



Digital Transformation of Public Services: The Case of the Document Management Application

Borbála Szedmák , László Varga & Roland Z. Szabó

To cite this article: Borbála Szedmák , László Varga & Roland Z. Szabó (03 Jul 2025): Digital Transformation of Public Services: The Case of the Document Management Application, International Journal of Public Administration, DOI: [10.1080/01900692.2025.2520522](https://doi.org/10.1080/01900692.2025.2520522)

To link to this article: <https://doi.org/10.1080/01900692.2025.2520522>



© 2025 The Author(s). Published with license by Taylor & Francis Group, LLC.



Published online: 03 Jul 2025.



Submit your article to this journal [↗](#)



Article views: 40



View related articles [↗](#)



View Crossmark data [↗](#)

Digital Transformation of Public Services: The Case of the Document Management Application

Borbála Szedmák^a, László Varga^b, and Roland Z. Szabó^c

^aDoctoral School of Business and Management, Corvinus University of Budapest, Budapest, Hungary; ^bDMS One Zrt, Budapest, Hungary;

^cDepartment of Corporate Leadership and Marketing, Kautz Gyula Faculty of Business and Economics, Széchenyi István University, Győr, Hungary

ABSTRACT

The article examines digital transformation in the public sector, focusing on its implementation and impact. A key milestone in Hungary's municipal digitalization is analyzed through a case study on the document management system of the Application Service Provider. Based on longitudinal data from over 3,000 municipalities, findings show that digital transformation delivers significant value to citizens and shortens administrative lead times. It enhances transparency, comparability, and efficiency in public administration. The study also emphasizes that adopting new technologies, standardizing processes, and centralizing IT management are critical factors in achieving these efficiency gains and modernizing public sector operations.

KEYWORDS

Public management; efficiency; digital transformation; centralization; transparency

Introduction

Digital transformation of public service delivery has been on the agenda in the past few decades (Dunleavy et al., 2006; Hao et al., 2020). However, moving toward a “true digital public administration” has only recently become crucial—partly as a result of the COVID-19 pandemic (Mergel et al., 2023; Moser-Plautz & Schmidhuber, 2023). As a result of the rapid advancement of information and communication technologies (ICTs), governments worldwide have progressively embraced various e-government features over the past few decades. Digital transformation outside the public sector is constantly reshaping citizens' expectations regarding the necessity for public administrations to provide high-value, real-time digital services (Mergel et al., 2019). Although many governments have not achieved their objective of digitizing all public services and administrative processes, there has been a notable increase in the adoption of new digital technologies, resulting in significant changes within public sector organizations (Enang et al., 2020; Gil-Garcia et al., 2018).

The trends toward digital transformation have evolved based on the premise that utilizing digital platforms for various public service activities and processes can lead to improved service quality, effectiveness, and efficiency (Mergel et al., 2023). Governments are

constantly adapting their operational models to enhance service delivery, increase efficiency, effectiveness, transparency, and interoperability, and increase citizen satisfaction. The e-government literature extensively explores how digitalization has improved the efficiency and effectiveness of public service delivery (Aminah & Saksono, 2021; Margetts & Dunleavy, 2013; Scholl, 2022; Westerman et al., 2011), however, according to some scholars, the expectations in connection with the potential benefits of digital government are unrealistic (Alshehri & Drew, 2010). The outcomes frequently tend to be modest, and it is often challenging to produce visible impacts, especially in the short term (Y.-Q. Zhu & Kindarto, 2016; Ziemba et al., 2016).

Although the topic of digital government has been receiving much scholarly attention, there is a need for more empirical studies, especially focusing on the evaluation of service performance (Hanisch et al., 2023; Panagiotopoulos et al., 2019; Tangi et al., 2020; B. Zhu et al., 2024). The efficiency gains resulting from digital transformation in the public sector are often not quantified and are not examined in the long term (Gabryelczyk, 2020), particularly not in the Central and Eastern European region (CEE) (Dan & Pollitt, 2015).

Moreover, further research is necessary to comprehend the differences among digital transformation strategies in various countries and to understand the

CONTACT Borbála Szedmák  borbala.szedmak@uni-corvinus.hu  Doctoral School of Business and Management, Corvinus University of Budapest, Fővám tér 8, Budapest 1093, Hungary

© 2025 The Author(s). Published with license by Taylor & Francis Group, LLC.

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

specifics of digital transformation projects in the public sector in order to develop a comprehensive theory of digital transformation, focusing on public administration (Mergel et al., 2019).

This study fills these research gaps by conducting a longitudinal analysis of a successful digital transformation project in the public sector. We have examined a milestone in the digital transformation of the Hungarian municipality system. Although the paper does not encompass the digital transformation of the entire public sector, it monitors the comprehensive transformation of a key pillar.

As a single case study, we have studied the impacts of the document management application provided by the Application Service Provider (ASP). Our conclusions are derived from a longitudinal analysis of the case numbers, case types, and case administration times of over 3000 municipalities, encompassing the period of 2017–2022. Furthermore, we have also conducted 24 expert interviews in order to identify the antecedents, goals, results, and effects of the project.

We have found that the digital transformation of the public administration system enhances the pace of transactions. The case illustrates how the complex interplay of the implementation of new technology, standardized processes and practices, and centralized IT management can lead to efficiency gains. Electronic transactions can be more efficient than paper-based transactions; however, not instantly: it takes a few years of learning to achieve efficiency gains. According to our results, the digital transformation of the public administration system also enhances paper-based transactions: the processes were transformed and optimized, which had a positive effect not only on the electronic but also on the traditional, paper-based cases.

The study is structured as follows. After reviewing the literature on the digital transformation of public services and formulating our hypotheses based on previous research findings, we define the research gaps and how our research fills them. Afterward, we introduce the methodology used, and then we present the results of the analysis regarding the hypotheses. In the discussion, we summarize the main steps—i.e., the “recipe” – for a successful digital transformation project in the public sector, and compare our results to the previous findings. Finally, we outline some further research areas.

Theoretical background

Digital transformation of public services

The advent of the Industrial Revolution 4.0 and rapid digital innovation has urged governments to leverage

technology to enhance public services and the quality of administrative functions in order to enhance societal well-being (Salgues, 2018). Digital transformation beyond the public sector is reshaping citizens’ anticipations regarding governments’ capacity to provide high-quality, instantaneous digital services (Clarke, 2020). In reaction to these evolving expectations, governments are altering their operational paradigms to enhance the delivery of public services and increase efficiency, effectiveness, transparency, interoperability, and citizen satisfaction (Mergel et al., 2019). While increasing efficiency is a key motive for public sector digitalization, IT systems are often just copies of paper-based processes (Bergmann, 2021). Bergmann (2021) highlights that public–private partnerships may be a solution to achieve real efficiency gains. The importance of partnerships between digital governments and private technology companies is also highlighted by Margetts and Dunleavy (2024).

According to Aminah and Saksono (2021), e-government includes employing ICT to deliver government services to citizens and businesses with greater effectiveness and efficiency. It represents the integration of ICT into governmental operations, and delivering government services through the utilization of information technology in order to enhance the performance of government institutions and services (Rodríguez Domínguez et al., 2011; Westerman et al., 2011). In order to successfully digitalize the public sector, it is of key importance to have sufficient organizational awareness of digital preservation and to dedicate change agents (Dorner, 2009). It is also essential to achieve organizational and cultural changes inside the government sector and behavioral shifts in the case of the actors of the society (Margetts & Dunleavy, 2002).

Information technology has brought several changes and advancements to public management. Technological advancements have prompted improvements in government service performance, aiming for greater efficiency, transparency, accountability, accessibility, and citizen participation (United Nations, 2016). More and more governments are embracing e-government as a strategy to bolster development efforts, and to achieve simplicity and automation in routine tasks and enhanced responsiveness in services provided for citizens (Dunleavy et al., 2006). Digital transformation within the public sector entails adopting novel approaches to collaborating with stakeholders, establishing fresh service delivery frameworks, and forging innovative forms of relationships (European Commission, 2013).

Digital-era governance (a term defined by Dunleavy et al., 2006) means a set of complex changes centered

around IT. It entails the reintegration of functions into the government domain, embracing holistic and needs-driven structures, and digitalizing administrative procedures. The three main principles in detail are the following:

- **Reintegration:** Instead of decentralization, highlighted by New Public Management (NPM), reassembling many of the components that NPM divided up into distinct corporate hierarchies and shifting the responsibility for integrating public services into consumable packages to citizens and other civil society actors represent the key opportunities for utilizing digital-era technological opportunities. Key components of reintegration include the rollback of agencification, joined-up governance (JUG), re-governmentalization, reinstating central processes, radically squeezing production costs, reengineering back-office functions, procurement concentration and specialization, and network simplification.
- **Needs-based holism:** Processes have to be reengineered from end-to-end, and unnecessary steps, and costs have to be cut. Key components of needs-based holism include client-based or needs-based reorganization, one-stop provision, interactive and “ask once” information-seeking, data warehousing, end-to-end service reengineering, and agile government processes.
- **Digitization changes:** In order to exploit productivity gains from the enhanced use of IT and related organizational changes, opportunities for transitioning to fully digital operations have to be seized. As the authors highlight, an important step toward digitalization is when organizations are able to shift from having the authoritative document on paper to electronically storing the documents. Key components of reintegration include electronic service delivery, new forms of automated processes—zero touch technologies (ZTT), radical disintermediation, active channel streaming, facilitating isocratic administration and co-production, and moving toward open-book government.

