Digital Governance of Public Policies in the European Union under Crisis Conditions (2018–2025): A Systematic Review of Resilience and Institutional Adaptation

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This study provides a systematic review of digital governance in the European Union under crisis conditions, analysing 27 Web of Science-indexed publications (2018–2025). It examines how crises such as COVID-19, the war in Ukraine, and economic disruptions have transformed

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digitalisation from a modernisation tool into a structural pillar of administrative resilience and democratic legitimacy. Using bibliometric mapping and thematic synthesis, the review identifies five key dimensions of digital resilience: infrastructure, competences, trust, regulation, and coordination. The findings show that digitally advanced administrations, such as Estonia and Slovenia, converted crises into opportunities for institutional learning, while fragmented systems in Central and Eastern Europe displayed uneven levels of maturity. The study contributes to digital institutionalism by proposing an integrative framework of resilience-by-design and highlights the need for anticipatory governance that aligns innovation, ethics, and accountability in future European digital policies.

Keywords: digital governance, public policy, institutional resilience, digital transformation, European Union

1. Introduction

Over the past two decades, the European Union has been repeatedly confronted with crises that have tested not only its political cohesion but also the operational resilience of its administrative systems. From the global financial turmoil of 2008 to the migration pressures of 2015, from Brexit to the COVID-19 pandemic and, most recently, the geopolitical disruptions caused by the war in Ukraine, each successive shock has accelerated an underlying transformation within European public governance: the gradual integration of core governmental functions, interactions, and accountability mechanisms into the digital sphere. What was once perceived merely as a set of ancillary e-government services designed to streamline bureaucracy has evolved into a strategic infrastructure of resilience and legitimacy. In the 2000s, digitalisation was often synonymous with modernisation; today, it represents a precondition for the continuity of governance and the credibility of democratic institutions (European Commission, 2023).

This evolution was further institutionalised through the European Commission's communication "2030 Digital Compass: The European Way for the Digital Decade", which established measurable targets for Europe's digital transformation, including gigabit connectivity and the digitalisa-

tion of public services, and introduced a coordinated governance framework for monitoring Member States' progress toward the 2030 objectives (European Commission, 2021).

The Digital Economy and Society Index (DESI), updated annually, operationalises this framework by monitoring four dimensions – connectivity, human capital, integration of digital technology, and digital public services – and consistently reveals the persistence of a digital divide between the north-western and south-eastern regions of the Union. While Finland, Sweden, Denmark, and the Netherlands score above the EU average, countries such as Romania, Bulgaria, and Greece continue to lag behind, particularly in terms of digital skills and the integration of technology into public administration (European Commission, 2023).

The relevance of this agenda became especially evident during the COVID-19 pandemic, which functioned as an unprecedented stress test for the European administrative architecture. Lockdowns, mobility restrictions, and the sudden need for data-driven decision-making exposed the centrality of digital infrastructures for maintaining essential services. The availability of online platforms, the interoperability of administrative registries, and the digital competences of public officials proved decisive in differentiating between institutions capable of ensuring continuity and those that experienced operational paralysis. Eurostat data indicate that between 2019 and 2021, the proportion of citizens accessing online public services rose by ten percentage points across the Union, with significant variations between the digital core and its periphery (European Commission, 2023). Consequently, digitalisation shifted from a policy option to a structural imperative – *a sine qua non* of governance resilience and public safety.

Comparative research confirms this dynamic. Hodžić, Ravšelj, and Jurlina-Alibegović (2021) demonstrate a strong correlation between e-government maturity – measured through online service availability, telecommunications infrastructure, and human capital – and indicators of governmental efficiency. Yet this relationship is mediated by institutional variables such as the rule of law, which conditions the capacity of states to capitalise on technological investment. Estonia exemplifies this convergence between digital infrastructure, innovation-oriented culture, and coherent institutional design. With over 99% of public services available online even before the pandemic, Estonia's model demonstrates how proactive, long-term investments in integrated digital ecosystems enhance institutional adaptability and democratic stability. Conversely, studies

focusing on Central and Eastern Europe, such as Frățilă and colleagues (2023), highlight persistent asymmetries. Using panel data for Romania's macro-regions, the authors show that while platforms like "ghiseul.ro" increase fiscal transparency and local revenues, their impact remains uneven due to deficits in broadband coverage and digital competences – confirming earlier findings by Lincaru and colleagues (2018) that link human-capital density in public administration to the territorial distribution of e-services.

These territorial inequalities underline a fundamental paradox: digitalisation can both mitigate and reproduce structural disparities. Where digital infrastructures are robust and administrative staff are digitally literate, governments achieve measurable gains in efficiency and transparency. Where these preconditions are absent, digital reforms risk deepening exclusion. Gavriluță, Stoica, and Farte (2022) arrive at similar conclusions in their comparative study of Romanian municipal websites, revealing that pandemic-induced digitalisation often remained incremental in the absence of coherent national strategies. Beyond infrastructure, trust and organisational culture emerge as equally decisive. Decman and Kozel (2023), examining e-voting in Slovenia, found that citizens' intention to adopt digital participation tools correlates not with the external pressure of crisis but with pre-existing trust in institutions and technology – implying that resilience cannot be legislated overnight but must be built through transparency and engagement.

At the same time, the literature increasingly connects digital governance to normative and legal dimensions. Aseeva (2024) conceptualises "liability and sustainability by design", advocating regulatory frameworks that embed ethical responsibility and compliance into technological architecture from inception. Similarly, Wilford and colleagues (2021) warn that distributed-ledger technologies, such as vaccine passports, introduce governance risks in the absence of interoperable standards. These analyses converge with Gerybaite's (2021) argument that European digital governance must balance security imperatives with individual rights, ensuring that emergency-driven innovation does not compromise fundamental freedoms.

