated in the digital age of data superabundance, during the transition from the old paradigm from a time of drastically less data, prior to the IT-facilitated advances in data creation, storage, and analytics.

Within e-government literature, the concept of “data” began as a minor, adjunct component compared to how it is now placed in the digital transformation narrative due to emergent technologies with central data elements. Initially, data primarily referred to the measurements, metrics, and key performance indicators (KPIs) that enable the evaluation of digital interventions or changes where e-government initiatives were introduced. Therefore, data had a more transactional than substantive role, associated with the historical basis in a New Public Management (NPM) perspective that brought managerialism to the public sector to optimize the “business of government.” Also apparent is the reference to data as a part of ICTs and within information systems when considering the early stages of growth models (Coursey & Norris, 2008). The conceptualizations of both Layne and Lee’s (2001) and Wescott’s (2001) models refer to horizontal integration and joined-up government. Data here permits a streamlined and smoother citizen/recipient experience. The continuation of this intended outcome of transformed government in public service provision is evident in more recent work about creating one-stop or even no-stop shops (Scholta et al., 2019). There is merit in advancing public service design from governments that see a citizen/recipient-centric approach that does not require an understanding of the complexities of the government organization as a bureaucracy (King & Cotterill, 2007; Lee & Lee, 2014; Saxena et al., 2022).

More recently, when one looks at the new role(s) of data, the position of data has shifted to a more central position. This is apparent in the commitment to open data as part of broader open government commitments. The open data trend has progressed alongside the popularisation of smart approaches to delivering public services, particularly at the local “city” (urban) levels in support of day-to-day operations by governments in spatial areas, for instance, utilizing dashboards in managing traffic flows, and emergency (or sports/leisure) events. Many examples of responsive services react to needs and, in this way, can facilitate more efficient spending by providing the service only when required. For instance, “intelligent street lighting” has sensors and scope for the physical infrastructure to operate in a manner that supports other services, such as public safety environmental monitoring (air quality, noise, etc.).

Data is increasingly considered an undervalued non-rival asset that will not degrade during use, thereby holding many possibilities (Jones & Tonetti, 2020). Emphasis is placed on data management, seen in the proliferation of data repositories and tools or legislation that make data more attainable, improving data governance materially. The role of private interests, such as technology companies like IBM or managing consultancies in this picture, is relevant (Söderström et al., 2020; Purandare, 2021). Some argue that the lauding of new “transformational” logistical elements presented agnostically, detached from the messiness of urban areas is undermining social sustainability by sanitizing the organic (Odendaal, 2016; Datta & Odendaal, 2019; Aurigi & Odendaal, 2022). Much academic literature now questions the perceived apoliticality of smartness and pursuit of answers from data (Kitchin, 2015; Pasquale, 2015; O’Neil, 2017; Green, 2021).

AQ: ‘O’Neil, 2017’ does not match any reference listed. Please provide the complete reference.

Within this perspective, in seeking to account for the changed role of data within public services provision, the first thing is to define data. This is not straightforward: conventional data forms are still relevant and widely used in policy-making. However, new forms of data, as well as data-related products, are disrupting established reference frameworks.

The opportunities from “better” data usage are well accounted for by many sectors, demonstrating more significant advances in understanding their products, services, and markets. Some insights illuminate broader societal problems, and in the context of Corporate Social Responsibility, Digital Era Governance, and existential threats (from climate change, AI, etc.), many actors cooperate under the banner of improved life chances for all, aligning to the global commitment to sustainability objectives. It is important to unpick the nice-to-haves from fundamental public goods (needs) the state must provide. Additionally, while the commercial (private) sector has shown significant improvements in efficiency and effectiveness, the state has yet to prove itself able to reach these levels similarly (Malomo & Sena, 2017).

One element in why this may be thus is down to the core difference between public and private and the necessary political and balancing components that are required of governments. Making a robust economic account of how public services are delivered and the necessity of balancing the distinct logics and philosophical underpinnings of the two sectors, addressing the matter of public choice and needs-meeting, the work of Ostrom and Ostrom (2019) is essential reading. While Ostrom and Ostrom do not directly address the datafication nor digital transformation themes covered in this chapter, “data” in its new forms and possibilities brings disruption and catalyzes the debate on collective public goods and their provision. To better understand the parameters is a pressing matter. Data science is not value-agnostic: values inform what data is collected, how, and the scope for use, including the admissibility of data and the way that specific data can argue for, defend, or justify not using other data such as way emphasize a distinct element (Green, 2021).

