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Institutional and Technological Mechanisms for Integrating Digital Services into the Information and Communication Support System for Local Communities

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ABSTRACT

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The relevance of this study stems from the fact that the digital transformation of local communities is increasingly moving beyond the implementation of individual e-services and requires the formation of a comprehensive information and communication support system, within which digital services, registries, communication channels, analytics, and feedback tools function as an integrated whole. This issue takes on particular importance in Ukraine, given the uneven level of digital maturity among communities, limited resources, and the need to improve the accessibility, security, and effectiveness of public services. The purpose of this article is to justify the institutional and technological mechanisms for integrating digital services into the information and communication support system of local communities and to develop a conceptual model for their coordinated interaction. Results. The article systematizes contemporary approaches to the digital transformation of local governance and demonstrates that the most productive approach is an integrated one that combines service-oriented, platform-interoperable, human-centered, and communicative-participatory logics. The key institutional prerequisites for the integration of digital services are identified, including regulatory certainty for digital interaction, organizational and coordination capacity, structured data management, staffing and resource support, and mechanisms for trust, security, inclusivity, and monitoring. The main technological components of an integrated community service architecture are identified: single sign-on, digital identification, interoperable data exchange, core registries, process orchestration modules, digital messaging, analytics, cybersecurity, and digital resilience. A conceptual model of the interaction between institutional, technological, and communicative frameworks is proposed. Conclusions. It is demonstrated that the integration of digital services in local communities should be viewed not as a collection of isolated IT solutions, but as a systemic mechanism for modernizing local governance. The effectiveness of such integration is determined by the alignment of institutional rules, technological compatibility, user-centricity, the quality of feedback, and the system's capacity for adaptive improvement. The proposed approach creates a theoretical and practical foundation for enhancing the accessibility, security, inclusivity, and effectiveness of digital public services in local communities.

KEYWORDS

public management, local communities, information and communication support, public administrative services, decentralization, digital services, digitalization, local self-government bodies.



Інституційні та технологічні механізми інтеграції цифрових сервісів у систему інформаційно-комунікативного забезпечення територіальних громад

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СТАТТЯ

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Актуальність дослідження зумовлена тим, що цифрова трансформація територіальних громад дедалі більше виходить за межі впровадження окремих електронних послуг і потребує формування цілісної системи інформаційно-комунікативного забезпечення, у межах якої цифрові сервіси, реєстри, канали взаємодії, аналітика та інструменти зворотного зв'язку функціонують як інтегрований комплекс. Особливої ваги ця проблема набуває в Україні в умовах нерівномірного рівня цифрової зрілості громад, обмеженості ресурсів і потреби в підвищенні доступності, безпечності та результативності публічних послуг. Метою статті є обґрунтування інституційних і технологічних механізмів інтеграції цифрових сервісів у систему інформаційно-комунікативного забезпечення територіальних громад та розроблення концептуальної моделі їх узгодженої взаємодії. У статті систематизовано сучасні підходи до цифрової трансформації місцевого врядування та доведено, що найбільш продуктивним є інтегрований підхід, який поєднує сервісну, платформно-інтероперабельну, людиноцентричну та комунікативно-партисипативну логіку. Визначено ключові інституційні передумови інтеграції цифрових сервісів, зокрема нормативно-правову визначеність цифрової взаємодії, організаційно-координаційну спроможність, упорядковане управління даними, кадрово-ресурсне забезпечення, механізми довіри, безпеки, інклюзивності та моніторингу. Виокремлено основні технологічні компоненти інтегрованої сервісної архітектури громади: єдиний користувацький вхід, цифрову ідентифікацію, інтероперабельний обмін даними, базові реєстри, модулі оркестрації процесів, цифрові повідомлення, аналітику, кібербезпеку та цифрову стійкість. Запропоновано концептуальну модель взаємодії інституційного, технологічного та комунікативного контурів. Доведено, що інтеграція цифрових сервісів у територіальних громадах має розглядатися не як сукупність ізольованих IT-рішень, а як системний механізм модернізації місцевого врядування. Ефективність такої інтеграції визначається узгодженістю інституційних правил, технологічною сумісністю, орієнтацією на користувача, якістю зворотного зв'язку та здатністю системи до адаптивного вдосконалення. Запропонований підхід створює теоретичну й прикладну основу для підвищення доступності, безпечності, інклюзивності та результативності цифрових публічних послуг у територіальних громадах.