Despite this growing body of evidence, a systematic synthesis of how crises reshape the digitalisation trajectory of EU public governance remains lacking. Most studies adopt sectoral or national lenses, focusing on health, taxation, or education, while overlooking how cross-sectoral dynamics – skills, trust, regulatory alignment, and coordination – inter-

act to produce resilience at the system level. The present article seeks to fill this analytical gap by conducting a systematic literature review of 27 peer-reviewed studies published between 2018 and 2025 in the Web of Science Core Collection. Through a combined bibliometric mapping and thematic synthesis, the paper explores how the digital dimension of public policies in the European Union evolved under crisis conditions, identifying common enabling factors and structural vulnerabilities. It argues that sustainable digital governance depends on embedding trust, equity, and algorithmic accountability into administrative design, transforming digitalisation from a technical innovation into a normative framework of democratic resilience.

The article is structured as follows. The next section outlines the methodological approach, detailing the search strategy, inclusion criteria, and bibliometric parameters. This is followed by the literature review, which synthesises thematic clusters emerging from the analysis—ranging from infrastructure and digital competences to institutional trust, regulation, and strategic coordination. The discussion section interprets these findings within the broader debates on administrative modernisation and resilience, and the concluding section formulates implications for future policy and research within the European Union.

2. Methodology

This study applies a systematic and conceptually grounded literature review (SLR) that integrates bibliometric mapping with qualitative thematic synthesis in order to trace how the digital dimension of public governance in the European Union has evolved under crisis conditions. The methodological design seeks to balance quantitative transparency with interpretive depth, aligning with best practices in policy and governance research (Snyder, 2019; Tranfield et al., 2003). Through this approach, the analysis moves beyond simple enumeration of studies to reconstruct the conceptual architecture through which scholars have theorised digital resilience and administrative continuity during crises.

All sources were retrieved exclusively from the Web of Science (WoS) Core Collection, selected for its rigorous peer-review criteria, structured metadata, and multidisciplinary coverage across political science, public administration, law, and information technology. The exclusive reliance on WoS ensured consistency and reduced the methodological bias as-

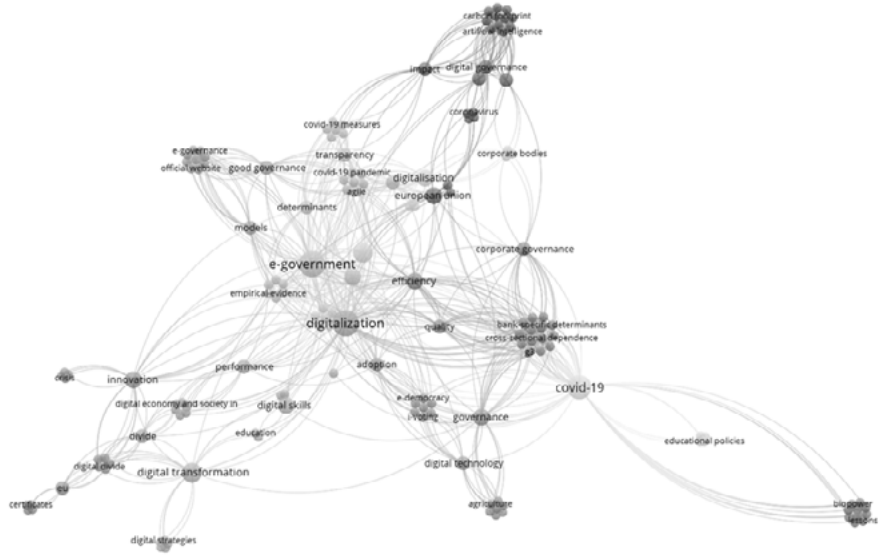
sociated with grey literature or non-indexed publications. The temporal scope (2018–2025) was chosen to capture the pre-pandemic acceleration of digital transformation and the subsequent reconfiguration triggered by the COVID-19 pandemic, the war in Ukraine, and economic disruptions. This time frame therefore represents a natural experimental period for assessing how crises acted as catalysts for digital reform within EU public systems.

The search strategy was designed to capture the intersection of four conceptual domains central to the study: digital transformation and e-government; crisis management and institutional resilience; public administration and policy design; and the European regional context. The Boolean search string applied to the "Topic" field was: ("digital governance" OR "e-government" OR "digital transformation") AND ("COVID-19" OR "crisis" OR "resilience" OR "emergency") AND ("public administration" OR "policy" OR "government") AND ("European Union" OR "EU" OR "Europe").

The initial Web of Science search retrieved 2,718 records published between 2018 and 2025. The results were subsequently filtered to include only journal articles and conference proceedings published in English and available as open access, ensuring access to the full text for qualitative examination. A two-stage screening procedure was then applied. First, titles, abstracts, and keywords were examined to determine substantive relevance to the four dimensions underpinning the study: digital transformation or e-government, crisis or institutional resilience, public administration or public policy, and a European or European Union context. Records were excluded if they focused exclusively on private-sector digital innovation; technical, engineering, or cybersecurity issues without a substantive public-administration or governance component; non-European settings without direct relevance to the European context; or studies in which crisis, resilience, or digital transformation were mentioned only incidentally rather than constituting a central analytical dimension. Duplicate records and publications that did not meet the predefined document-type, language, temporal, or accessibility criteria were also removed. The remaining potentially relevant studies were subjected to full-text verification, and only publications satisfying all four substantive eligibility dimensions were retained. This screening and eligibility assessment resulted in a final analytical corpus of 27 publications, selected for their direct relevance to the relationship between crisis-driven digital transformation and public-sector governance in Europe.