Public sector digitalization aims to enhance the satisfaction of users (Mergel et al., 2019) and create enhanced public value (Scupola & Mergel, 2022). Public value means the citizens’ expectations of the government and public services (Scupola & Mergel, 2022). In terms of e-government, it means improving efficiency, and services provided to citizens, and enhancing social values by focusing on inclusion, democracy, and transparency (Twizeyimana &

Andersson, 2019). It includes the following categories (Panagiotopoulos et al., 2019; Scupola & Mergel, 2022; Twizeyimana & Andersson, 2019):

- **Citizen value:** Improving interactions with citizens,
- **Economic value:** Cost savings and time gains, resulting from greater administrative efficiency,
- **Administrative value:** Better public service delivery,
- **Societal value:** Better transparency.

According to Scupola and Mergel (2022), public sector digitalization in Denmark resulted in fewer government expenditures, increased efficiency, cost-effectiveness, time savings (economic value), improved data coherence and data sharing among different authorities, common platform, easier compliance with regulations (administrative value), more satisfied customers (societal value), one-stop-shop, better services with quality standards, transparency (citizen value).

Hypothesis 1: Digital transformation of the public administration system results in significant efficiency gains.

In connection with e-governance or digital governance, recentralization is highlighted by several authors. In line with some previous studies (e.g., Ibrahim, 2022; Margetts & Dunleavy, 2013), Hammerschmid et al. (2023) find that ICT reinforces recentralization, by analyzing digitalization strategies of eight European countries (Estonia, France, Germany, Italy, the Netherlands, Norway, Spain, and the United Kingdom). The example of India also supports the need for centralization in connection with digitalization: a centralized ICT-based infrastructure improved the speed of transactions in the case of the Government of India and its states (Kompella, 2017). While centralized ICT systems foster integration and result in centralized power and control, paradoxically, they also enable more flexibility and decentralization (Allen et al., 2001). According to Peled (2001), new information and communication technologies strengthen central power, but at the same time, they also help diffuse bureaucratic power. Centralization leverages economies of scale, which result from maximizing the potential of technologies that drive output growth at a faster rate than costs. Centralization keeps operations in line with protocols and standards. If operations are highly centralized, implementing a centralized IT system is both feasible and likely beneficial (King, 1983). (Re)centralization allows instantaneous data access for decision-making,

and ensures reliability and security (Evaristo et al., 2005).

Hypothesis 2: A centralized ICT-based infrastructure enhances the pace of transactions.

Hanisch et al. (2023) emphasize that digital governance goes further than digitalizing the existing analogue mechanisms: digital governance includes new forms of organizing, and creating, and capturing value. IT is not enough in itself to achieve change; processes, people, policies, and leadership have to be changed in order to digitally transform the public sector. It is essential to view digital transformation as a holistic organizational approach rather than simply a shift toward online forms or the transition from analogue to digital public service delivery (Mergel et al., 2019). Technologies are becoming powerful tools for administrative reforms in the public sector; however, they are just one element of the complex system: it is also important to make adjustments to the business processes, organizations, and structures, which directly affect the deployment of technologies (Gil-Garcia et al., 2022). In terms of government transformation, digital transformation does not only mean the adoption of new technological tools: it is a comprehensive approach that can be characterized by change across all organizational aspects (Tangi et al., 2021). The scope of digital governance is more than just the usage of ICT in the public sector: it facilitates transformational changes in the operation and business processes of governments (Scholl, 2022). To reflect this comprehensive approach, Haug et al. (2023) use the term digitally induced change instead of digital transformation in order to highlight that technology lays the foundations for transformative endeavors, but the primary effort and transformative potential are within the organizations themselves.

The relationship between information technology and business process reengineering (BPR) is twofold. On the one hand, information technology enables business process reengineering: the assistance of information systems is needed for the success of a BPR project (Grover et al., 1995). On the other hand, BPR is often needed for the success of the implementation of an IT system. The introduction of technological innovations must be preceded by an organizational transformation in order for the desired efficiency gains to be achieved. Organizational innovation indirectly supports technological innovations by providing a favorable ecosystem (Damanpour & Evan, 1984). To fully harness the potential of digitalization, outdated processes should be replaced with newly designed and optimized digital workflows (displacement), rather than simply layering

digital tools over existing analogue systems (Marienfeldt et al., 2024). Electronic transactions are more efficient than paper-based transactions, but only if the processes and services are fully digital, linked up with identification systems, payment systems, etc., and there are no additional inhibiting factors, such as human intervention.

According to Davenport (2005), the benefits of business process standardization (BPS) surpass those anticipated from BPR, as BPS allows organizations to share processes more effectively. BPS offers better monitoring opportunities and improved communication and coordination, as it ensures the uniformity of processes across organizations (Wüllenweber et al., 2008). BPS can greatly enhance process performance, especially in service industries that benefit from economies of scale (Bharadwaj et al., 1993). Münstermann et al. (2010) also highlight that the positive effects of BPS on process time, cost, and quality are strongest in the case of service firms. Standardization improves process performance, reduces cycle-time and process costs, leads to improved process quality, reduces the probability of mistakes, helps react to changes (e.g., regulatory changes), makes processes transparent, and helps benchmarking—as a result of common key performance indicators (Münstermann et al., 2010).

The benefits of BPS are highlighted in the case of the public sector as well. It allows governments to centralize functions through shared services (Kubicek & Cimander, 2009), shortens service lead times, and allows multiple public services to share the same process, resulting in additional cost savings (Mukherjee et al., 2021). Standardizing processes and making them available as a shared resource across public service agencies can unlock significant value through economies of scale (Mukherjee et al., 2019).

Although digitalization can enhance efficiency through repeated and rule-based transactions and can improve transparency, it is not a solution that can cure all problems: it is important to find the right measures and complement automated governance with analogue governance to overcome its weaknesses. Digital transformation requires a complex change in business operations that affects both new (electronic-based) and traditional (paper-based) transactions.

Hypothesis 3: Electronic transactions are inherently more efficient than paper-based transactions.

Hypothesis 4: Digital transformation of the public administration system also enhances paper-based transactions.

Research gaps

Although digital services within the public sector are considered to be among the most vital elements of the administrative system's reform and the topic has received much scholarly attention (Hao et al., 2020; Ma & Zheng, 2018), there is a need for more empirical studies, particularly in the evaluation of service performance, and there is limited evidence indicating that digital services have resulted in accelerated development (B. Zhu et al., 2024). Hanisch et al. (2023) also highlight the question of how organizations can take advantage of digital governance as a further research field. There is little empirical evidence about the outcomes of digital transformation in the public sector (Panagiotopoulos et al., 2019; Tangi et al., 2020), and further research is needed in order to understand public value creation through digital transformation (Mergel et al., 2019). Efficiency gains as a result of digital transformation are not sufficiently quantified in the public sector. While previous research has pointed out that small and large firms have different opportunities and potentials in connection with digital transformation (Horváth & Szabó, 2019), this issue has not been investigated in the case of the public sector.

Furthermore, additional investigation is needed to understand the differences between different countries' digital transformation strategies, and what a specific digital transformation project within public administrations looks like in order to develop a comprehensive theory of digital transformation in the public sector (Mergel et al., 2019). Our study contributes to this goal by introducing a nationwide example of successfully digitalizing government services in the CEE region.

According to Gabryelczyk (2020), it is a further research direction to explore and understand the effects of public governance digitalization in the long term. We aim to contribute to the research field by providing a longitudinal analysis of the digital transformation of the public administration system, with special attention to the main public services offered by municipalities.

There is also little knowledge of how public value is created through digital transformation in governance (Scupola & Mergel, 2022). Our study shows a great example of how public value can be created (and measured) by digitalizing the main public services offered by municipalities. The article aims to contribute to the investigation of the mentioned research gaps by introducing a successful case for digitalizing a country's municipality system, and providing empirical evidence for the efficiency gains resulting from it, and measuring these gains. Although the paper does not encompass the entire digital

transformation of the public sector, it monitors the comprehensive transformation of a key pillar which could be a role model for other large-scale digital transformations in the public sector.

