DIGITALIZATION IN BUILDING THE RESILIENCE OF PUBLIC ORGANIZATIONS

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Purpose: The environment of contemporary public organizations is characterized by high dynamics of change, including those implied by crises. One important trend in the environment is the widespread digitization of organizations and the strong trend toward digitizing the management of public organizations and the use modern technologies in the delivery of public services. The COVID epidemic has significantly increased these activities. At the same time, demonstrating the need to build the resilience of public organizations. This article aims to look at how digitization can be used to build the resilience of public organizations.

Design/methodology/approach: a literature review was used as the research method.

Findings: the literature search conducted indicates that digitalization, and strictly digital maturity of organizations, can foster organizational resilience.

Originality/value: (Mandatory) The value of the article is the initial analysis of the literature on the digitalization of public organizations in relation to building organizational resilience in the public sector, which implies possibilities for future research and development of this research thread

Keywords: public organization, resilience, digitization.

Category of the paper: General review.

1. Introduction

Social, political, economic, and demographic changes are making public organizations look for better ways to provide public services. At the same time, cultural changes are taking place in the last decade of the twentieth century, resulting from the transition from an industrial civilization to a knowledge civilization. The change from a traditional society to a digital one has been so fast that people have decided to call it the fourth industrial revolution, which is also called Industry 4.0. We've seen a lot of digitization lately, which has been made even faster by the global Covid-19 pandemic. The digitization trend is supported by a number of European Union activities, such as an increase in funds allocated for ICT development and a change in the EU strategies in force for the Member States. The most recent strategy, Digital Compass

2030: The European Way in the Digital Decade, presented in 2021, focuses activities around creating conditions for achieving four main goals: (1) a digitally skilled society and highly skilled digital professionals; (2) secure, efficient and sustainable digital infrastructure; (3) digital transformation of businesses; and (4) digital transformation of public services. At the same time, the Covid-19 pandemic has clearly highlighted the need to build the resilience of public organizations, which can be supported precisely by the digitalization of organizations. This article presents considerations regarding the possibility of supporting the building of organizational resilience through the digitization of organizations. The article presents general considerations derived from the literature search.

2. Digitization of public organizations

The pressure to raise the quality and standard of life and the search for efficient ways of providing services has influenced the expansion of the areas of emanation of the Industry 4.0 concept, and the observed practice reveals many applications outside the context of the manufacturing industry in, for example, urban management, public and social services, and social and healthcare systems (Giulio, Vecchi, 2021; Chute, French, 2019). Regarding the public sector, the drive to improve operational efficiency through the use of modern technologies applies both to the actions of individual organizations that choose to do so, but also to entire areas of public service delivery through the implementation of relevant central or regional level programmes, thereby realizing the drive to transform the public sector towards Government 4.0 (Naqvi Al, Munoz, 2020). The transition towards Government 4.0 is not a single and short-term implementation of a specific technology, but rather a long-term evolutionary process of transforming the government/public sector to focus on citizen services (Walencik, 2018). The evolution towards Government 4.0, following Janowski (2015), can be divided into four stages:

- Digitalization - implementing ICT to improve its internal processes and structures, e.g. launching websites.
- Transformation - implementation of ICT with applied organizational and process transformation within the administration itself, without changes in stakeholder relations, e.g. e-government.
- Engagement - the use of ICT to both support internal processes and to support the communication and relations of the public administration with stakeholders, e.g. e-processes, e-public services, e-governance.
- Contextualization - the impact of ICT use in public administration on the whole public sector and its stakeholders.

The use of modern technology in the public sector can help improve the delivery of public services and contribute to the best use of available resources. The benefits of using modern technology in the public sector (Väyrynen, Helander, Jalonen, 2023; Ziemba, Papaj, 2023; Naqvi Al, Munoz, 2020; Stern, Daub et al., 2018; Walencik, 2018) include. Identification of problems in real time and faster response to them; faster and more efficient decision-making and more accurate decisions; access to huge amounts of data, which allows improving the analysis carried out, provides new *evidence* for the design and adaptation of public policies to the new reality (*evidence-based public policies*); reduction of time in dealing with official matters, bureaucracy, more personalized service for citizens and business; cost reductions; increased efficiency of the administration; improved innovation in public service delivery; ICT enables the introduction of reforms relating to the way in which public organizations operate; increased transparency of public sector activities; increased quality of services; new channels of communication and, as a result, improved information flow and support for active citizen participation.