The bibliographic records – comprising titles, abstracts, author keywords, and citation data – were exported from Web of Science in CSV format and processed using VOSviewer 1.6.19. A keyword co-occurrence analysis was conducted to visualise the conceptual relationships among studies. The inclusion threshold was set at a minimum of two keyword occurrences, ensuring semantic density while minimising noise. Synonymous expressions (e.g., "e-government" and "electronic government") were merged, and generic descriptors such as "Europe", "impact", or "case study" were excluded. The resulting network and density visualisations captured the structural patterns and frequency distributions that underpin the current research landscape of digital governance under crisis conditions.

Figure 1: *Keyword co-occurrence network of literature on digital public governance in the European Union (2018–2025).*



Source: Author, based on Web of Science Core Collection data, visualized using VOSviewer 1.6.19.

Figure 1 presents the conceptual network generated in VOSviewer exclusively from the 27 publications retained after the screening and eligibility assessment. Records excluded during the previous stages were not included in the bibliometric mapping. Nodes represent keywords extracted from the final analytical corpus, with node size corresponding to their frequency of occurrence. The distribution of nodes indicates distinct the-

matic clusters identified through co-occurrence patterns, while the spatial proximity between nodes reflects the strength of their conceptual association. Accordingly, the network should be interpreted as a representation of the thematic structure of the final eligible corpus rather than of the entire set of records initially retrieved from Web of Science.

The conceptual mapping illustrated in Figure 1 provided the analytical foundation for the qualitative thematic synthesis. Each of the 27 papers was subjected to systematic reading and coding. Following the grounded theory logic (Strauss & Corbin, 1998), the process involved three iterative stages: open coding, which identified recurring concepts and variables; axial coding, which connected them into analytical categories; and selective coding, through which the categories were integrated into a coherent interpretive framework. Through this iterative comparison, five cross-cutting dimensions emerged – infrastructure, digital competences, institutional trust, regulatory adaptation, and strategic coordination – which collectively capture the conceptual logic of digital resilience in the EU's public governance.

To ensure methodological consistency, several verification measures were implemented. All records were retrieved exclusively from the Web of Science Core Collection, and their eligibility was verified through examination of titles, abstracts, keywords, and, where necessary, full texts. The final corpus was jointly reviewed and coded by the two authors during a structured Microsoft Teams session using a predefined coding framework. Each publication was discussed in relation to the analytical categories, and coding decisions were reached by consensus. As the coding procedure was collaborative rather than independent, no formal inter-coder reliability coefficient was calculated. Descriptive statistics on publication year, geographical coverage, and disciplinary orientation were subsequently used to characterise the composition of the corpus and identify potential regional or thematic imbalances.

Nevertheless, several constraints must be acknowledged. The exclusive reliance on Web of Science may underrepresent policy reports, governmental white papers, or practitioner literature that contribute to applied insights. The language filter (English) excludes analyses published in national languages, particularly in Central and Eastern Europe, where digitalisation trajectories often diverge. The 2018–2025 temporal window captures the pandemic and post-pandemic acceleration but omits the earlier conceptual formation of e-government frameworks in the 2000s. Finally, bibliometric mapping privileges keyword-rich, technologically

oriented studies, potentially marginalising qualitative or normative work with lower citation visibility. These limitations are inherent to the SLR method but are mitigated through transparency in selection, triangulation of validation procedures, and critical contextual interpretation.

3. Results and Findings

The bibliometric mapping and thematic synthesis conducted across the 27 Web of Science-indexed studies revealed a complex yet internally coherent conceptual structure, reflecting the gradual transformation of digitalisation from a modernisation tool into a structural mechanism of administrative resilience. Thirteen thematic clusters were identified through keyword co-occurrence analysis, subsequently consolidated into five analytical dimensions that describe how the European Union and its member states have operationalised digital governance under crisis conditions: infrastructure and technological depth; digital competences and organisational capacity; institutional trust and democratic legitimacy; regulatory adaptation and ethical governance; and strategic coordination and policy coherence. Together, these dimensions form an interpretive framework for understanding how digital transformation sustains public institutions during systemic disruptions such as the COVID-19 pandemic, the war in Ukraine, and economic shocks.

3.1. Infrastructure and Technological Depth

The first and most dominant dimension concerns the technological underpinnings of digital resilience. Across the European Union, the ability of governments to ensure administrative continuity during crises has been strongly associated with the maturity of their digital infrastructure. Hodžić, Ravšelj, and Jurlina-Alibegović (2021) demonstrated that e-government maturity – measured through online service availability, telecommunications infrastructure, and human capital – is positively correlated with governmental efficiency and effectiveness. Similarly, Doran and colleagues (2023), using data from the European e-Government Development Index (EGDI), found that the density of broadband networks, mobile connectivity, and online service quality collectively explain a significant portion of the variation in government performance across EU member states. Complementing these findings, Aristovnik and colleagues

(2021), in a comparative study of local administrative authorities in five European countries, found that the first wave of COVID-19 accelerated ICT use while also exposing differences in regulatory clarity and organisational readiness.