Methods

The article introduces the case—as a single case study—of the document management application of the Application Service Provider (ASP), a nationwide effort to digitalize the public sector at the level of the municipalities. The study uses mixed methods in order to triangulate the sources (Jack & Raturi, 2006). In the frame of qualitative research, document analysis was performed. Three studies—created by the Hungarian State Treasury and the National Infocommunications Services Company (NISZ)—were analyzed about the digital transformation of the public sector in Hungary. These include:

- A feasibility study about the implementation,
- A system review (municipal ASP 2.0),
- And a study on the operating model of the regional IT application service centers.

Besides analyzing these documents, 24 semi-structured expert interviews were also conducted about the project, its antecedents, goals, the structure of the application service center, and the results and effects of the project. [Appendix A](#) summarizes the interview guidelines. The predefined set of questions helped us guide the conversation toward the areas and issues we wanted to address (Qu & Dumay, 2011). At the same time, semi-structured interviews offered us flexibility to explore new topics by not strictly adhering to pre-prepared questions.

Interviewees ([Table 1](#)) included managers and officials of organizations creating and maintaining the ASP, namely the Ministry of Interior, the Ministry of National Economy, the Hungarian State Treasury, the National Infocommunications Services Company (organizations of the central public administration), municipalities, consultants, and technology providers. As a sampling strategy, we used a comprehensive sample (Miles & Huberman, 1994): we interviewed the representatives of the main institutional stakeholders who served as change agents. [Appendix B](#) introduces the coding system used for the analysis of the interviews.

In order to empirically measure the effects of the nationwide project, quantitative analysis was performed as well. The measures used are the following:

- The number of cases (electronic, hybrid, paper-based),

Table 1. Details of interviewees.

Interviewee ID	Role	Overall work experience (in years)	Gender
1.	Technology provider	15+	male
2.	Technology provider and central public administration	30+	male
3.	Technology provider	15+	male
4.	Consultant	20+	male
5.	Technology provider	15+	male
6.	Central public administration	15+	male
7.	Technology provider	15+	male
8.	Central public administration	20+	male
9.	Consultant	25+	male
10.	Technology provider	35+	female
11.	Technology provider	20+	male
12.	Technology provider	10+	female
13.	Technology provider and central public administration	10+	female
14.	Technology provider	20+	male
15.	Municipality	20+	male
16.	Technology provider	15+	male
17.	Technology provider	20+	male
18.	Technology provider	20+	male
19.	Technology provider	25+	male
20.	Technology provider	25+	male
21.	Technology provider	15+	female
22.	Consultant	45+	male
23.	Consultant	20+	male
24.	Consultant	35+	male

Source: own construction.

- Efficiency gains, measured by case closing time, referring to the speed of completing a service (Chan et al., 2021; Kim et al., 2006; Voghouei & Jamali, 2018).

A case refers to any public issue or responsibility which is assigned to local authorities for regulation and administration in the interests of the local population and businesses. Such matters typically include urban planning, local transport, waste management, local economic development, education at the municipal level, and social services. One case may include many documents, if the citizen has several questions, or if incomplete documents are returned to customers several times. In these cases, the citizen and the municipality are sending each other several documents back and forth, but all these documents belong to one case.

All measures were analyzed in the case of paper-based, electronic, and hybrid file (document) types. In order to fill the research gap defined by Gabryelczyk (2020), a longitudinal dataset was used for the period of 2017–2022. We have followed the digital transformation of 1324 entities (aka tenants) (meaning more than 3000 municipalities).

According to previous studies, size matters in the case of digital transformation (Horváth & Szabó, 2019). SMEs are typically less prepared for new technologies (Smit et al., 2016), have fewer financial resources (e.g., McMahon, 2001; Mittal et al., 2018), and experience, and also face capacity constraints in terms of digitalization (Kennedy & Hyland, 2003). In contrast,

MNEs have better resources and capacity, thus far greater opportunities to invest in new technologies than SMEs (Dangayach & Deshmukh, 2005). Based on these studies, we used the size of the entities as a control variable:

- Small entities: under 10,000 cases/year,
- Medium-sized entities: between 10,000 and 49,999 cases/year
- Large entities: 50000 cases or more/year.

According to these categories, our sample includes 1,132 small, 181 medium-sized, and 11 large entities.

The data obtained was analyzed using descriptive analysis techniques.

Results

Although municipalities have the same tasks in terms of public accounting and local taxation, regulated by legislation, in the past, there was no common IT solution for supporting them. All municipalities were struggling to develop their isolated solutions for a specific area, which resulted in not only very costly, heterogeneous operations, but also made it hard to oversee their actual financial status.

By recognizing this problem, the central public administration decided to develop a central IT application platform, namely the Application Service Provider (ASP), to standardize and support local governments'

internal operations and offer them the needed electronic administration services free of charge.

The need for an integrated digital solution

In the last decade, local governments applied for public funding and spent billions of HUF in Hungary on the construction and development of their IT systems and electronic administration. The results of the implemented programs affected approximately 20% of the local governments and 65–70% of the Hungarian population. Municipalities with a larger population and wealthier resources were successful in using the funds, while the municipalities of smaller settlements were only able to take advantage of the opportunities to a limited extent.

Although there was no framework to ensure the efficient use of resources, several successful pilots were created. At the same time, the assessment of the results is mixed, because fragmented solutions were created, as a result of which local governments reached very different levels of e-government administration maturity. The development of the back-office applications of local governments did not proceed at the desired pace either; they remained mostly heterogeneous and partly outdated. Furthermore, registers were fragmented, and municipalities still lacked interoperability. Moreover, most of the services implemented within the framework of the developments reached only the second level (initiating a case) and the third level (bilateral interactive communication with the municipality) of the service levels defined by the EU; a significant number of local governments faced challenges with achieving the fourth level (implementation of full-scale digital administration, including electronic payments). Finally, the maintenance and operation costs of the implemented systems in many cases clearly exceeded the budgets of the local governments.

The majority of local governments concentrate their resources on performing their mandatory tasks, so concerning e-government administration solutions, their resources only allowed them to create their own websites. Websites are usually one-way communication channels that fulfil just the basic level of e-government services in the case of the majority of local governments. Electronic submission of downloaded forms was possible only in some larger municipalities. Various modern IT solutions—integrated document management systems, group work support, electronic administration, workflow support, etc.—only occurred occasionally.

Based on the above experiences, it is clear that individual subsidies in the domestic local government system do not ensure the efficient use of resources. Centrally developed integration and interoperability

standards are needed in order to avoid fragmented developments, and it is also necessary to ensure that the applicable solutions can be financed in the long term by municipalities.

The Hungarian municipal ASP—a central, shared service for municipalities

The demand for the dissemination of technical quality standards, the requirement for optimal investment, and operating resource utilization raised the need for the introduction of the municipal ASP and its nationwide expansion by 2018.

By applying the principle of shared services, using resources efficiently, and ensuring sustainable operation, the municipal ASP makes it possible to modernize fragmented and outdated technology applications and supports interoperability. It supports local governments in performing their tasks and internal operations, thus it increases the internal operational efficiency of local governments with the help of modern IT solutions and related organizational development; simplifies and unifies their reporting obligations; and helps provide unified municipal electronic administration services.

The municipal ASP supports the central public administration in monitoring the resource management of local governments with modern tools and methods, which contributes to the timely recognition of possible financial risks and the preservation of the solvency of the local government subsystem, and it also helps centralize the municipal reporting system.

As a result of the municipal ASP, parallel institution building can be avoided, as applications are provided centrally. On the other hand, local governments have gained a prominent role in providing public administration services: citizens and businesses can access municipal and central administration services locally, in a one-stop shop.

The long-term goal is for municipal ASP to increase the performance of public administration, in order to achieve faster administration and better customer service, contribute to the development of the e-economy, strengthening Hungary's competitive position, attracting investors, and creating new jobs, and increasing digital literacy and providing equal opportunities for the disadvantaged.

By establishing modern, integrated, and cost-effective, state-of-the-art IT support services both for the municipalities and their customers, this development was a significant step in the governmental digital transformation roadmap to achieve the e-government state. Thanks to the services offered by the municipal ASP, not only is the internal operation of municipalities

digitally transformed, but it has also become possible for citizens and businesses—as the clients of local governments—to manage their cases electronically, regardless of location, 24 h a day.

The municipal ASP is a modular, integrated system, which consists of the following main subsystems for supporting the related business operations and processes:

- Management system
- Real estate system
- Municipal tax system
- Document management system
- Municipal portal system
- Industrial and commercial system.

Organizational and operational model of the municipal ASP

The Hungarian State Treasury (hereafter Treasury) has been designated as the operator of the municipal ASP Center, while the IT operation is assigned to the National Infocommunications Services Company (hereafter NISZ). The application operation of the individual subsystems of ASP—according to the type of the system—is shared between the Treasury and NISZ, and is supplemented by the support of third-party vendors.