When led by technology companies and those entities significantly invested in data usage, the assurances of gaining “better” outcomes, the core imperative of e-government (OECD, 2003), and promises from ICTs and associated data within a digital transformation framework must be unpacked. Perspectives of data as capital are arguably at odds with governments’ public good and needs-balancing mandates as inherently political entities (on data as capital, see Sadowski, 2019).

In summary, data is playing a changing role in public service provision. This began, in alignment with NPM and early e-government studies, as data’s role in measurement and evaluation evolved towards imperatives of interoperability that link up services within and across government agencies. Finally, nowadays, data is evolving further to accommodate the non-traditional/new forms of data and its related products (i.e., data as digital flows, code, and algorithms). This brings opportunities and challenges, which will be addressed in the final section of this chapter.

NEW AND EMERGING TECHNOLOGIES AND PUBLIC SERVICE PROVISION

Applying new and emerging technologies holds the promise of further enhancing government service provision. However, it also poses regulatory and ethical challenges that must be addressed to maximize benefits and minimize risks. Furthermore, integrating these for

successful public delivery has become one of the significant factors in governments' efforts in service delivery. Within this context, this section examines how new and emerging technologies can be integrated into government to add value to the online provision of public services. The list of new and emerging technologies includes, but is not limited to, artificial intelligence, virtual reality/metaverse, blockchain, and open government data.

Before moving on, descriptions of key concepts are in order: Artificial intelligence is defined as "a set of technologies that allow machines to learn, reason, interact and deal with uncertainty by themselves (the intelligence) while being a replica produced by humans (the artificial) (Ballester, 2021, pp. 69- 72). Virtual reality is "an advanced human-computer interface that simulates a realistic environment and allows participants to interact with it" (Latta & Oberg, 1994, p. 23). The blockchain concept is "a system that maintains a ledger of all transactions ... [It] is a system with distributed nontrusting parties collaborating without a trusted intermediary ... [It] supports smart contracts ... as a way of replacing paper-based contracts and human intermediaries with smart contracts" (Tabatabaei et al., 2023, p. 3). Finally, open government data is "a subset of Open Data, and is simply government-related data made open to the public [that] might contain multiple datasets, including budget and spending, population, census, geographical, parliament minutes, etc. It also includes data that is indirectly 'owned' by public administrations (e.g., through subsidiaries or agencies), such as data related to climate/pollution, public transportation, congestion/traffic, child care/education" (Attard et al., 2015, p. 7).

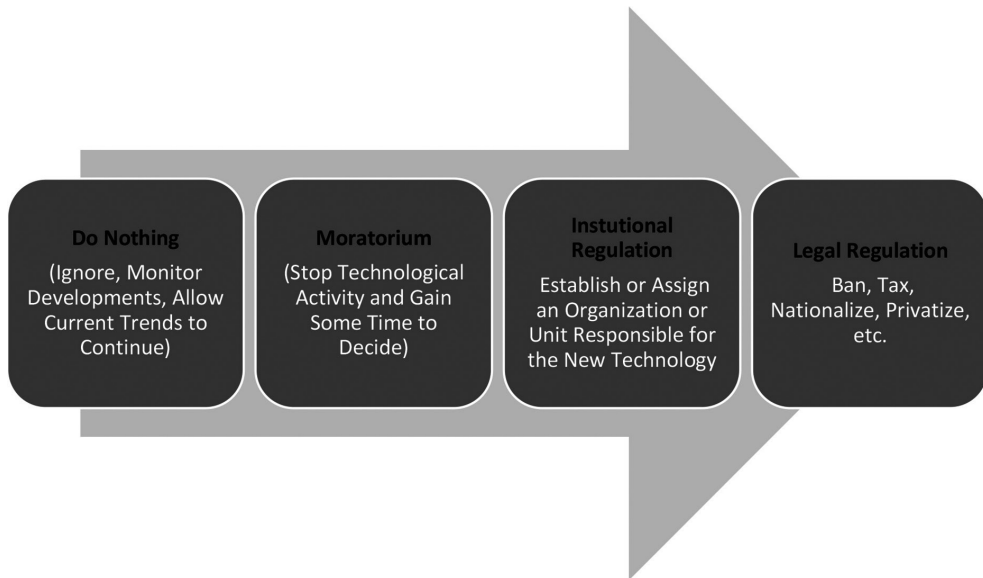
This section provides examples of how new and emerging technologies are used to provide online public services. For example, Bex et al. (2017) discuss in detail the role(s) that artificial intelligence applications will most likely play in the judicial system of various countries. According to the 2022 World E-Parliament Report prepared by the Interparliamentary Union (Interparliamentary Union", 2022, p. 28), using artificial intelligence in parliament has been determined to be one of the top priorities and opportunities to modernize and enhance democratic governance processes. More so, it has been determined to spur legislative institutions to become more agile, inclusive, and responsive to the evolving needs and expectations of citizens in the digital age (Ballester, 2021; IPU, 2022).