However, the literature also reveals pronounced territorial asymmetries. Frățilă and colleagues (2023) show that the Romanian digital payment platform "ghiseul.ro" produced measurable increases in local tax revenue and fiscal transparency, yet its efficiency remains geographically uneven, being concentrated in regions with high broadband penetration and digitally skilled personnel. These findings corroborate those of Lincaru and colleagues (2018), who emphasised the role of "human capital clusters" as predictors of investment priorities in digital infrastructure. The interdependence between physical connectivity and institutional capacity is a recurring insight: digitalisation alone does not generate resilience unless supported by equitable infrastructural distribution. The Estonian case further validates this argument. With over 99% of public services available online prior to the pandemic, Estonia demonstrates how early investment in interoperable platforms and e-identity systems enables administrative continuity and crisis adaptability. Conversely, in states where infrastructure remains fragmented or centralised, digital initiatives often replicate pre-existing bureaucratic inefficiencies instead of mitigating them (Makarychev & Wishnick, 2022).

3.2. Digital Competences and Organisational Capacity

The second dimension highlights the decisive role of human and institutional competences in sustaining digital governance. Even the most sophisticated infrastructure remains inert without the skills and organisational routines necessary to use it effectively. Stofková and colleagues (2022), examining Slovakia's performance, reveal that stagnation in digital literacy – among young people and public servants – directly constrains the uptake of e-government services, regardless of technological availability. The study emphasises that strategic objectives related to DESI indicators must be accompanied by explicit training programmes and long-term professionalisation policies. In Slovenia, Stare, Klun, and Decman (2023) show how the development of teachers' digital competences at the University of Ljubljana facilitated a seamless transition to online education during lockdown, turning a crisis adaptation into a durable curricular innovation. Similarly, Moldovan, Macarie, and Barnes (2024) observe that

in Romania, universities with structured digital training strategies experienced less disruption and more effective coordination between academic and administrative units. At the level of public cultural organisations, Buršić, Golja, and Maras Benassi (2023) similarly show that Croatian public museums expanded digital initiatives and online engagement during pandemic closures, illustrating how organisational adaptation supported continuity of public-facing services.

These findings suggest that crises accelerate digital learning processes, but only where institutional cultures are open to experimentation and horizontal knowledge exchange. Where such cultures are absent, digitalisation becomes procedural rather than transformative. The evidence from Safonov, Usyk, and Bazhenkov (2022) concerning Ukraine further supports this interpretation: the pandemic catalysed government-led programmes for digital skills, positioning digital literacy as a key indicator of institutional resilience and administrative legitimacy.

3.3. Institutional Trust and Democratic Legitimacy

A third dimension emerging across the literature concerns the interplay between technology, public trust, and democratic legitimacy. Decman and Kozel (2023) show that in Slovenia, the intention to adopt e-voting was not determined by fear of infection during the pandemic but by pre-existing levels of trust in both governmental technology and the electoral system. Similarly, Makarychev and Wishnick (2022) argue that in Estonia, digital governance operates as an expression of "digital power", whereby technological infrastructure reinforces citizens' confidence in the state rather than replacing democratic accountability. Trust, therefore, is not a by-product of technology but a precondition for its adoption.

This dimension also encompasses the symbolic and cultural dimensions of legitimacy. Gavriluță, Stoica, and Farte (2022) find that although many Romanian cities expanded their digital presence during the pandemic, the quality and accessibility of municipal websites varied greatly depending on prior administrative commitment and citizen engagement. Where transparency and participatory mechanisms were already institutionalised, digitalisation enhanced communication; elsewhere, it merely digitised bureaucratic opacity. In this sense, institutional trust functions as a mediating variable between technological innovation and democratic resilience. The literature converges on the view that resilient governance emerges not from technological sophistication alone, but from embed-

ding procedural fairness, transparency, and accountability within digital systems. At a broader societal level, Ionescu-Feleagă, Ionescu, and Stoica (2022) reported a positive and significant association between the Digital Economy and Society Index and the World Happiness Index across EU countries during 2019–2021, suggesting that digitalisation may also be associated with broader social outcomes relevant to public value.

3.4. Regulatory Adaptation and Ethical Governance

The fourth dimension centres on the normative and legal frameworks that guide digital transformation. The COVID-19 pandemic and subsequent crises have intensified debates on privacy, interoperability, and algorithmic accountability. Aseeva (2024) introduces the concept of "liability and sustainability by design", arguing for the integration of ethical and legal safeguards into technological development from its earliest stages. In the same vein, Wilford and colleagues (2021) show that digital vaccination certificates built through public-private partnerships pose governance challenges due to the absence of standardised cross-border legal frameworks. The authors caution that, without regulatory convergence, such technologies risk creating "digital borders" that restrict mobility and exacerbate social inequalities.

Further studies extend these insights into broader contexts. Gerybaite (2021) emphasises the complexity of balancing public health imperatives with individual rights during the transnational implementation of emergency digital measures, while Hulkó, Kálmán and Lapsánszky (2025) demonstrate that EU legislative instruments such as the Digital Services Act (DSA), the Digital Markets Act (DMA), and the forthcoming AI Act seek to harmonise crisis-driven digitalisation across member states but also generate new tensions regarding digital sovereignty. These regulatory developments illustrate the growing recognition that ethical governance must be embedded in the design of digital systems to ensure legitimacy, accountability, and sustainability. Romashchenko and Bitė (2024) extend this argument to the corporate domain, showing that the digitalisation of shareholder meetings in Lithuania, Germany, and Estonia can inadvertently strengthen majorities unless procedural safeguards for minorities are codified. Across all these analyses, regulation emerges as both a constraint and an enabler of digital resilience: without legal harmonisation, innovation risks fragmentation; without flexibility, law risks obsolescence.