The top-level state responsibility of ASP operation is shared between the Ministry of Interior (hereafter BM) and the Ministry of National Economy (hereafter NGM). The tasks and responsibilities of the organizations directly involved in the operation of ASP are shown in [Figure 1](#).

The ASP Center is responsible for the long-term, sustainable operation and nationwide expansion of the municipal ASP. The management of the ASP Center is provided by the Hungarian State Treasury, while the IT background is provided and operated by NISZ, which is also responsible for providing (together with other governmental central organizations) electronic access to central administration records and related electronic services (SZEÜSZ).

The Management Organization is responsible for providing municipal ASP services at an expected quality level, supports operations management, prepares the necessary supervisory decisions, as well as supervises the organizations taking part in operating the system. The ASP Management Organization is the most important, central element of the ASP system: it manages all the other organizations (affiliated ASP tenant municipalities, IT Service Providers, organizations operating specific subsystems, public administration bodies, and supervisory bodies) participating in providing ASP

services. The IT Service Provider operates the framework of the ASP, the data center, and the IT network infrastructure that ensures the operation of the municipal ASP Center.

The BM, as the supervisory body of NISZ, and the NGM, as the supervisory body of the Treasury, are directly responsible for ensuring the long-term sustainability of the municipal ASP by securing the necessary operational and legal environment and by providing strategic management and decision-making support.

The basic purpose of the Municipal ASP is to provide appropriate standardized, shared central services to its clients, i.e., municipalities, and through them, to the clients of the municipalities as well. Most of the ASP operation tasks are covered by the ASP Center, however, the participating ASP tenant municipalities also have a role in the smooth service operation. By joining the ASP, certain service management and service support tasks should be carried out by local municipalities, and the following roles must be designated: official representative, ASP contact person, key user(s), and local IT operator(s).

The organizations providing SZEÜSZ and public registry services appear as background service providers in the ASP operation model. (The use of these services is determined by legislation.) Our analysis focuses on the document management subsystem of ASP, as this was the pioneer and most successful application.

Empirical evidence for the success of the municipal ASP

Our analysis ([Figure 2](#)) shows that most municipalities switched to using the system within 1 year, but by 2019, almost every one of them had started to use the document management application, which means 1,324 tenants (It means over 3,000 municipalities because small settlements and districts are incorporated into one tenant).

The number of cases continued to increase until 2019, and then—due to COVID-19—it decreased significantly. The reason for this is that the deadline for several expiring permits and licenses has been automatically extended, thus new cases did not have to be opened.

Electronic administration is gaining an ever-increasing role, by 2021, almost 50% of the cases have become electronic. By 2022, the number of electronic cases slightly dropped. It is a question of whether this is just a temporary stabilization period or the boundary of digital transformation in the case of Hungarian municipalities.

The spread of digitalization was also supported by the pandemic: the increase realized in 2020 and 2021 in

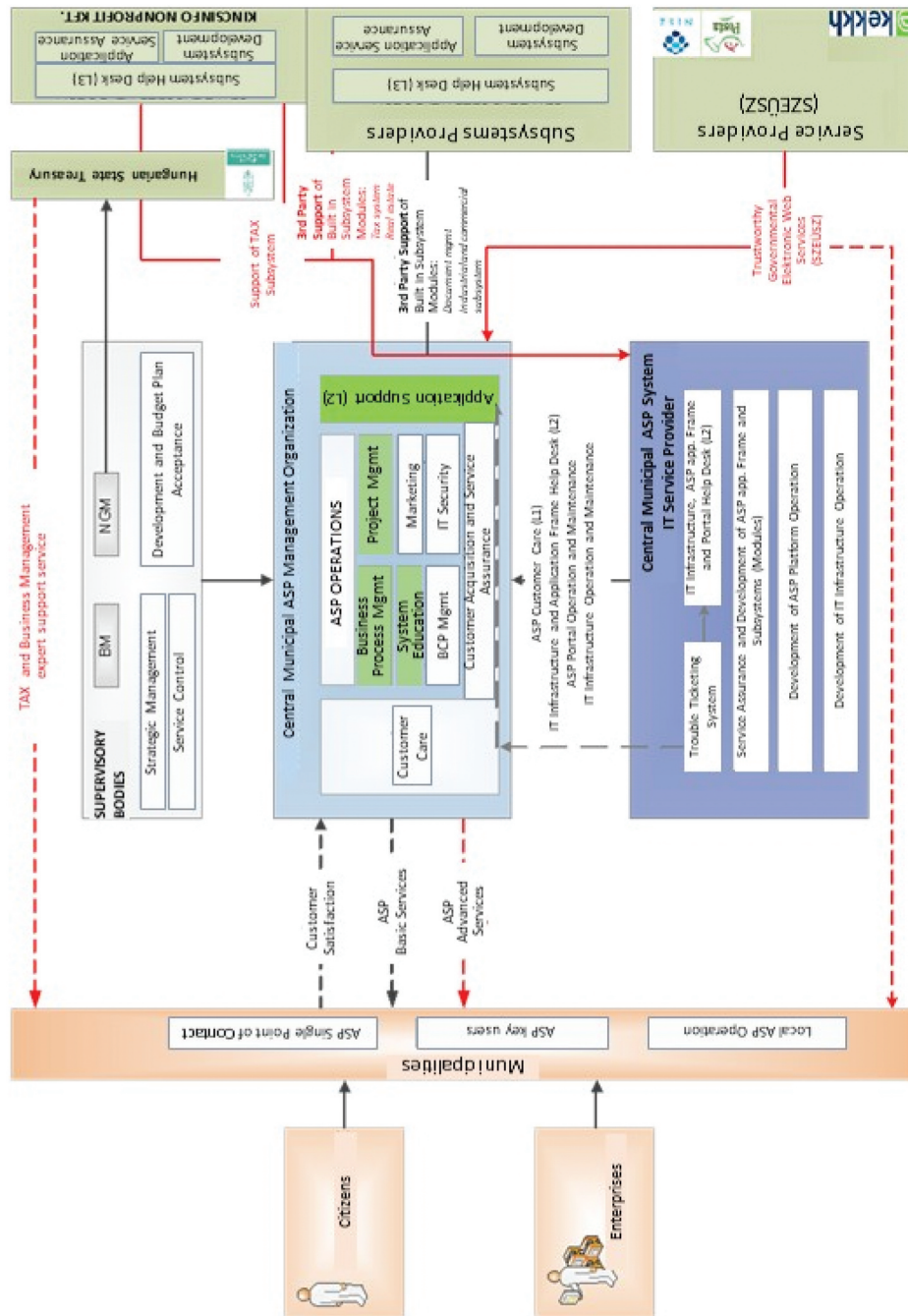


Figure 1. The tasks and responsibilities of the organizations directly involved in the operation of ASP. Source: own construction.

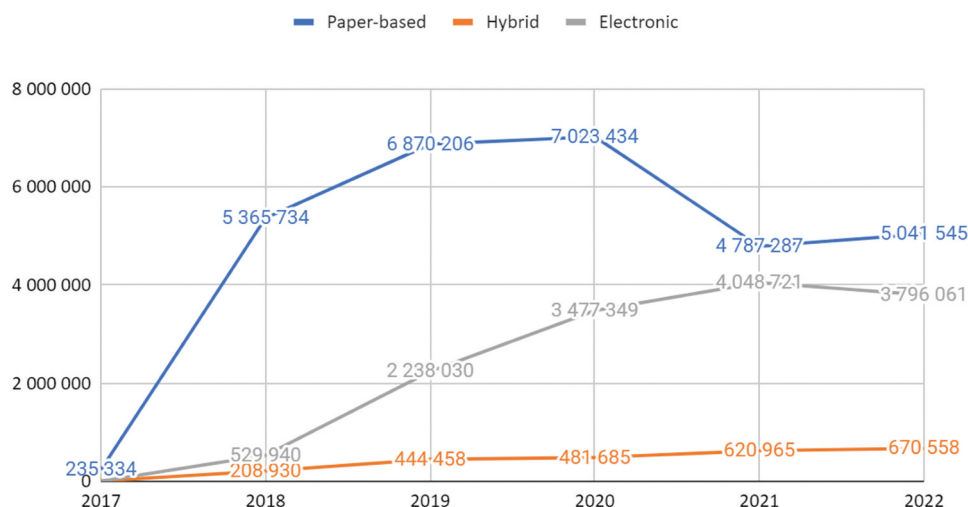


Figure 2. Number of case file types. Source: own construction.

favor of electronic case numbers is clearly visible (Figure 3). Using electronic services is in the best interest of citizens as it makes administration easier and faster. The pandemic accelerated this shift.