Blockchain technology can also be used to keep judicial records, leading to increased integrity, transparency, accessibility, and security of judicial records. This technology is expected to eliminate some intermediary institutions in public service delivery, such as the notary public. For instance, the Japanese city of Tsukuba has become the country's first city to switch to a blockchain-based digital voting system. People verify their identities with social security numbers and vote online on proposed social projects. Ølnes, Ubacht, and Janssen (2017) accept blockchain's potential to be helpful in various fields but also recommend more research on this subject before moving quickly to the implementation phase.

Open government data is another promising area. Starting with the opening of data.gov in the United States in 2009, open data portals at the national and local government levels have been mushrooming worldwide. However, experts point out the functionality, support, and inclusiveness barriers to success in open government data initiatives (Zuiderwijk & Reuver, 2021), and there is a need to focus on usefulness in specific data for governments' service provision (Tetley-Brown & Klein, 2021). There is also doubt that the Global South benefits as much from open data initiatives as the Global North (Serwadda et al., 2018). Finally, the standardization of open data is also an ongoing global discussion within the broader framework of digital government standards (OECD, 2020).

Another interesting example of how new technologies can be integrated into digital governance policy-making and online public service provision can be found in Seoul's metaverse strategy in the Republic of Korea (South Korea). The metaverse concept refers to a collective virtual shared space created by converging virtual reality, augmented reality, and other immersive technologies (Allam, Sharifi, Bibri, Jones & Krogstie, 2022). South Korea has invested millions of dollars in the “Basic Plan for Metaverse Seoul” Project, part of Korea's “Digital New Deal.” With this plan, Seoul will provide public services and handle civil complaints through its metaverse platform.

Overall, whenever any new technology is to be transferred and adapted to an online public service delivery system, the planning and implementation of this adoption process are very similar. The first step is to do nothing and observe; it is important not to implement any particular public policy regarding the new technology immediately. This allows a moratorium in cases where the uncertainty around the new technology is high, such as with artificial intelligence, or if the risks of adopting the new technology exceed the benefits of its use in public service provision. Following this, some decisions can be made, for instance, regarding institutional frameworks (e.g., setting up a new organization or unit responsible for the new technology or assigning an old organization or unit) or legal regulation (Banning, taxing, nationalizing, privatizing, etc.). This decision-making process is presented in Figure 12.3 below.



Source: Adapted from Yildiz and Babaoglu, 2020, p. 1.

Figure 12.3 Decision steps for the adoption of emerging technologies in online public service provision

DISCUSSION, CONCLUSIONS, AND DIRECTIONS FOR FUTURE RESEARCH

As mentioned above, one of the biggest challenges is appropriately measuring the results within the context of the changes that IT use has caused in public service provision. The end goal is to measure the outcomes and impact of IT-enabled services accurately. There are also several other significant challenges, such as the security challenge (ensuring the security of government information and protecting the privacy of personal information), addressing algorithmic bias, the challenge of achieving equality and fairness in online public service provision, that is, the digital divide problem, and finally the surveillance challenge. Addressing these challenges will require ongoing research, collaboration, and innovation to ensure that IT-enabled public service delivery ultimately serves the needs of all citizens.

Regarding the challenge of measuring performance, that is, the outcomes and impact of public service provision efforts, understanding user needs and the impact of IT products or services is the first step to transforming IT service delivery (Siddiquee, 2016). Significantly, one way to measure impact is for governments to identify which digital services citizens find challenging. The extent of dissatisfaction can drive governments to prioritize improvement and service delivery areas. This can be done through research – asking people which service aspect needs improvement. Improved services can shape trust on the part of governments. Citizens expect more transparent and accessible services from governments and the public sector (Cucciniello et al., 2015). Therefore, efforts must be made to improve and deliver services that meet the needs and challenges of the citizens.