3.5. Strategic Coordination and Policy Coherence

The final dimension identified by the review concerns the role of strategic coordination among institutions and levels of governance. Hrytsenko, Yatsenko, and Mohylna (2024) analysed 23 national digital strategies adopted after 2020 and concluded that long-term, cross-sectoral planning ensures greater stability than *ad hoc* responses to crises. Countries such as Belgium, where federal strategies integrated e-health, e-justice, and open data objectives, achieved higher interoperability and institutional coherence. In contrast, Romania's fragmented sectoral initiatives produced reactive and inconsistent outcomes. Kostev and Anguelov (2024) corroborate this finding, showing that although civil servants often perceive digitalisation positively, progress remains limited without organisational reforms and strategic investment in automation. A related cross-border perspective is provided by Mikhaylova (2022), whose analysis of Russia's western border regions highlights how governance arrangements, infrastructure, and digital divides condition the development of cross-border digital spaces.

At the European level, the European Commission's "Path to the Digital Decade 2030" and the Digital Economy and Society Index (DESI) serve as coordination mechanisms that align national reforms with Union-wide objectives (European Commission, 2023). Yet, as Bilotta (2020) notes, digital governance in the EU also functions as a geopolitical project aimed at asserting technological sovereignty *vis-ã-vis* global competitors, which complicates the balance between supranational guidance and national autonomy. This geopolitical dimension is particularly evident in Makarychev and Wishnick's (2022) notion of "digital biopolitics", whereby small democracies such as Estonia deploy digital infrastructure not only for efficiency but also for security and symbolic sovereignty. Across the reviewed literature, effective strategic coordination emerges as the linchpin connecting technological, institutional, and normative dimensions of digital governance. Where coordination is coherent and multi-level, digital transformation reinforces both administrative efficiency and democratic trust; where it is fragmented, the result is uneven progress and regulatory fatigue.

3.6. Synthesis

Taken together, the five dimensions identified through the bibliometric and thematic synthesis suggest that, within the reviewed corpus, digital transformation in European public governance is neither linear nor

uniform. The reviewed studies indicate that digital resilience emerges through the interaction of infrastructure, human capital, institutional trust, regulatory frameworks, and strategic coordination. Across the cases examined, crises frequently functioned as accelerators of digital change, while also exposing pre-existing disparities in institutional capacity and digital preparedness.

Within the reviewed studies, the cases focusing on Estonia, Belgium, and Slovenia illustrate contexts in which anticipatory digital policies, institutional coordination, investment in competences, and attention to trust and regulatory safeguards were associated with greater adaptive capacity. Conversely, studies examining Romania, Slovakia, and other less digitally consolidated contexts identified persistent challenges related to fragmented coordination, uneven infrastructure, and insufficient investment in digital competences. These findings should therefore be understood as patterns emerging from the cases represented in the reviewed literature rather than as general assessments of the administrative systems of these countries as a whole.

Overall, the reviewed literature suggests that sustainable digital governance is associated with the capacity to combine technological innovation with human-capital development, regulatory coherence, institutional trust, and democratic accountability. These patterns provide the empirical foundation for the subsequent discussion, which situates the findings of the reviewed corpus within broader theoretical debates on institutional resilience and governance transformation in the European Union.

4. Discussion

The results of the systematic review reveal that the digital transformation of public governance in the European Union is no longer a secondary modernisation project but a defining axis of institutional resilience. Across the analysed literature, digitalisation emerges as a multidimensional process that reconfigures how states anticipate, absorb, and recover from crises. The empirical findings indicate that resilience is not merely the capacity of administrations to restore their pre-crisis equilibrium (resilience as recovery), but rather their ability to integrate crisis experiences into new institutional architectures (resilience as transformation). This distinction situates digitalisation within a broader paradigm of adaptive governance, where technological systems, legal frameworks, and organi-

sational cultures co-evolve in response to uncertainty (Duit et al., 2010; Aseeva, 2024).

From a theoretical perspective, the evidence supports a hybrid model of resilience that bridges the functionalist view of "administrative continuity" with the normative concept of "democratic legitimacy". As Bannister and Connolly (2014) argue, trust and transparency are not external outcomes of digital governance but intrinsic design variables. This review confirms that resilient systems are those that encode accountability and inclusiveness directly into their digital infrastructures. The Estonian and Slovenian cases, for example, show how digital identity systems, participatory platforms, and algorithmic auditing tools collectively strengthen citizen confidence and ensure institutional legitimacy (Makarychev & Wishnick, 2022; Decman & Kozel, 2023). In contrast, fragmented or opaque systems – such as those documented in Romania and Greece – illustrate the limits of purely technical reforms that neglect cultural and ethical dimensions of governance (Frățilă et al., 2023; Gavriluță, Stoica & Farte, 2022).

These patterns align with the theoretical literature on "digital institutionalism" (Cordella & Paletti, 2019), which conceptualises digital governance as a process of institutional layering rather than disruption. The reviewed evidence indicates that resilience emerges where digital reforms complement, rather than replace, existing administrative routines. During the COVID-19 crisis, for instance, digitally mature governments integrated online services and data-driven decision tools without dismantling established accountability channels. This capacity for "institutional recombination" – the blending of digital tools with traditional oversight – appears to be a defining feature of adaptive governance in Europe. The Slovak and Slovenian examples further demonstrate that digital competence development within public institutions enhances both operational efficiency and policy learning (Stofková et al., 2022; Stare, Klun & Decman, 2023).