Our interviewees highlighted the efficiency gains as a result of introducing the document management application. The application supports municipalities in performing their tasks in a standardized and optimized way, as processes and tasks were optimized before introducing the application by considering municipalities' opinions and best practices as well. As a result, municipalities' internal operational efficiency has increased, and the time needed to handle cases has drastically decreased. Municipalities were required to join the ASP according to a predefined schedule, ensuring that efficiency gains appeared country-wide.

The efficiency of the system is also shown by the fact that the administration time (case closing time) has been radically reduced. This supports **hypothesis 1**: Digital transformation of the public administration system results in significant efficiency gains, and **hypothesis 2**: A centralized ICT-based infrastructure enhances the pace of transactions.

The trend of the decreasing case closing time can be observed in the case of not only the electronic but also the paper-based case numbers. Thus, digital transformation and related process development, standardization, and transparent performance encouraged the entire organization to manage cases faster. This supports **hypothesis 4**: Digital transformation of the public administration system also enhances paper-based transactions.

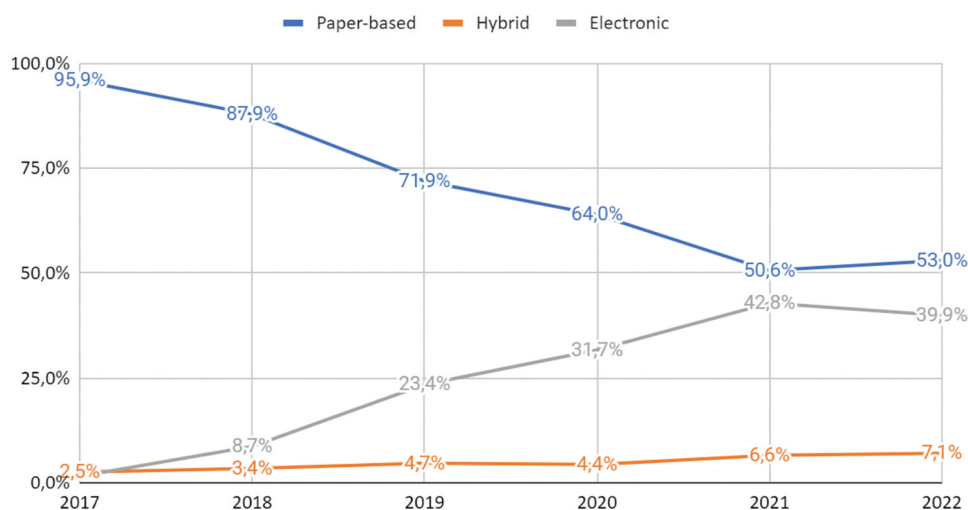


Figure 3. Ratio of case file types. Source: own construction.

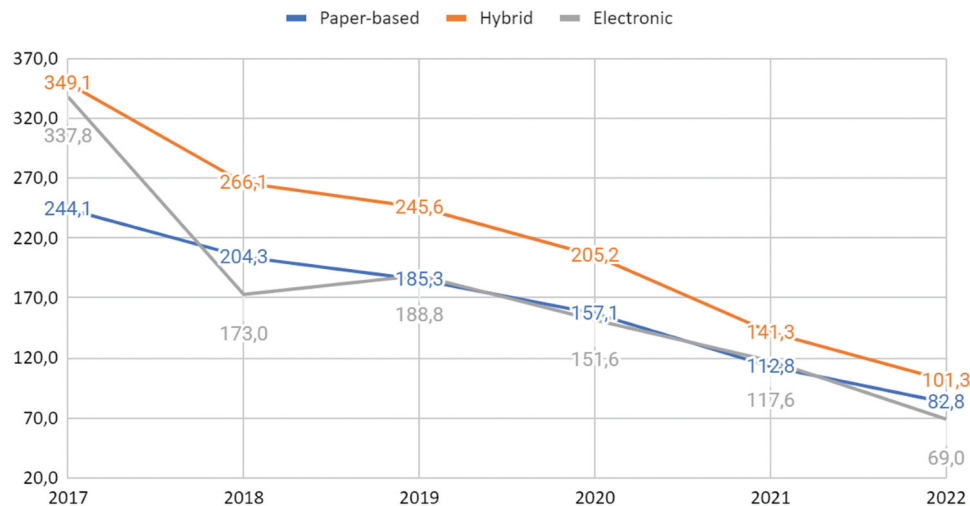


Figure 4. Average case closing time (days). Source: own construction.

In connection with the electronic cases, the learning curve is clearly visible: in the beginning, in 2017, closing time in the case of electronic cases was even longer than in the case of paper-based cases, but in 2022, it was already 13.8 days faster on average (Figure 4). In the beginning, digitalization caused additional tasks, but shortly after, quick wins were realized, as several processes were optimized and managed digitally, by using the document management application. Then, the co-evolution of paper-based and electronic cases can be observed. After the processes were optimized and set up, it became evident that electronic cases are faster. It partly supports **hypothesis 3**: Electronic transactions are inherently more efficient than paper-based transactions. This is true if the processes and services are fully digital, linked up with identification systems, payment systems, etc., and there are no additional inhibiting factors, such as human intervention. It took a few years of learning to achieve this state.

It does matter when we analyze the speed of managing (electronic) cases: in the case of the municipal ASP, it took a learning period of 5 years for electronic cases to become faster, i.e., more efficient than paper-based transactions.

Our analysis also points out that organizational size matters in the case of digital transformation: larger organizations have more potential benefits (Table 2). In the case of small municipalities, the speed of transactions was higher in the beginning (2017) in the case of paper-based, hybrid, and electronic cases as well, compared to large municipalities. However, in 2022, the opposite can be observed: large municipalities manage cases faster.

Discussion and conclusion

Steps for successfully digitalizing the public sector

Based on the success of the municipal ASP, the following recommendations can be defined for how to drive change and digitally transform the public sector. First, an *initial challenge* is needed. It was necessary to ensure that the municipalities operate transparently and per the legal regulations. It was not possible without digital technologies. However, digital technologies were expensive, thus only the larger municipalities could afford them, and they had the urge to function properly. Second, it is of key importance to *lobby*. Technology providers lobbied the government for the entire sector

Table 2. Average case closing time (days) in the case of small, medium, and large municipalities.

	Paper-based			Hybrid			Electronic		
	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
2017	238	249	1 034	345	350	1 419	240	386	1 497
2018	193	233	268	243	305	339	171	176	187
2019	174	190	240	231	245	308	162	170	314
2020	148	156	217	202	208	209	137	131	248
2021	114	112	109	142	141	139	103	98	201
2022	87	79	75	107	96	101	74	71	51

Source: own construction.

to work with their software in order to achieve transparency. In return, the provider could give its technology cheaply to the state, and the state was able to give the services for free to the municipalities. Thus, the financial challenge was defeated. A *strategic partnership* has also to be formed. Representatives of the main institutional stakeholders serving as change agents formed a strategic coalition to lead the digital transformation of the municipalities. Furthermore, *having a vision* is also essential. The vision of digital municipalities was a centralized platform with different applications that help municipalities operate transparently and follow the legal requirements. Moreover, *change agents* have to be mobilized. In the case of the ASP project, pioneer change agents were the technology providers which developed applications for the ASP, and pioneer users, i.e., the first municipalities that used the applications and served as success stories for roll-out. Finally, *continuous growth* has to be ensured. The document management application was downloaded by 1,377 users by the end of the first year (2016). The number of cases (including electronic, paper-based, and hybrid cases), managed by the document management application, increased from 245,333 to 8,219,490 between 2017 and 2022. Based on the success of the document management application, further applications were implemented on the ASP.

Our case provides a great example of the importance of change agents (Dorner, 2009) and achieving organizational and cultural changes and behavioral shifts in the case of all stakeholders (Margetts & Dunleavy, 2002).

Efficiency and recentralization

Through the municipal ASP, the Hungarian government enhanced the transparency and efficiency of government services (Aminah & Saksono, 2021; Mergel et al., 2019). Delivering government services through the utilization of information technology improved the performance of government institutions and services (Westerman et al., 2011): case closing times have decreased significantly. In line with Hammerschmid et al. (2023), we found empirical evidence for the continued importance of the key feature—namely, efficiency—of NPM in the digital era.

Although Hungary has a different socio-economic background and lags behind Denmark in terms of different indices measuring digital maturity, such as the DESI index, the digital transformation of the public administration system in Hungary have similar results as the Danish case example (Scupola & Mergel, 2022). The municipal ASP led to increased

efficiency and time savings (economic value), a common platform, improved data coherence and data sharing, compliance with regulations (administrative value), more satisfied customers as a result of reduced case closing times (societal value), better services and transparency (citizen value). For citizens, i.e., customers, administration is a hassle: their goal is to get their cases arranged and closed as fast as possible, without a lot of interactions and long hours spent in government offices. From this perspective, digital services provide value for them as digitalization accelerates administration time.