At the same time, reaping the full benefits of applying the technologies known as Industry 4.0 to the public sector requires overcoming emerging obstacles. Among them, we can point out (Kitsios et al., 2023; Kuhlmann, Heuberger, 2021; Naqvi Al, Munoz, 2020): (1) the often outdated information technology (IT) infrastructure in public organizations; (2) the lack of statistical awareness and the lack of tool experience of staff (especially relevant for Big Data analyses); (3) the problem of data access while protecting sensitive data; (4) the low quality of available data (e.g. incompleteness); (5) problem of bureaucratic internal procedures in the organization; (6) lack of financial resources; (7) lack of trust of users (citizens) in new technological solutions; (8) resistance of employees of public organizations; (9) lack of specialists; (10) outdated regulations and working procedures; (11) administrative law.

The implementation of modern technology into the functioning of the public sector is a significant change in its operating principles and requires proper management of the change process. Müller and Abildgaard Skau (2015), based on a literature review, identified six areas that need to be examined in the change process to increase the likelihood of success, viz:

- External environment (legislation, political and administrative reforms, socio-economic factors).
- Organization (financial resources, organizational infrastructure, cooperation, stakeholders, organizational culture).
- Governance (commitment, strategy, project management).
- Employees (human resources, resistance to change, education and training).
- Citizens (digital exclusion, education and training, citizens' needs and trust).
- Technology (infrastructure, security, design, and access).

The areas of digitization related to public management concern various spheres of socio-economic life. Digitization, together with the dynamic development of increasingly sophisticated ICT, are becoming alternatives to or replacing existing solutions. The main domain of digitization expansion in public institutions is the creation of public e-services as *front office* (supporting interaction between the customer and the public institution) and the implementation of IT systems as *back office* (supporting *back office* and internal processes in public institutions.

3. Resilience of public organizations

Key findings and developments in research on the resilience of public organizations highlight the dynamic and context-dependent nature of resilience. Organizational resilience is defined as the ability to absorb shocks, develop responses and engage in transformational action to take advantage of disruptive events (Bracci, Tallaki et al., 2021). This resilience is not just about returning to a previous state, but involves transformation and adaptation to new circumstances (Bracci, Tallaki et al., 2021). Resilience can be both planned and adaptive, encompassing predetermined planning opportunities and emergent responses to crises, respectively (Bracci, Tallaki et al., 2021). Resilience is increasingly recognized as crucial for organizations facing complex technologies and external dependencies that expose them to multiple risks and require them to maintain or improve their performance in times of adversity. Several characteristics and processes that underpin organizational resilience have been identified in the literature, including risk awareness, collaboration, agility and improvisation, supported by corporate philosophy, decentralization, information systems and human resource management processes (Leite, Hodgkinson et al., 2021). However, these characteristics and processes are not universally applicable but vary according to context, highlighting the need for a contextual approach to resilience in public organizations (Leite, Hodgkinson et al., 2021). Resilience is influenced by an organization's strategy, resources, culture and structures, and can be significantly affected by political leadership during crises (Bracci, Tallaki et al., 2021). For example, local government organizations demonstrate resilience by reinventing institutional forms and strategically managing change through decision support systems that facilitate information flows (Bracci, Tallaki et al., 2021). Resilient organizations are characterized by situational awareness, tolerance for ambiguity, agility, creativity and the ability to manage vulnerabilities and learn from experience (Parker, 2023). Employee resilience is also crucial, emphasizing the need for continuous learning, collaboration and adaptability in the face of high demands and an uncertain environment (Pinheiro et al.). Public organizations need to balance the need for flexibility and adaptability with stability, predictability and efficiency, as they are primarily responsible for providing daily services to the community