A critical insight emerging from the synthesis is that digital resilience is relational rather than deterministic. The success of digital transformation depends on the alignment between technological capacity, legal coherence, and socio-political trust. Infrastructure provides the skeleton of resilience, but competences, ethics, and coordination provide its nervous system. Where these components are misaligned – due to bureaucratic inertia, fragmented legislation, or political instability – digitalisation may reinforce inequalities and governance gaps instead of closing them (Lincaru et al., 2018; Kostev & Anguelov, 2024). This relational understanding challenges techno-optimistic narratives that equate digital expansion

with modernisation and calls for a more contextual appreciation of institutional readiness and societal trust. Adjacent cross-sector evidence from Iuga (2025), examining internet-banking adoption across the 2008 financial crisis and the COVID-19 pandemic in the EU, similarly indicates that governance quality and technological progress shape digital adoption during period of crisis.

The findings also highlight a growing convergence between "digital sovereignty" and "resilience discourse" within EU governance. As Hulkó, Kálmán, and Lapsánszky (2025) observe, recent European legislative initiatives such as the DSA, DMA, and AI Act operate simultaneously as instruments of regulatory harmonisation and as assertions of technological independence. Within the reviewed corpus, this dual logic is particularly evident in Bilotta's (2020) analysis of the EU's digital tax policy, which frames technological sovereignty as both an economic and a geopolitical imperative. Yet, the resilience of European digital governance ultimately depends not on autonomy per se but on interoperability and mutual trust among member states. The challenge for policymakers, therefore, lies in designing frameworks that preserve national flexibility while embedding shared ethical and procedural standards across the Union.

Another major implication concerns the ethical architecture of resilience. Aseeva's (2024) notion of "liability and sustainability by design" underscores the shift from reactive regulation—focused on *ex post* compliance – to anticipatory governance, in which accountability and environmental prudence are embedded in the design of algorithms, data flows, and infrastructures. This anticipatory approach is echoed in Cowls and colleagues (2023), who call for "energy-aware" AI governance, linking climate responsibility to digital innovation. The reviewed literature suggests that such "algorithmic accountability" is essential for sustaining legitimacy during crises: citizens are more likely to accept emergency digital measures, such as vaccine passports or online voting, when they perceive clear, transparent safeguards (Wilford et al., 2021; Decman & Kozel, 2023).

The intersection between "trust" and "regulation" further illustrates that digital resilience is both normative and procedural. Public systems that explicitly communicate their ethical principles and ensure citizen participation in technological design tend to maintain higher legitimacy even under stress. In this sense, digital trust becomes a form of "democratic infrastructure" (Makarychev & Wishnick, 2022), enabling societies to process collective risk without resorting to coercive control. Conversely, in low-trust environments, digitalisation can amplify alienation, especial-

ly when algorithmic systems lack transparency or when data-driven decision-making bypasses deliberative channels.

At the supranational level, the European Commission's Digital Decade 2030 framework and the Digital Economy and Society Index (DESI) represent attempts to institutionalise digital resilience as a measurable and enforceable policy goal (European Commission, 2023). These instruments function not merely as benchmarking tools but as governance mechanisms that encourage coherence between national strategies and Union-wide objectives. The success of this model, however, depends on the translation of supranational targets into localised action. As Hrytsenko, Yatsenko, and Mohylna (2024) demonstrate, countries that integrate DESI metrics into national policy cycles achieve greater stability and cross-sectoral coordination. By contrast, fragmented administrative systems – lacking vertical coherence between central and local authorities – struggle to convert digital agendas into tangible public value.

The cross-country evidence therefore reinforces the notion that resilience is co-produced by infrastructures, institutions, and citizens alike. Estonia's model of e-governance exemplifies this co-production: through interoperable systems and transparent data governance, it enables both operational efficiency and democratic oversight. The Romanian and Slovak cases, on the other hand, illustrate how digital inequalities, whether infrastructural or educational, can undermine the inclusiveness of resilience. These findings echo broader theoretical debates in public administration, where resilience is conceived not as a static capacity but as an evolving equilibrium between technological adaptability and social legitimacy (Ansell & Trondal, 2018).

The review also contributes to the understanding of "policy learning under crisis conditions". The COVID-19 pandemic served as a stress test that transformed *ad hoc* digital improvisations into enduring administrative reforms. As observed by Tomaževič and colleagues (2023), the adoption of agile values during the pandemic fostered iterative learning cycles in public institutions, reducing hierarchical rigidity and encouraging experimentation. This resonates with the concept of "meta-governance" proposed by Qin and colleagues (2022), which emphasises the need to integrate public and private actors within shared digital ecosystems. Crises thus operate as laboratories for innovation, accelerating both horizontal collaboration and reflexive governance.

Overall, the discussion confirms that digital transformation in the EU has entered a post-technocratic phase. It no longer revolves around the

adoption of tools but around the design of resilient digital institutions that balance efficiency with legitimacy, autonomy with interoperability, and innovation with ethics. The comparative evidence suggests that successful cases – such as Estonia, Belgium, and Slovenia – share three core attributes: anticipatory investment in infrastructure, systematic capacity-building, and participatory regulation. These cases illustrate that resilience-by-design is attainable when digital governance is conceived as an ecosystem rather than a set of isolated reforms.