While our data support that electronic transactions are more efficient than traditional, paper-based transactions, we cannot state that electronic transactions (i.e., e-government or digital government) are instantly more efficient: a learning period is needed in order to achieve efficiency gains. Although it requires a few years of learning, our analysis also shows that larger organizations have more potential benefits due to economies of scale. This is in line with previous studies (Dangayach & Deshmukh, 2005; Horváth & Szabó, 2019; Kennedy & Hyland, 2003; McMahon, 2001; Mittal et al., 2018; Smit et al., 2016).

In terms of digitalization, it is a crucial milestone for many organizations to transition from utilizing physical files and documents to electronic document management, and printing paper copies when necessary (Dunleavy et al., 2006). Our case shows a great example of exceeding this step of digital maturity: Hungarian ASP includes not only electronic document management; in this case, the whole workflow is digitally driven.

Although the key components of digital-era governance (Dunleavy et al., 2006) refer to the central, national governance system, many of them appear in the case of the municipal ASP. Rollback of agencification happened through the mergers of municipalities, and central processes were (re)established by having one central system for all municipalities. Back-office functions were reengineered: the legacy system of paper copies was replaced by electronic workflows. In our case, not only did the back-office functions change, but new opportunities opened up for the front office, too: citizens can easily submit their requests through an easy-to-navigate interface. Procurement concentration can also be observed: all municipalities have to use either the applications provided in the frame of ASP, or they can use other systems, but in this case, these other systems must have exactly the same functions. In the latter case, municipalities are also responsible for finding and buying these other systems. Based on the fact that the municipal ASP resulted in more than 90% growth in terms of efficiency, it can also be assumed that it contributed to radically

reducing process costs. However, this is an area which requires further analysis.

In terms of needs-based holism, client-based reorganization, one-stop provision, interactive and “ask once” information seeking, and data warehousing can also be observed in the case of the nation-level digital governance services in Hungary. Citizens can easily access all services through one interface, and their data is centrally stored. ASP represents an end-to-end service reengineering and is a great example for achieving agile government processes as well: legal compliance is an essential feature.

Digitization changes can be widely observed in the case of the ASP. These changes include electronic services delivery (ESD), centralized, state-directed IT procurement, radical disintermediation (by making it possible for citizens and other stakeholders to directly connect to state systems), and a citizen-centered approach. However, some of the digitization changes defined by Dunleavy et al. (2006) do not appear in our case example. e.g., instead of active channel-streaming, workflows are the same no matter whether the “customer” started the process online or offline. Furthermore, the municipal ASP does not include new forms of automated processes, e.g., “zero-touch technology” (ZTT), either. It can be a future development stage; however, it is a question of to what extent digitalization is desirable in the public sector. According to Hanisch et al. (2023), augmented forms will be superior, where analogue and digital forms will co-exist and overcome each other’s shortcomings.

In line with some previous studies (Hammerschmid et al., 2023; Ibrahim, 2022; Margetts & Dunleavy, 2013), our case also highlights the importance of (re)centralization in connection with digitalizing the main public services offered by municipalities: one central system was established for all municipalities. Just like in India (Kompella, 2017), a centralized ICT-based infrastructure improved the speed of transactions in Hungary, too. At the same time, this centralized ICT system enables decentralization for municipalities (Allen et al., 2001). The case study shows how centralization can keep operations in line with protocols and standards, leverage economies of scale (King, 1983), ensure reliability, and provide instant data access (Evaristo et al., 2005). The document management application helps strengthen central power and diffuse bureaucratic power at the municipality level (Peled, 2001).

Digital governance goes further than digitalizing the existing analogue mechanisms

As Hanisch et al. (2023) and Merger et al. (2019) highlight, digital governance includes new forms of

organizing and creating value: IT is not enough in itself to achieve change; processes, people, policies, and leadership have to be changed. Our case provides an example of how the processes were transformed as a result of digitalization: the aspiration for a digital government positively impacted the paper-based processes and cases as well. It was not only a shift from analogue to digital services; it was rather a holistic and comprehensive approach that incorporated the optimization of all processes, as described by Mergel et al. (2019), Tangi et al. (2021), Haug et al. (2023) and Gil-Garcia et al. (2022). As Scholl (2022) and Grover et al. (1995) highlight, the digitalization of the public sector facilitates and enables transformational changes in the operation and business processes. According to Dunleavy et al. (2006), technology itself does not transform organizations; rather, it is how organizations operate and utilize technology that alters work practices. This could be observed in the case of the municipal ASP.

Our study shows the importance of organizational transformation (Damanpour & Evan, 1984), business process reengineering and standardization (Bharadwaj et al., 1993; Davenport, 2005; Marienfeldt et al., 2024; Mukherjee et al., 2019, 2021; Münstermann et al., 2010; Wüllenweber et al., 2008) in connection with implementing a technological innovation and achieving the expected efficiency gains. In the case of the ASP project and specifically, the document management application, the standard processes were defined by the related laws on a high level, but the standards on the municipality level were missing: these high-level regulations had to be broken down and standard processes guiding the operations of municipalities had to be defined. Process reengineering was necessary in the case of most municipalities in order to get rid of old practices and achieve legal compliance, and operate effectively and efficiently. A centralized IT system helped keep operations and processes in line with the laws and standards and offered the benefits of the scale of economy (King, 1983). Without an IT system, a lot of auditors would have been needed to audit the processes. An IT system can enforce that municipalities follow the pre-defined processes and standards. Thus, the analyzed project shows how the implementation of new technology, standardized processes and practices, and centralized IT management together can lead to improvements in the processing time of cases.

Further research directions

The very same activities and initiatives may not be working in different contexts. It would be important to analyze the cultural differences between municipalities

and identify the barriers to using the municipal ASP, especially the document management application. There might be some municipalities that are counter-interested in transparency. How can we overcome these barriers and cultural differences and motivate the municipalities which are currently performing poorly in terms of digitalization? It would be an interesting further research avenue to analyze and compare the cases of the best and worst-performing municipalities.

Based on the fact that the municipal ASP resulted in more than 90% growth in terms of efficiency, it can also be assumed that it contributed to radically reducing process costs. However, this is an area which requires further analysis. e.g., how has the number of employees of the municipalities changed? As a result of digitalization, their workload decreased; however, it is a question of whether it appears in terms of costs as well.

According to Hanisch et al. (2023), it is important to find the right measures in terms of digitalization: it is unlikely for automated governance to emerge as the sole dominant form. Instead, the prevailing mode of governance is likely to evolve toward augmented forms, blending analogue and digital approaches to complement each other and address their respective shortcomings. From this perspective, it would be interesting to analyze the case types within the document management application, and—based on the case numbers and the complexity of the cases—investigate which case types should be fully automated and which should be handled by humans. What are the barriers to fully automating the processes?

As previously discussed, digitalization reinforces centralization. However, it is also important to find the right balance between centralization and decentralization. It would be a further research area to investigate in the case of which case types it would be preferable to handle the cases in a decentralized way versus in a centralized way. e.g., as a future step, those cases that occur rarely could be handled by a central specialist.

The case study approach usually has limitations and potential contextual constraints regarding the generalizability of the findings; thus, it is recommended to investigate the research questions in the case of other countries' municipal systems. On the other hand, although local government systems vary greatly across countries, inefficiencies stemming from decentralized operations can be observed in many cases. Institutional backgrounds are different from country to country, but a lack of human, financial, and technical resources, higher administrative costs, etc., can limit the ability of municipalities to effectively deliver public services under decentralized conditions (see e.g., Faguet, 2004). While municipalities are decentralized by nature,

our case highlights that (re)centralizing some administrative functions can resolve these inefficiencies.

Author contributions

CRedit: **Borbála Szedmák:** Conceptualization, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft, Writing – review & editing; **László Varga:** Conceptualization, Data curation, Investigation; **Roland Z. Szabó:** Conceptualization, Formal analysis, Investigation, Methodology, Supervision, Validation, Visualization.

Disclosure statement

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

Funding

Borbála Szedmák's and László Varga's work within Project no. [C1760262] has been implemented with the support provided by the Ministry of Culture and Innovation of Hungary from the National Research, Development and Innovation Fund, financed under the KDP-2021 funding scheme. Roland Z. Szabó's work within Project No. [K 147436] has been implemented with the support provided by the Ministry of Culture and Innovation of Hungary from the National Research, Development and Innovation Fund, financed under the K_23 "OTKA" funding scheme.

Ethics approval

The Research and Ethics Committee of Corvinus University of Budapest has granted the research ethics approval for the research, under file number KRH/96/2025.

