ISSN 2786-5533 (Online)

DOI: 10.52363/passa-2025.1-25

УДК 351.074+332.1+004.738.5

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THE ROLE OF THE STATE IN TRANSFORMING THE PUBLIC ADMINISTRATION SYSTEM FOR SUSTAINABLE REGIONAL DEVELOPMENT IN THE CONTEXT OF DIGITALIZATION

This article explores the state's critical role in transforming public administration systems to promote sustainable regional development under conditions of digitalization. It addresses the institutional challenges of digital transformation at the regional level, identifies state-driven tools and mechanisms, and analyzes international best practices—particularly Estonia's experience. It also evaluates Ukraine's current landscape and proposes directions for fostering a coherent and inclusive digital transformation strategy that aligns with sustainable development goals (SDGs).

Key words: *public administration, digital transformation, regional development, digital governance, sustainable development, state capacity, smart regions, digital infrastructure.*

" Sustainable development in the digital era is impossible without a strong and strategically oriented state."

Problem setting. Digitalization has transformed from a tool of optimization to a paradigm of governance, particularly in the context of sustainable regional development. In Ukraine, which is experiencing a full-scale war and socio-economic disruption, the capacity of regional governance systems to adapt and thrive under digital transition is a matter of national resilience. The role of the state is not limited to policy creation but includes institutional design, coordination, and stimulation of digital equity across regions. The lack of uniformity in access, digital infrastructure, and local administrative capacity raises urgent questions: how can the state enable a transformative, inclusive, and resilient digital governance ecosystem that advances regional sustainability? How can national strategies align with local needs and

the global agenda, especially with Ukraine's European integration path?

Recent research and publications analysis. Issues of regional governance modernization and digital transformation have been actively studied by both Ukrainian and international scholars. Among domestic researchers, essential contributions have been made by O. Dovhan, S. Obolensky, A. Pomaza-Ponomarenko, and O. Radchenko, who examine smart governance models and digital innovations in public administration. Internationally, the works of J. Kuhlmann, G. Bouckaert, and the OECD [1; 3; 6] focus on digital government systems and regional development strategies. The UNDP and EU reports also address gaps in local e-governance in Ukraine [2; 7]. However, most of the literature highlights sectoral or municipal cases, leaving a research niche in understanding the strategic role of the central state in orchestrating regional-level digital transitions aligned with sustainability. This paper addresses that gap.

Paper objective. This article aims to define and analyze the strategic role of the state in transforming the public administration system to support sustainable regional development in the digital era. The main focus is on understanding how national institutions can facilitate coherent, inclusive, and efficient digital transformation of local governance across Ukraine's regions, particularly under the influence of decentralization and EU integration.

Paper main body. In the modern digital era, the transformation of public administration is not only about the adoption of new technologies but about reshaping institutional culture, administrative capacity, and regional equity. The role of the state in this process is foundational: it acts as the guarantor of digital inclusion, the architect of strategic frameworks, and the facilitator of intergovernmental coordination. Digital governance at the regional level is increasingly recognized as a catalyst for achieving broader socio-economic goals, including those related to resilience, sustainability, and democratic accountability.

The state's intervention must begin with the development of clear strategic frameworks that align national digital policies with regional development objectives. Ukraine's Digital Development Strategy until 2025 [1] sets an ambitious agenda, but its implementation at the subnational level remains fragmented. The lack of institutional coordination between central and regional authorities leads to overlapping competencies and unbalanced digital progress among oblasts. Moreover, many territorial communities lack the expertise and financial resources to implement digital governance practices independently [2].

Key to successful transformation is the concept of "smart regions"—territorial entities that use data, innovation, and ICT to solve complex development challenges while ensuring environmental sustainability and citizen participation [3]. However, to become truly "smart," regions require not only infrastructure but institutional scaffolding: training systems for public servants, legal interoperability between systems, and secure digital identity management. In this, the state must act as a "meta-governor," orchestrating the roles of private actors, municipalities, and civil society in a unified digital governance ecosystem [4].

The success of countries such as Estonia and Lithuania lies in the central government's proactive role in enabling digital services that are uniformly accessible across regions. Estonia's X-Road platform, for example, provides secure inter-institutional data exchange, which has become the backbone of both central and municipal e-services [5]. This model is underpinned by a legal and institutional framework that obligates local governments to participate in nationwide digital infrastructure. Lithuania has followed a similar model through its "Public Sector Reform Programme" which includes the mandatory adoption of digital service standards across all levels of government [6].