(Duit, 2016). Interorganisational coordination and citizen co-production are identified as mechanisms to increase the resilience of public service delivery systems. These mechanisms improve governance effectiveness and transform service delivery systems into resilient structures capable of coping with shocks (Shen, Cheng et al., 2022). Overall, the research suggests that resilience in public organizations is a complex, multi-faceted phenomenon that requires a nuanced understanding of the specific characteristics, processes and contextual factors that contribute to resilience. This understanding is essential for developing effective strategies to enhance the resilience of public organizations in the face of crises and disruptive change. Key challenges in public organization resilience include balancing the need for flexibility and adaptability with stability and predictability, addressing bureaucratic constraints that hinder resilience, and the complexity of interorganisational collaboration and multi-level governance (Duit, 2016; Bracci, Tallaki et al., 2021; Leite, Hodgkinson et al., 2021). Open questions include how to effectively integrate resilience thinking into daily public service delivery and how to develop resilience as a dynamic capability among employees (Pinheiro et al.; Shen, Cheng et al., 2022).

4. Digitization and resilience of public organizations

Digitalization significantly increases the resilience of public organizations, enabling them to adapt quickly, improve efficiency and make data-driven decisions (Rădoiu, Bătuşaru, Porancea-Răulea, 2024). It also fosters collaboration and ensures business continuity by putting stakeholders at the centre and promoting an integrated, innovation-driven mindset (Rădoiu, Bătuşaru, Porancea-Răulea, 2024). In the context of public service delivery, digital platforms have decentralized the process, enabling citizens and communities to co-produce and ensuring government responsiveness after a crisis, which contributes to transformative resilience (Shen, Cheng et al., 2022). This transformative resilience is further supported by digital platforms reducing the cost of citizen participation, thereby potentially addressing the scale of co-production and shared governance (Shen, Cheng et al., 2022). Overall, digitization not only supports recovery resilience, but also fosters transformational resilience, enabling public organizations to effectively manage change and increase resilience (Shen, Cheng et al., 2022; Bracci, Tallaki et al., 2021). Digitalization plays a key role in enhancing the resilience of public organizations, enabling them to adapt quickly, improve operational efficiency and ensure continuity of service delivery. However, the integration of digital tools also comes with challenges, such as concerns about data privacy, the need for interoperability between different systems and the potential monopolization of digital platforms (Rădoiu, Bătuşaru, Porancea-Răulea, 2024; Shen, Cheng et al., 2022). Opportunities provided by the digitization of public organizations in relation to building organizational resilience:

- Improved decision-making: Digital tools facilitate data-driven decision-making, which can significantly improve the responsiveness and adaptability of public organizations in crisis.

- Citizen participation: Digital platforms reduce the cost of citizen engagement, thereby increasing the shared governance and co-production of public services that are essential for transformational resilience (Shen, Cheng et al., 2022; Yang, Cheng et al., 2020).

- Sustainability and efficiency: Digitization in building design and construction promotes sustainability by enabling analysis of long-term impacts and supporting complex decision-making processes for retrofitting and greener buildings (Muench et al.)

- Talent management: Digitalization supports the continuous development of human capital through training and talent management, which is key to maintaining an innovative and resilient workforce.

- Ethical and secure digitization: Consideration of ethical issues such as data privacy and cybersecurity can lead to best practices to ensure safe and responsible use of digital tools in public organizations.

- Improved crisis management: Digitalization can improve the resilience of public organizations, enabling more effective crisis management through real-time data and better communication tools (Gaie, Lacerda et al., 2022).

- Knowledge management: implementing continuous improvement plans based on critical knowledge can significantly increase organizational resilience, preparing them better for future challenges (Lima, Sell et al., 2023).

- Educational integration: developing educational programmes that integrate digitalization with public sector-oriented courses can better prepare future employees, ensuring a smoother transition and adaptation to digital technologies in public organizations (Müller-Török, Prosser et al., 2022).

As Elston, Bel et al. (2022) the use of advanced technologies to enhance situational awareness and operational efficiency can help organizations maintain or improve performance during unexpected adversity.

Digital maturity has also been linked to higher levels of organizational resilience, as digitally mature organizations showed better situational awareness and adaptive capacity during the COVID-19 pandemic (Robertson, Botha et al., 2022). Digital maturity was identified as a key driver of organizational resilience, with digitally mature organizations demonstrating greater adaptability and situational awareness during disruptions such as the COVID-19 pandemic (Robertson, Botha et al., 2022). This suggests that digital leadership, not just capabilities, play a key role in enhancing resilience (Robertson, Botha et al., 2022).