References

- Allen, B., Juillet, A., Pacquet, L., & Roy, G. J. (2001). E-Governance & government on-line in Canada: Partnerships, people & prospects. *Government Information Quarterly*, 18(2), 93–104. [https://doi.org/10.1016/S0740-624X\(01\)00063-6](https://doi.org/10.1016/S0740-624X(01)00063-6)
- Alshehri, M., & Drew, S. (2010). *Implementation of e-government: Advantages and challenges*. International Association for Scientific Knowledge (IASK).
- Aminah, S., & Saksono, H. (2021). Digital transformation of the government: A case study in Indonesia. *Malaysian Journal of Communication*, 37(2), 272–288. <https://doi.org/10.17576/JKMJC-2021-3702-17>
- Bergmann, A. (2021). Editorial: Digitalization starts affecting core processes. *Public Money & Management*, 41(4), 279–280. <https://doi.org/10.1080/09540962.2021.1885153>
- Bharadwaj, S. G., Varadarajan, P. R., & Fahy, J. (1993). Sustainable competitive advantage in service industries: A conceptual model and research propositions. *Journal of Marketing*, 57(4), 83–99. <https://doi.org/10.1177/002224299305700407>

- Chan, F. K., Thong, J. Y., Brown, S. A., & Venkatesh, V. (2021). Service design and citizen satisfaction with e-government services: A multidimensional perspective. *Public Administration Review*, 81(5), 874–894. <https://doi.org/10.1111/puar.13308>
- Clarke, A. (2020). Digital government units: What are they, and what do they mean for digital era public management renewal? *International Public Management Journal*, 23(3), 358–379. <https://doi.org/10.1080/10967494.2019.1686447>
- Damanpour, F., & Evan, W. M. (1984). Organizational innovation and performance: The problem of “organizational lag”. *Administrative Science Quarterly*, 29(3), 392–409. <https://doi.org/10.2307/2393031>
- Dan, S., & Pollitt, C. (2015). NPM can work: An optimistic review of the impact of new public management reforms in central and Eastern Europe. *Public Management Review*, 17(9), 1305–1332. <https://doi.org/10.1080/14719037.2014.908662>
- Dangayach, G. S., & Deshmukh, S. G. (2005). Advanced manufacturing technology implementation: Evidence from Indian small and medium enterprises. *Journal of Manufacturing Technology Management*, 16(5), 483–496. <https://doi.org/10.1108/17410380510600473>
- Davenport, T. H. (2005). The coming commoditization of processes. *Harvard Business Review*, 83(6), 100–108. <https://doi.org/10.1108/14637151211225207>
- Dorner, D. G. (2009). Public sector readiness for digital preservation in New Zealand: The rate of adoption of an innovation in records management practices. *Government Information Quarterly*, 26(2), 341–348. <https://doi.org/10.1016/j.giq.2008.11.003>
- Dunleavy, P., Margetts, H., Bastow, S., & Tinkler, J. (2006). New public management is dead - long live digital-era governance. *Journal of Public Administration Research and Theory*, 16(3), 467–494. <https://doi.org/10.1093/jopart/mui057>
- Enang, I., Asenova, D., & Bailey, S. J. (2020). Identifying influencing factors of sustainable public service transformation: A systematic literature review. *International Review of Administrative Sciences*, 88(1), 258–280. <https://doi.org/10.1177/0020852319896399>
- European Commission. (2013). *Powering European public sector innovation: Towards a new architecture*. <https://ec.europa.eu/digital-single-market/en/news/powering-european-public-sector-innovation-towards-new-architecture>
- Evaristo, J. R., Desouza, K. C., & Hollister, K. (2005). Centralization momentum: The pendulum swings back again. *Communications of the ACM*, 48(2), 66–71. <https://doi.org/10.1145/1042091.1042092>
- Faguet, J.-P. (2004). Does decentralization increase responsiveness to local needs? Evidence from Bolivia. *Journal of Public Economics*, 88(3–4), 867–893. [https://doi.org/10.1016/S0047-2727\(02\)00185-8](https://doi.org/10.1016/S0047-2727(02)00185-8)
- Gabryelczyk, R. (2020). Has COVID-19 accelerated digital transformation? Initial lessons learned for public administrations. *Information Systems Management*, 37(4), 303–309. <https://doi.org/10.1080/10580530.2020.1820633>
- Gil-Garcia, J. R., Dawes, S. S., & Pardo, T. A. (2018). Digital government and public management research: Finding the crossroads. *Public Management Review*, 20(5), 633–646. <https://doi.org/10.1080/14719037.2017.1327181>
- Gil-Garcia, J. R., Prentza, A., & Krimmer, R. (2022). Emerging topics in digital government mini-track (Introduction). *Proceedings of the 55th Hawaii International Conference on System Sciences*, Hawaii, USA.
- Grover, V., Jeong, S. R., Kettinger, W. J., & Teng, J. T. C. (1995). The implementation of business process reengineering. *Journal of Management Information*, 12(1), 109–144. <https://doi.org/10.1080/07421222.1995.11518072>
- Hammerschmid, G., Palaric, E., Rackwitz, M., & Wegrich, K. (2023). A shift in paradigm? Collaborative public administration in the context of national digitalization strategies. *Governance-An International Journal of Policy Administration and Institutions*, 37(2), 411–430. <https://doi.org/10.1111/gove.12778>
- Hanisch, M., Goldsby, C. M., Fabian, N. E., & Oehmichen, J. (2023). Digital governance: A conceptual framework and research agenda. *Journal of Business Research*, 162(113777), 1–13. <https://doi.org/10.1016/j.jbusres.2023.113777>
- Hao, Z., Liu, Y., Zhang, J., & Zhao, X. (2020). Political connection, corporate philanthropy and efficiency: Evidence from China’s anti-corruption campaign. *Journal of Comparative Economics*, 48(3), 688–708. <https://doi.org/10.1016/j.jce.2020.03.002>
- Haug, N., Dan, S., & Mergel, I. (2023). Digitally-induced change in the public sector: A systematic review and research agenda. *Public Management Review*, 26(7), 1963–1987. <https://doi.org/10.1080/14719037.2023.2234917>
- Horváth, D., & Szabó, Z. R. (2019). Driving forces and barriers of industry 4.0: Do multinational and small and medium-sized companies have equal opportunities? *Technological Forecasting and Social Change*, 146, 119–132. <https://doi.org/10.1016/j.techfore.2019.05.021>
- Ibrahim, A. M. (2022). A mapping towards a unified municipal platform: An investigative case study from a Norwegian municipality. *Sustainable Futures*, 4, 100063. <https://doi.org/10.1016/j.sfr.2022.100063>
- Jack, E. P., & Raturi, A. S. (2006). Lessons learned from methodological triangulation in management research. *Management Research News*, 29(6), 345–357. <https://doi.org/10.1108/01409170610683833>
- Kennedy, J., & Hyland, P. (2003). A comparison of manufacturing technology adoption in SMEs and large companies. *16th Annual Conference of Small Enterprise Association of Australia and New Zealand* (pp. 1–10). Ballarat.
- Kim, M., Kim, J. H., & Lennon, S. J. (2006). Online service attributes available on apparel retail web sites: An E-S-QUAL approach. *Managing Service Quality: An International Journal*, 16(1), 51–77. <https://doi.org/10.1108/09604520610639964>
- King, J. L. (1983). Centralized versus decentralized computing: Organizational considerations and management options. *ACM Computing Surveys (CSUR)*, 15(4), 319–349. <https://doi.org/10.1145/289.290>
- Kompella, L. (2017). E-Governance systems as socio-technical transitions using multi-level perspective with case studies. *Technological Forecasting & Social Change*, 123, 80–94. <https://doi.org/10.1016/j.techfore.2017.06.024>
- Kubicek, H., & Cimander, R. (2009, January). Three dimensions of organizational interoperability: Insights from recent studies for improving interoperability frameworks. *European Journal of EPractice*, 6, 1–12.