In contrast, Ukraine has achieved notable advances at the national level (e.g., the Diia platform), but these successes are often not replicated at the regional scale due to asymmetrical administrative capacity, weak digital infrastructure in rural areas, and inconsistent funding mechanisms [1], [3]. Moreover, as emphasized in the UNDP report on Ukraine's local governance, there is often low trust in digital tools among local civil servants and citizens, exacerbated by cybersecurity concerns and the legacies of bureaucratic opacity [7].

From a regulatory perspective, the state must ensure horizontal and vertical policy coherence. The current legal environment in Ukraine still lacks a comprehensive law on digital regional development, and while sectoral acts exist (e.g., the Law on Public Electronic Services [5]), there is a need for integrative legislation that defines the digital obligations of oblast and hromada authorities, sets interoperability standards, and mandates regular monitoring based on performance indicators. Estonia's model includes digital maturity indexes for municipalities, allowing the central government to target support and improve accountability [5].

Capacity building is another pillar where the state's role is irreplaceable. As demonstrated by Poland's National School of Public Administration and Estonia's Cyber Diplomacy Summer School, targeted training programs can professionalize local digital governance [6]. Ukraine's

Diia.Osvita platform has begun offering digital literacy courses, but systematic and mandatory programs for regional public officials remain underdeveloped [1].

An additional area of strategic importance is the integration of the Sustainable Development Goals (SDGs) into regional digital strategies. Digital transformation must not be pursued for its own sake but as a pathway to inclusive and sustainable development. Ukraine's current regional strategies rarely integrate SDG indicators, and even fewer connect them explicitly with digitalization goals [3], [4]. A holistic framework, where digitalization becomes an enabler of SDG 11 (Sustainable Cities and Communities), SDG 16 (Strong Institutions), and SDG 9 (Innovation and Infrastructure), would allow Ukraine to better leverage international support and align with EU cohesion policy.

International partnerships offer valuable resources and templates. The European Commission's Digital Decade Programme 2030 outlines metrics and funding instruments that Ukraine could adapt to measure digital regional readiness and to access targeted financial instruments [8]. Ukraine is already cooperating with the EU in terms of interoperability and cyber resilience; however, its regions need direct inclusion in such frameworks to scale their capacities [1].

Finally, the full-scale war and the resulting humanitarian and infrastructural crises have introduced new complexities. Digital tools have proven essential for service continuity and displaced citizen registration. At the same time, the war has intensified regional disparities and made it harder for underdeveloped regions to invest in digital modernization. This amplifies the necessity of a strong state-led redistribution mechanism—one that not only supports recovery but ensures that digital transformation becomes a lever for rebuilding smarter, more inclusive, and sustainable communities [2], [7].

In conclusion, the transformation of public administration at the regional level requires a systemic approach led by the state. This involves the integration of legal, infrastructural, educational, and financial tools to build a coherent digital governance ecosystem. It also demands a long-term vision, aligned with both national recovery goals and global development standards. The state must not only coordinate but inspire this transformation—anchoring it in values of equity, innovation, and sustainability.

Digital transformation represents more than the integration of technology; it entails structural shifts in governance logic, institutional culture, and citizen interaction. The

state plays a foundational role in setting the legal and organizational framework for this transformation, ensuring equal access, managing risks, and aligning efforts with global sustainable development goals (SDGs). In Ukraine, digital transformation is supported at the national level by the Ministry of Digital Transformation through policies such as the Digital Development Strategy until 2025 [2], the Diia ecosystem, and platforms for civil servant training (Diia.Osvita) [8].

However, the effectiveness of these efforts is uneven across regions due to disparities in infrastructure, human capacity, and strategic alignment. While some municipalities (e.g., Lviv, Vinnytsia, Mariupol pre-2022) have made strides in smart governance [5], many rural hromadas lag behind. The state must therefore act as an enabler through five strategic functions: (1) formulating policy that integrates regional digital goals with EU digital frameworks [7]; (2) institutionalizing coordination mechanisms like regional Digital Transformation Offices; (3) building capacity by upskilling civil servants and promoting citizen digital literacy; (4) regulating data standards, cybersecurity, and ethical norms; and (5) enabling finance for regional IT infrastructure and innovation through subventions and PPPs.