Theoretically, this article advances the field by proposing an integrated framework of five interdependent dimensions of digital resilience – infrastructure, competences, trust, regulation, and coordination – derived from both bibliometric patterns and thematic synthesis. This framework bridges the gap between fragmented empirical studies and the broader theoretical discourse on adaptive governance, offering a conceptual model for assessing institutional preparedness in the face of future disruptions. Practically, the findings provide actionable insights for policymakers: resilience should not be retrofitted after crises but coded into the design of administrative systems from the outset.

In sum, the European experience demonstrates that digitalisation becomes a source of resilience only when embedded in coherent, ethically grounded, and participatory governance architectures. Without such a foundation, digital transformation risks devolving into procedural modernisation – efficient in appearance but fragile in substance. As crises multiply and technological change accelerates, the challenge for European governance will be to sustain this balance by designing digital systems that are not only smart but also fair, transparent, and democratically accountable.

5. Conclusion

This systematic review suggests that, within the body of literature examined, digital transformation has increasingly been conceptualised as an important component of institutional resilience in European public governance. Across the health, economic, and geopolitical crisis contexts represented in the reviewed studies, digital infrastructures were frequently associated with administrative continuity, institutional adaptation, and changing patterns of interaction between public institutions and citizens. The 27 studies included in the final corpus indicate that digital govern-

ance extends beyond technical efficiency and is increasingly discussed in relation to democratic legitimacy, regulatory adaptation, institutional trust, and organisational capacity. The synthesis organised these findings into five interdependent dimensions – infrastructure, competences, trust, regulation, and coordination – which together provide an analytical framework for interpreting resilience-oriented digital governance across the European contexts represented in the corpus.

The first conclusion concerns the relationship between infrastructure and human capital. Across the reviewed studies, digital resilience was associated not only with access to broadband networks, interoperable platforms, and digital services, but also with the availability of organisational capabilities and digital competences. The studies focusing on Estonia and Slovenia illustrate contexts in which digital infrastructure was accompanied by institutional learning and capacity-building, whereas the Romanian and Slovak cases examined in the corpus point to challenges arising when technological investment is not matched by organisational capacity or digital skills. These findings suggest that technological and human infrastructures should be considered mutually reinforcing elements in the design of resilience-oriented digital strategies.

The second conclusion concerns trust and legitimacy. The reviewed evidence indicates that the adoption and acceptance of digital public services are shaped not only by technological characteristics but also by perceptions of institutional integrity, transparency, and procedural fairness. The studies by Decman and Kozel (2023) and Makarychev and Wishnick (2022), for example, highlight the importance of pre-existing institutional and technological trust in the specific contexts they examined. Within the reviewed corpus, trust therefore emerges as an important enabling condition for digital transformation rather than simply as one of its outcomes. These findings support the incorporation of transparency, accountability, and participatory mechanisms into the design of digital public services.

The third conclusion relates to regulatory and ethical coherence. Several studies included in the review suggest that crisis-driven digitalisation has increased the salience of questions concerning privacy, interoperability, accountability, and the legal governance of digital technologies. Aseeva (2024) and Wilford and colleagues (2021), among others, emphasise the importance of anticipatory regulatory approaches that integrate ethical and legal safeguards into technological design. The regulatory developments discussed in the reviewed literature, including the Digital Services Act, Digital Markets Act, and AI Act, illustrate broader European efforts

to address emerging digital-governance challenges. At the same time, the studies examined point to continuing tensions between regulatory harmonisation, national autonomy, and differences in institutional capacity. These findings indicate that regulatory coherence remains an important dimension of digital resilience in the European contexts represented in the corpus.

The fourth insight concerns strategic coordination. Within the reviewed literature, digital resilience is frequently associated with coordination across institutions, sectors, and levels of governance. The Belgian case discussed by Hrytsenko, Yatsenko, and Mohylna (2024), for instance, illustrates how cross-sectoral strategies can support policy coherence and interoperability, whereas other cases represented in the corpus highlight difficulties associated with fragmented sectoral approaches. At the supranational level, the Digital Decade 2030 framework and DESI are discussed as mechanisms for coordinating and benchmarking national digital-development trajectories. The evidence reviewed here therefore suggests that inter-institutional coordination, sustained investment, and policy learning are important enabling conditions for resilience-oriented digital governance.

Beyond the empirical synthesis, this study proposes an integrative analytical framework for understanding digital resilience in public governance. The five identified dimensions – infrastructure, competences, trust, regulation, and coordination – connect technical, institutional, and normative aspects of digital transformation. Based on the patterns identified within the reviewed corpus, the framework conceptualises resilience not only in terms of recovery following disruption but also in terms of the capacity of institutions to adapt their technological, organisational, and regulatory arrangements. In this respect, the study contributes to discussions on adaptive governance (Ansell & Trondal, 2018) and digital institutionalism (Cordella & Paletti, 2019), while providing a conceptual structure that may be tested and refined in future comparative research.

Several limitations qualify these conclusions. The reliance on a single bibliographic database, Web of Science, may have excluded relevant publications indexed elsewhere, as well as institutional reports and non-English-language scholarship. The temporal focus on 2018–2025 captures a period marked by rapid digital change and multiple crises but does not encompass earlier stages in the development of e-government. In addition, the geographical distribution of the reviewed studies is uneven, with some countries and administrative contexts receiving substantially more

attention than others. The findings should therefore not be interpreted as representative of all European Union member states or public administration systems. Finally, the use of keyword-based bibliometric analysis may favour studies with more explicit technological terminology and underrepresent research emphasising citizen experience, organisational culture, or normative dimensions of digital governance.