- Ma, L., & Zheng, Y. (2018). Does e-government performance actually boost citizen use? Evidence from European countries. *Public Management Review*, 20(10), 1513–1532. <https://doi.org/10.1080/14719037.2017.1412117>
- Margetts, H., & Dunleavy, P. (2002, April 4). *Better services through e-government: Academic article in support of "better services through e-government."* Stationery Office. For the UK National Audit Office. Retrieved August 25, 2023, from http://www.nao.gov.uk/publications/nao_reports/01-02/0102704-III.pdf
- Margetts, H., & Dunleavy, P. (2013). The second wave of digital-era governance: A quasi-paradigm for government on the web. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 371 (1987), 20120382. <https://doi.org/10.1098/rsta.2012.0382>
- Margetts, H., & Dunleavy, P. (2024). The political economy of digital government: How Silicon Valley firms drove conversion to data science and artificial intelligence in public management. *Public Money & Management*, 1–11. <https://doi.org/10.1080/09540962.2024.2389915>
- Mariénfeldt, J., Wehmeier, L. M., & Kuhlmann, S. (2024). Top-down or bottom-up digital transformation? A comparison of institutional changes and outcomes. *Public Money & Management*, 45(5), 456–465. <https://doi.org/10.1080/09540962.2024.2365351>
- McMahon, R. G. P. (2001). Growth and performance of manufacturing SMEs: The influence of financial management characteristics. *International Small Business Journal: Researching Entrepreneurship*, 19(3), 10–28.
- Mergel, I., Dickinson, H., Stenvall, J., & Gasco, M. (2023). Implementing AI in the public sector. *Public Management Review*, 1–14. <https://doi.org/10.1080/14719037.2023.2231950>
- Mergel, I., Edelman, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. *Government Information Quarterly*, 36(4), 101385. <https://doi.org/10.1016/j.giq.2019.06.002>
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis*. Sage Publications, Inc.
- Mittal, S., Khan Ahmad, M., Romero, D., & Wuest, T. (2018). A critical review of smart manufacturing & industry 4.0 maturity models: Implications for small and medium-sized enterprises (SMEs). *Journal of Manufacturing Systems*, 49, 194–214. <https://doi.org/10.1016/j.jmsy.2018.10.005>
- Moser-Plautz, B., & Schmidhuber, L. (2023). Digital government transformation as an organizational response to the COVID-19 pandemic. *Government Information Quarterly*, 40(3), 1–12. <https://doi.org/10.1016/j.giq.2023.101815>
- Mukherjee, K. K., Iyer, K. C., & Sawhney, A. (2019). Sector-level objectives and associated inhibiting and enabling factors for the Indian real estate sector from a process standardisation perspective. *Property Management*, 37(3), 367–389. <https://doi.org/10.1108/PM-03-2018-0019>
- Mukherjee, K. K., Reka, L., Mullahi, R., Jani, K., & Taraj, J. (2021). Public services: A standard process model following a structured process redesign. *Business Process Management Journal*, 27(3), 796–835. <https://doi.org/10.1108/BPMJ-03-2020-0107>
- Münstermann, B., Eckhardt, A., & Weitzel, T. (2010). The performance impact of business process standardization: An empirical evaluation of the recruitment process. *Business Process Management Journal*, 16(1), 29–56. <https://doi.org/10.1108/14637151011017930>
- Panagiotopoulos, P., Klievink, B., & Cordella, A. (2019). Public value creation in digital government. *Government Information Quarterly*, 36(4), 101421. <https://doi.org/10.1016/j.giq.2019.101421>
- Peled, A. (2001). Centralization or diffusion: Two tales of online government. *Administration & Society*, 32(6), 686–709. <https://doi.org/10.1177/00953990122019622>
- Qu, S. Q., & Dumay, J. (2011). The qualitative research interview. *Qualitative Research in Accounting and Management*, 8(3), 238–264. <https://doi.org/10.1108/11766091111162070>
- Rodríguez Domínguez, L., García Sánchez, I. M., & Gallego Álvarez, I. (2011). Determining factors of e-government development: A worldwide national approach. *International Public Management Journal*, 14(2), 218–248. <https://doi.org/10.1080/10967494.2011.597152>
- Salgues, B. (2018). *Society 5.0: Industry of the future, technologies, methods and tools* (vol. 1). Wiley.
- Scholl, H. J. (2022). Digital government research: A diverse domain. In Y. Charalabidis, L. S. Flak, & G. Viale Pereira (Eds.), *Scientific foundations of digital governance and transformation. Public administration and information technology* (Vol. 38). Springer. https://doi.org/10.1007/978-3-030-92945-9_3
- Scupola, A., & Mergel, I. (2022). Co-production in digital transformation of public administration and public value creation: The case of Denmark. *Government Information Quarterly*, 39, 101650. <https://doi.org/10.1016/j.giq.2021.101650>
- Smit, J., Kreutzer, S., Moeller, C., & Carlberg, M. (2016). *Industry 4.0*. Brussels: European Parliament.
- Tangi, L., Janssen, M., Benedetti, M., & Noci, G. (2020). Barriers and drivers of digital transformation in public organizations: Results from a survey in the Netherlands. In G. V. Pereira, M. Janssen, H. Lee, I. Lindgren, M. P. R. Bolívar, H. J. Scholl & A. Zuiderwijk (Eds.), *Electronic government. EGOV 2020. Lecture notes in computer science* (Vol. 12219, pp. 42–56). Springer. https://doi.org/10.1007/978-3-030-57599-1_4
- Tangi, L., Janssen, M., Benedetti, M., & Noci, G. (2021). Digital government transformation: A structural equation modelling analysis of driving and impeding factors. *International Journal of Information Management*, 60, 102356. <https://doi.org/10.1016/j.ijinfomgt.2021.102356>
- Twizeyimana, J. D., & Andersson, A. (2019). The public value of e-government – a literature review. *Government Information Quarterly*, 36(2), 167–178. <https://doi.org/10.1016/j.giq.2019.01.001>
- United Nations. (2016). *UN e-government survey 2016: e-government in support of sustainable development*. United Nations Department of Economic and Social Affairs. Public Administration UN. <https://publicadministration.un.org/egovkb/en-us/reports/un-e-government-survey-2016>
- Voghouei, H., & Jamali, M. A. (2018). Determinants of government efficiency: Does information technology play a role? *Eurasian Business Review*, 8(3), 285–298. <https://doi.org/10.1007/s40821-017-0088-2>
- Westerman, G., Calmédjane, C., Bonnet, D., Calmédjane, C., Ferraris, P., & McAfee, A. (2011, November 17). *Digital transformation: A road-map for billion-dollar organizations*. Capgemini. <https://www.capgemini.com/it-it/resources/digital-transformation-a-road-map-for-billion-dollar-organizations/>

- Wüllenweber, K., Beimborn, D., Weitzel, T., & König, W. (2008). The impact of process standardization on business process outsourcing success. *Information Systems Frontiers*, 10(2), 211–224. <https://doi.org/10.1007/s10796-008-9063-x>
- Zhu, B., Zhong, R., & Wei, C. (2024). Measuring digital government service performance: Evidence from China. *China Economic Review*, 83(102105), 102105–102117. <https://doi.org/10.1016/j.chieco.2023.102105>
- Zhu, Y.-Q., & Kindarto, A. (2016). A garbage can model of government IT project failures in developing countries: The effects of leadership, decision structure and team competence. *Government Information Quarterly*, 33(4), 629–637. <https://doi.org/10.1016/j.giq.2016.08.002>
- Ziemba, E., Papaj, T., Żelazny, R., & Jadamus-Hacura, M. (2016). Factors influencing the success of e-government. *Journal of Computer Information Systems*, 56(2), 156–167. <https://doi.org/10.1080/08874417.2016.1117378>

Appendices

Appendix A. Interview structure

- (1) What were the challenges the public sector and the municipalities faced before the ASP project?
- (2) What kind of previous solutions were implemented? How successful were these aspirations? Did they achieve the intended goals?
- (3) What were the goals of the ASP project?
- (4) Have these goals been met? What are the achieved benefits of the project?
- (5) What are the long-term goals of the project?
- (6) What is the structure of the ASP project?

Appendix B. Coding system for qualitative analysis

Descriptive codes	Themes	Insights
no common IT solution for supporting municipalities isolated solutions for a specific area municipalities lacking interoperability	fragmented solutions	challenges to be solved
costly, heterogeneous operations hard to oversee municipalities' actual financial status	financial inefficiency	
different levels of e-government administration maturity partly outdated back-office applications challenges with achieving full-scale digital administration	digitalization lag	
municipalities not handling cases according to regulations billions of HUFs were spent on the construction of local governments' IT systems and electronic administration	legal non-compliance financial investments	antecedents: individual subsidies not leading to expected results
tender programs affected just ~ 20% of local governments (bigger, wealthier municipalities) modern IT solutions only occurred occasionally maintenance and operation costs exceeded the budgets of the local governments	individual subsidies not having a wide effect individual subsidies not ensuring the efficient use of resources	
centrally developed integration interoperability standards technical quality standards	technological goals	mid-term goals
optimal investment, and operating resource utilization standardizing and supporting local governments' internal operations modernize fragmented and outdated technology applications	financial goals standardization goals technological benefits	achieved benefits
support interoperability increases the internal operational efficiency simplifying reporting obligations	benefits for municipalities	
monitoring the resource management of local governments centralizing the municipal reporting system	benefits for central public administration	
access to municipal and central administration services locally, in a one-stop shop increasing the performance of public administration	benefits for citizens and businesses faster administration and better customer service	long-term goals
development of the e-economy increasing digital literacy IT Service Provider Supervisory bodies Management Organization Service providers Subsystem providers	e-government structure of ASP	structure of ASP