In addition, working towards the zero-wait or no-wait time goal and one-click transactions across all government services can result in high costs and unrealistic expectations (Dudley et al., 2015). Providers can find a balance between delivering high-quality and responsive services and applying performance indicators and the proper metrics for analysis. This implies capturing levels of citizens' satisfaction and keeping up with perceptions that affect user satisfaction.

Regarding the security challenge (ensuring the security of government information and protecting the privacy of personal information), a lack of information security at both organizational and personal levels can be the new norm. Shoshana Zuboff argues that we live in the age of “surveillance capitalism” (Zuboff, 2019), in which enormous amounts of information about basic life activities such as education, healthcare, shopping, and communication are collected by big technology firms and governments. Collecting and processing all these data via big data analysis has two main objectives. The first aim is to determine individual consumption patterns to encourage more consumption by creating further demand for various services and products. The second objective is to discover the political views, attitudes, and behaviors of individuals/citizens better to control the citizenry (Zuboff, 2019). Regulatory steps have been taken in many countries to protect personal and government information (Wu, 2014; Bennett & Raab, 2017; Arora, 2019), albeit to a limited effect.

Closely related to the security challenge is the surveillance challenge. It is exemplified by the implementation of the social credit system in China (Liang et al., 2018; Burgess & Wysel, 2022). In this system, people are surrounded by IT applications, such as advanced security cameras, numerous sensors, and mobile applications that track and measure how people and organizations abide by the rules and regulations of the Chinese government. A complex

system of rewards and punishments is implemented according to the level of obedience to the rules. In such systems, the objective of effective and efficient online public service provision is overshadowed by the objective of administrative surveillance. This widespread application of IT for surveillance purposes is a warning for the rest of the world about the dark side of IT applications in government.

Several solutions are presented regarding the equality and fairness challenge, that is, the digital divide problem. One such program is the application of universal service policies and the resulting laws in many countries (Mueller, 1999; Jaag et al., 2009; Winseck, 2015). Universal service policies try to ensure that the people and groups that are trapped in the disadvantaged/ “dark” side of the digital divide, such as old people, disabled people, and people living in less-connected rural areas, gain equality of opportunity to access and benefit from the societal and economic fruits of IT use. Another solution is digital government intermediaries (González-Zapata and Heeks, 2015; Sein and Furuholt, 2012; Sharma and Mishra, 2015; Weekakkody et al., 2013). These intermediaries use online public services in the name of the people who are unable or unwilling to use them. Depending on the case, the intermediaries can be real persons such as family members, relatives, neighbors of users, or representatives of different organizations, such as members of NGOs, religious organizations (Wahid et al., 2011), or government employees, such as librarians working in public libraries (Warren & Goulding, 2006), who help bridge the digital divide.

The prejudice challenge (the algorithmic bias problem) is closely related to the equality and fairness challenge. Algorithmic bias is defined as “when the outputs of an algorithm benefit or disadvantage certain individuals or groups more than others without a justified reason for such unequal impacts ... [It has] behavioral, organizational, and social implications, antecedents, and consequences” (Kordzadeh & Ghasemaghaei, 2022, p. 388). Although algorithms, in general, and artificial intelligence that depend on algorithms to function in particular produce many beneficial results for public service provision, algorithmic bias is a negative externality that must be identified and eliminated if necessary (Flügge et al., 2020). In one example, in 2020, a Dutch court ordered the immediate halt of an automated surveillance system for detecting welfare fraud because it disproportionately targets poorer citizens and immigrants (Henley & Booth, 2020). In another case (Mao, 2023), from 2016 to 2019, an incorrect algorithm known as “Robodebt” sent letters to more than half a million Australians, accusing them of welfare fraud. The people who were asked to pay back thousands of dollars of welfare benefits felt like criminals and caused at least three known suicides. A court ruled the Robodebt scheme illegal in 2019 after forcing many poor people to pay off false debts.

All these different challenges clearly show that, on the one hand, there is a lot to be done to improve public service delivery via IT. On the other hand, within the context of rising global demand for online services, there is an enormous potential to be realized in terms of service quality and quantity with the help of IT use.

Future research can be focused on creative solutions for these challenges, as well as the public value proposition, operational capacity, and legitimizing environments of various digital governance actors. Another promising avenue for future research could be to examine international benchmarking studies (including but not limited to the United Nations E-government Survey) that partially cover the advantages and disadvantages of online public service provision worldwide. For example, it would be interesting to learn how these international benchmarking studies serve policy learning and transfer in online public service provision at a global scale.

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