Furthermore, the resilience of community and care organizations during pandemics highlighted the role of absorptive, adaptive and transformational capacities in responding to crises, with organizations that created networks of trust and intra-organisational collaboration

adapting more effectively (Dayson, Bimpson et al., 2021; Orru, Nero et al., 2021). Finally, the development of resilience frameworks and models has facilitated a more profound understanding of the factors contributing to organizational resilience and provided a basis for further research into effective strategies for enhancing resilience in different organizational contexts (Tashiro, Kitago et al., 2024; Nair, Manohar et al., 2024).

Key findings and developments in the research topic of public organization digitization and organizational resilience include several aspects. Firstly, the digitization of public sector ICT is driven by factors such as increased self-service via the Internet, IoT, real-time business intelligence and integrated information systems, which are fundamentally changing the public sector ICT landscape (Müller-Török, Prosser et al., 2022). This transformation is particularly evident in the context of smart cities, which rely heavily on smart infrastructure (Müller-Török, Prosser et al., 2022).

Secondly, a focal point of the research was the resilience of public organizations, especially during crises such as the COVID-19 pandemic. The research showed that public organizations can maintain resilience by managing critical knowledge and developing continuous improvement plans based on this knowledge (Lima, Sell et al., 2023). Furthermore, the resilience of IT projects in public services has been enhanced by strengthening the organizational, operational, functional and design dimensions, which proved crucial during the pandemic (Gaie, Lacerda et al., 2022).

In addition, research highlights the importance of flexible organizational structures, a cohesive organizational culture and multi-stakeholder participation in promoting project success and resilience (Yang, Cheng et al., 2020). Public participation and the use of big data are also highlighted as important factors for improving organizational resilience (Yang, Cheng et al., 2020).

Finally, the transition to teleworking during the COVID-19 pandemic tested the resilience of public services and the results suggest that public services were resilient to the crisis and that the transition to teleworking was manageable for employees (Fischer, Siegel et al., 2022). This indicates that public organizations have the potential to adapt to significant changes in the working environment while maintaining operational resilience.

Recent developments in the digitization of public organizations and organizational resilience include various innovative approaches and tools to enhance resilience and adapt to changing environments. For example, the Resilience Analysis Grid (RAG) has been successfully used to assess and improve the organizational resilience of the Santa Catarina Civil Defence, demonstrating the importance of critical knowledge management in public organizations (Lima, Sell et al., 2023). In addition, information systems integration, particularly in the context of smart cities, has been identified as a key driver of public sector ICT digitization, fundamentally changing the landscape of public sector operations (Müller-Török, Prosser et al., 2023).

Digitising public organizations and enhancing organizational resilience are crucial in today's rapidly changing global landscape. Key challenges include integrating new technologies, managing the digital divide and ensuring continuous improvements in resilience through critical knowledge management (Lima, Sell et al., 2023; Müller-Török, Prosser et al., 2022; Skøtt, 2021).

5. Conclusion

The field of organizational resilience is evolving from a mechanistic view of bouncing back from the bottom after a crisis to a more adaptive and transformational approach that emphasizes learning and network relationships. Key challenges include the need for comprehensive assessment methods and a more profound understanding of the interaction between resilience and other organizational attributes such as digital maturity and social capital. In conclusion, the digital transformation of public sector organizations, driven by the rapid advancement of Industry 4.0 technologies and accelerated by the COVID-19 pandemic, presents both significant opportunities and challenges. As public organizations embrace digitization, they are increasingly equipped to enhance operational efficiency, support data-driven decision-making, and foster greater citizen engagement, all of which contribute to their resilience. Digitization allows these organizations to respond more effectively to crises, adapt to changing environments, and maintain continuity in public service delivery.

However, realizing the full potential of digital technologies in building organizational resilience requires addressing critical barriers such as outdated IT infrastructure, data privacy concerns, and resistance to change among staff. Successful digital transformation also demands strong leadership, a commitment to continuous learning, and the development of flexible structures that promote collaboration and innovation. Ultimately, digitization not only supports the immediate recovery and adaptive resilience of public organizations but also enables their long-term transformative resilience, positioning them to thrive in an increasingly complex and dynamic world. The integration of digital tools and strategies, when effectively managed, will be crucial for the continued evolution and resilience of the public sector in the face of future disruptions.

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