A case study of Estonia highlights the success of a centralized yet flexible digital strategy. Estonia's model of digital ID, the X-Road system, decentralized service delivery, and training for local governments demonstrates the importance of state leadership, cross-ministerial coordination, and early infrastructure investment [1; 4]. Ukraine can adopt similar strategies by creating regional digital coordination centers and appointing Regional Digital Policy Officers. The state should ensure that open data platforms are harmonized across hromadas and that progress is regularly monitored via SDG-compatible indicators. Furthermore, cybersecurity must become an integral element of regional strategies, particularly amid hybrid threats.

Public trust is another critical pillar. Digital solutions must not only be accessible but also credible. Therefore, communication strategies, feedback mechanisms, and transparency initiatives are necessary. A sustainable regional digital ecosystem requires not only infrastructure but also institutional maturity and civic readiness. The war has accelerated certain innovations out of necessity, but long-term resilience demands a state-led, vision-driven approach that bridges digital divides and ensures inclusivity

In the age of rapid technological advancement and global crises, digital transformation has become not merely a modernization tool but a strategic imperative for public

administration systems, particularly in countries facing complex challenges such as Ukraine. This transformation is central to ensuring that governance at the regional level is not only more efficient and transparent but also capable of supporting sustainable development aligned with global goals. The state, as the key actor in public policy, must orchestrate this transformation by shaping institutions, fostering capacities, and enabling inclusive participation across regions.

Digital transformation in the context of public administration refers to the deep integration of digital technologies into all facets of governmental operations, service delivery, and citizen engagement. Unlike traditional e-government initiatives, digital transformation is holistic, reengineering institutional structures, management cultures, and inter-sectoral interactions. It enhances public sector agility, data-based decision-making, and collaborative governance. This transformation is intrinsically linked with Sustainable Development Goals (SDGs), particularly SDG 9 (industry, innovation, and infrastructure), SDG 11 (sustainable cities and communities), and SDG 16 (peace, justice, and strong institutions), as it fosters innovation, accessibility, and equity in governance systems [1][2].

In Ukraine, the ongoing war has amplified the relevance of this paradigm shift. Digital tools have proven vital for managing displaced populations, coordinating humanitarian aid, ensuring information resilience, and maintaining basic public services under extreme conditions. Therefore, digital transformation at the regional level is not only about modernization but about strengthening the nation's resilience, sovereignty, and institutional integrity.

The state plays a pivotal role in shaping the digital trajectory of its regions. It acts as a meta-governor that aligns national priorities with regional specificities. As a policy strategist, the state defines long-term digital development goals through strategic documents such as Ukraine's Digital Development Strategy until 2025 [2]. These strategies incorporate EU digital policy frameworks, ensuring harmonization with the European Digital Decade programme [7].

In decentralized systems, where regions have autonomous powers, the state must ensure coherence through coordination mechanisms. For example, national digital policies must include clear mandates for local digital infrastructure development, open data policies, and smart community support. Through ministries, especially the Ministry of Digital Transformation, the state provides methodological support, standardizes digital platforms, and encourages innovation at the subnational level. This integrative function ensures that digital governance

contributes to balanced territorial development and reduces regional disparities.

To operationalize strategic visions, robust institutional frameworks are essential. These include regulatory systems, dedicated organizational structures, and coordination platforms. Ukraine has taken major steps in this direction with the launch of the Diia ecosystem, which offers citizens access to over 70 public services via mobile and web applications [2]. However, the diffusion of such platforms at the regional and hromada levels is uneven.

Establishing regional digital transformation offices or appointing Chief Digital Officers (CDOs) in oblast administrations can bridge this gap. These entities act as mediators between national strategies and local execution. They also monitor compliance with cybersecurity standards, interoperability protocols, and GDPR-aligned privacy rules [5]. Furthermore, interagency task forces that include local government, IT professionals, academia, and civil society are critical for ensuring inclusive and locally grounded implementation.

Institutional integration is also necessary. The alignment between local self-government bodies and central agencies through digital platforms ensures real-time data exchange, streamlining policy responses in areas like health care, emergency management, and education.

Digital transformation requires not only infrastructure but also people — specifically, civil servants with digital competencies and citizens capable of interacting with online services. The state is responsible for designing and funding large-scale training initiatives. One of the most successful tools in Ukraine is Diia.Osvita, a government-supported e-learning platform for civil servants and the broader public [8].