These limitations also indicate several directions for future research. Comparative and longitudinal studies could examine whether crisis-driven digital adaptations become institutionalised over time or return to pre-crisis patterns. Additional research across different administrative sectors and national contexts could test whether the five dimensions identified in this review operate similarly in less represented European settings. Qualitative and mixed-method approaches could further investigate how public servants and citizens experience digital transformation, while expanded bibliometric analyses incorporating additional databases could provide a broader representation of the literature.

In practical terms, the reviewed studies suggest that resilience-oriented digital governance benefits from the combined development of technological capacity, digital competences, institutional trust, regulatory clarity, and strategic coordination. Rather than treating these as separate policy areas, the evidence contained in the corpus points to their interdependence. For policymakers, this implies that anticipatory approaches to digital governance should consider technological innovation together with accountability, inclusiveness, organisational capacity, and institutional learning.

In conclusion, within the scope of the reviewed corpus, digital governance emerges as an important component of institutional adaptation under crisis conditions. The studies examined suggest that technology alone does not produce resilience; rather, resilience is associated with the interaction of technological capacity, institutional competences, regulatory safeguards, trust, and strategic coordination. These findings provide a basis for further empirical testing of the proposed resilience-by-design framework across a wider range of European administrative contexts.

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DIGITAL GOVERNANCE OF PUBLIC POLICIES IN THE EUROPEAN UNION UNDER CRISIS CONDITIONS (2018–2025): A SYSTEMATIC REVIEW OF RESILIENCE AND INSTITUTIONAL ADAPTATION

Summary

This study examines how crisis conditions have shaped the digital transformation of public governance in the European Union between 2018 and 2025. A systematic review of 27 publications indexed in the Web of Science Core Collection was conducted, combining bibliometric mapping with qualitative thematic synthesis. Keyword co-occurrence analysis using VOSviewer was applied to the final eligible corpus, followed by systematic coding of the reviewed studies. The analysis identified five interdependent dimensions of digital resilience: infrastructure and technological capacity; digital competences and organisational capability; institutional trust and democratic legitimacy; regulatory and ethical adaptation; and strategic coordination. Within the reviewed corpus, crises such as the COVID-19 pandemic and subsequent geopolitical and economic disruptions were frequently associated with accelerated digitalisation, while simultaneously exposing differences in institutional preparedness, administrative capacity, and digital maturity. The studies examined suggest that resilience is more likely to emerge where technological investment is accompanied by human-capital development, institutional trust, regulatory coherence, and coordinated policy action. Conversely, fragmented governance, uneven infrastructure, and limited digital competences were repeatedly associated with weaker or less sustainable forms of digital adaptation. Based on these patterns, the study proposes an integrative resilience-by-design framework that conceptualises digital governance as a multidimensional process linking technological, institutional, normative, and organisational capacities. The findings contribute to debates on adaptive governance and digital institutionalism while providing a basis for further comparative research across European administrative contexts.

Keywords: *digital governance, public policy, institutional resilience, digital transformation, European Union*

DIGITALNO UPRAVLJANJE JAVNIM POLITIKAMA U EUROPSKOJ UNIJI U KRIZNIM UVJETIMA (2018.–2025.): SUSTAVNI PREGLED OTPORNOSTI I INSTITUCIONALNE PRILAGODBE

Sažetak

U radu se istražuje kako su krizni uvjeti oblikovali digitalnu transformaciju javnog upravljanja u Europskoj uniji od 2018. do 2025. godine. Proveden je sustavni pregled 27 publikacija indeksiranih u bazi Web of Science Core Collection kombiniranjem bibliometrijskog mapiranja i kvalitativne tematske sinteze. Na konačnom uzorku radova koji su zadovoljili kriterije uključivanja provedena je analiza supojavljivanja ključnih riječi primjenom programa VOSviewer, nakon čega je slijedilo sustavno kodiranje analiziranih radova. Analizom je utvrđeno pet međusobno povezanih dimenzija digitalne otpornosti: infrastruktura i tehnološki kapaciteti, digitalne kompetencije i organizacijska sposobnost, institucionalno povjerenje i demokratski legitimitet, regulatorna i etička prilagodba te strateška koordinacija. U analiziranom uzorku krize poput pandemije bolesti COVID-19 te kasnijih geopolitičkih i gospodarskih poremećaja često su bile povezane s ubrzanjem digitalizacije, pri čemu su istodobno pokazale razlike u institucionalnoj pripravnosti, upravnim kapacitetima i digitalnoj zrelosti. Analizirani radovi upućuju na to da otpornost s većom vjerojatnošću nastaje kada su tehnološka ulaganja praćena razvojem ljudskih potencijala, institucionalnim povjerenjem, regulatornom koherentnošću i koordiniranim djelovanjem u području javnih politika. Nasuprot tomu, fragmentirano upravljanje, neujednačena infrastruktura i ograničene digitalne kompetencije opetovano su se povezivali sa slabijim ili manje održivim oblicima digitalne prilagodbe. Na temelju utvrđenih obrazaca u radu se predlaže integrativni okvir otpornosti ugrađene u dizajn (resilience by design) kojim se digitalno upravljanje konceptualizira kao višedimenzionalni proces koji povezuje tehnološke, institucionalne, normativne i organizacijske kapacitete. Rezultati ovog istraživanja pridonose raspravama o adaptivnom upravljanju i digitalnom institucionalizmu te pružaju osnovu za daljnja komparativna istraživanja u različitim europskim upravnim kontekstima.

Ključne riječi*: digitalno upravljanje, javne politike, institucionalna otpornost, digitalna transformacija, Europska unija*