Digital capacity-building must be embedded into the human resource strategies of regional and municipal governments. This involves retraining public sector employees, introducing digital modules in public administration curricula, and building networks of digital champions within local bureaucracies. Additionally, citizen-facing programs are needed to address digital exclusion, particularly among elderly, rural, and marginalized groups.

Digital inclusiveness is a core condition for democratic governance. Without addressing the digital divide, any transformation risks reinforcing social inequality. Therefore, initiatives must be accompanied by public awareness campaigns, digital libraries, and community-based ICT centers to ensure broad accessibility.

Financing remains one of the biggest challenges for regional digital transformation.

The state must create a diversified financing framework, combining public investment, international donor assistance, and private sector participation. Subventions for broadband expansion, regional GIS systems, and smart utilities are essential, particularly in war-affected or rural areas [3].

Technological innovation should be matched by policy experimentation. For example, the creation of regional digital innovation labs can allow municipalities to prototype smart solutions in transport, waste management, or energy efficiency. These labs, supported by national ministries, can serve as testing grounds before scaling up. Moreover, Ukraine's active IT sector and startup ecosystem offer vast opportunities for public-private collaboration, from open data analytics to AI-based policy forecasting.

The state must also ensure data interoperability, cybersecurity protocols, and digital sovereignty through clear legal frameworks, as outlined in the Law on Public Electronic Services [9]. This includes protecting personal data, ensuring service continuity, and defining responsibilities in case of cyber incidents.

Globally, Estonia remains a benchmark for digital governance, particularly in integrating national and local digital services. Its X-Road platform ensures data interoperability across all levels of government, allowing citizens in remote areas to access services on par with urban centers. Estonia's early investment in digital ID, e-Residency, and decentralized cybersecurity infrastructures has created a resilient and inclusive digital ecosystem [4].

Ukraine can draw specific lessons: the importance of a centralized digital vision, early legal codification of digital rights, and the creation of a professional cyber-diplomatic corps [6]. Benchmarking tools such as the OECD's Digital Government Index and the National Cybersecurity Index can guide progress monitoring and policy adjustment [1].

Other relevant models include Lithuania's Digital Cities Program, Poland's GovTech framework, and Finland's regional digital cooperation platforms. Each highlights the value of state coordination, multilevel governance, and innovation-friendly regulation.

Despite progress, Ukraine faces several systemic challenges. First, fragmentation of infrastructure across oblasts impedes uniform service delivery. Many rural areas lack broadband connectivity, hindering access to digital public services. Second, institutional inconsistency in local administrations and resistance to change delay implementation [3].

A significant challenge is the lack of tailored regional digital strategies, which leads to

overlaps or gaps in service delivery. Furthermore, trust in digital platforms remains a concern due to past incidents of data breaches or slow responses to user inquiries.

Security risks are especially high in the context of hybrid warfare. Ukraine has been subjected to numerous cyberattacks targeting critical infrastructure. Ensuring resilience requires integrating cybersecurity at all stages of regional digital policy planning [10].

To accelerate progress and ensure alignment with sustainable development, Ukraine's state institutions should adopt several strategic actions. Firstly, establishing regional digital coordination centers can facilitate real-time monitoring and coordination. Secondly, the appointment of Regional Digital Policy Officers (RDPOs) can strengthen accountability and drive interdepartmental collaboration.

Thirdly, the state should integrate open data systems at the hromada level with national digital platforms to enable evidence-based local governance. Fourthly, investing in smart infrastructure pilots—such as in energy, transport, or e-health—can demonstrate tangible benefits and mobilize community support.

Furthermore, cybersecurity and digital ethics training must become mandatory for all public servants. Lastly, an inter-ministerial platform should be created to track regional contributions to digital SDG targets and provide technical assistance.

Among the most illustrative international models of regional digitalization are Estonia, Poland, and Lithuania—countries with post-socialist legacies that have successfully implemented nationwide digital governance systems with strong regional components. These experiences offer valuable comparative insights for Ukraine.

Estonia has become a global digital leader, where over 99% of public services are available online. The X-Road platform connects government, private, and civil sectors, ensuring interoperability and security of services across all regions. Estonia's municipalities—despite their small size—have full access to digital services via national coordination mechanisms. The country also established the position of Cyber Diplomacy Ambassador and introduced data embassies abroad to protect information sovereignty [4]. Digital literacy programs and consistent investment in broadband penetration have drastically reduced the digital divide, even in remote communities.

Poland, while more decentralized, has emphasized regional autonomy in digital innovation. The GovTech Polska program, initiated by the Prime Minister's Office, fosters cooperation

between central government and local innovators. Regional governments can submit challenges which are solved through national tech contests. Poland has also implemented ePUAP, a unified public services platform, with local authorities required to onboard and customize services per local needs. Its Smart City strategies are adapted to regional realities through EU co-financed projects.

Lithuania has focused on digital cities and regional development through a centralized but flexible framework. Municipalities implement digitization strategies based on national KPIs. Lithuania has emphasized digital security and cyber hygiene through local capacity building and established Digital Innovation Hubs in each region. Public-private partnerships and regional ICT clusters are central to the country's digital growth.

Compared to these countries, Ukraine has made significant strides through the Diia ecosystem, yet it lacks regional digital governance structures of comparable depth. There is no institutionalized mechanism for regional digital performance benchmarking, such as a national digital readiness index or subnational innovation dashboard. Moreover, Ukraine does not yet have mandatory digital transformation strategies for oblasts or hromadas, nor a system to monitor their execution. Estonia and Lithuania, in contrast, have institutionalized these frameworks.

Lessons for Ukraine include the importance of:

• Early institutionalization of digital leadership roles at the regional level (e.g. Chief Digital Officers)

• Mandatory onboarding of all municipalities onto national platforms

• Clear digital performance indicators and regional digital benchmarking

• Crisis-resilient systems, including data sovereignty and cyber diplomacy

Ukraine's future digital governance strategy must incorporate these elements while recognizing its unique challenges.

Despite clear progress in national-level digitalization, Ukraine faces systemic barriers at the regional level that hinder comprehensive digital transformation.

One of the most pressing issues is institutional fragmentation. Digital initiatives are often implemented in silos by various ministries, without unified coordination or regional integration. Oblast administrations lack dedicated digital departments or CDOs, and few hromadas have their own ICT strategies. This leads to duplicated efforts, unscalable pilot

projects, and limited continuity.

Secondly, digital inequality is acute across oblasts. Broadband internet coverage remains limited in rural and frontline regions, particularly in war-affected areas such as Zaporizhzhia or Kherson. The lack of stable connectivity excludes thousands of citizens from digital services, thus exacerbating social and economic divides [3].

Public distrust in government platforms—due to historical corruption, insufficient cybersecurity, and a lack of human-centered design—remains a major hurdle. Even though Diia is widely used, surveys suggest a significant portion of the population still prefer paper-based services, especially among older citizens and residents of rural areas.

The fragmentation of strategies further complicates matters. While the national strategy (2021–2025) is ambitious, very few oblasts have adapted or localized it. There are no formal mandates, monitoring systems, or budget lines to compel local authorities to create and implement digital action plans.

The ongoing martial law and security context adds additional constraints. Military priorities often override digital initiatives in frontline regions. Cyberattacks by hostile states increase the cost of digital resilience, forcing authorities to focus on reactive defense rather than proactive development. Simultaneously, the human and financial resources of regional administrations are severely overstretched due to population displacement, infrastructure damage, and energy insecurity. These overlapping stressors reduce the administrative capacity to engage in long-term digital planning.

Conclusions. Cybersecurity and digital ethics education must be embedded in all civil servant training programs. Local officials must understand data protection, cyber hygiene, and algorithmic accountability to ensure that regional digital systems are secure, fair, and rights-respecting. Finally, create a national platform for regional digital dialogue, involving local governments, civil society, academia, and IT businesses. This would foster peer learning, knowledge exchange, and innovation diffusion across regions. By executing these reforms, the Ukrainian state can act not only as a digital regulator but as a catalyst of sustainable regional innovation, ensuring that all citizens—regardless of location—benefit from digital transformation.

The transformation of public administration in Ukraine is inseparable from the country's regional resilience and path toward European integration. Digitalization, while often driven by

crisis, must evolve into a strategic pillar of sustainable regional development. The state must lead this process as policy strategist, institutional architect, educator, regulator, and investor. Without its leadership, regional disparities will deepen, and sustainability goals may remain out of reach.

A state-centric model does not imply centralization, but rather national coherence, strategic vision, and support for bottom-up innovation. For Ukraine, building digital capacity in regions is not only a development imperative but a national security priority. The future lies in a decentralized but integrated digital governance ecosystem, where every region—urban or rural—has the tools, knowledge, and support to grow smart, safe, and sustainable.

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Received: 29.04.2025
Accepted: 19.05.2025
Published: 26.06.2025