КЛЮЧОВІ СЛОВА

публічне управління, територіальні громади, інформаційно-комунікативне забезпечення, публічно-адміністративні послуги, децентралізація, цифрові послуги, цифровізація, органи місцевого самоврядування.

1. Introduction

The digital transformation of public management is gradually shifting from the logic of individual e-services to the logic of integrated service ecosystems, in which the interaction of registers, interagency coordination, electronic identification, user experience, and sustainable communication channels between the authorities and the community are of key importance. For territorial communities, this is of particular importance, since it is the local level that most often acts as the first point of contact between residents and the public service system. The UN E-Government Survey 2024 report explicitly emphasizes that strengthening local e-governance is critical for a comprehensive digital transformation, and most national portals still perform better than urban ones, indicating that the local digital divide persists. Europe had the highest average Local Online Service Index of -0.803 in 2024, however, even in this region, the national level often outstrips the local level.

The Ukrainian context makes this problem even more acute. According to the results of the first measurements of community digitalization in 2025, the average Community Digital Transformation Index was only 16 points out of 100 possible. The best results of the community were demonstrated in the field of digitalization of public services and digital skills, while digital infrastructure and the digital economy remained the weakest areas. At the same time, the development of platform solutions shows that with institutional support, scaling is possible: as of March 2026, 1,302 territorial communities, that is, 99% of communities in the territory controlled by Ukraine, have gained access to the urban cadastre system. This shows that the problem lies not only in the availability of technologies as such, but in the architecture of their integration, data management, coordination of responsible actors and the ability to turn digital tools into a single system of information and communication support for the community.

Under these conditions, the scientific interest shifts from the description of individual digital services to the analysis of the mechanisms of their institutional embedding in local self-government. That is why the subject of the study is institutional and technological mechanisms that ensure not just the digitalization of administrative procedures, but the formation of an integral, sustainable, integrated system of information and communication support of the territorial community.

2. Literature Review

Contemporary literature on digital governance demonstrates a shift from a technocratic vision of e-government to a systemic approach in which digital services are seen as part of broader organizational and societal transformations. The OECD emphasizes that the design and delivery of public services in the digital age requires a change in organizational culture, competencies, resources and management mechanisms with a focus on the user, integration and coherence. Later OECD analytical materials further emphasize the importance of scalable digital infrastructure, data governance, cooperation with the GovTech ecosystem, as well as personalized and proactive services [1].

In the works of Gasco Hernandez, the digital transformation of local governments is interpreted not as a set of individual IT solutions, but as a long-term institutional restructuring of local governance [2]. In particular, the author substantiates the need to move from the study of individual tools to the analysis of the organizational capacity of local authorities, and in co-authorship with Nasi et al. shows that it is organizational capacity that is critical for the successful digital transformation of local governments [3]. This is especially important for territorial communities, where staff shortages, poor coordination, and fragmentation of functions can block even technically available solutions.

Another block of research is related to digital participation and community interaction. Tejedo-Romero et al. [4] prove that municipalities are increasingly implementing online initiatives for citizen participation, and larger communities are implementing more relevant mechanisms. This confirms that the integration of digital services cannot be reduced only to electronic document management or online applications, but should include channels of information interaction, consultations, e-petitions, participation budgets, digital feedback and communication with the user throughout the full service cycle.

In interoperability and smart governance studies, attention is focused on the fact that the quality of digital services depends on the ability of systems to share data, agree on standards, and work across cross-sectoral and cross-organizational boundaries. D. Ray et al. have previously outlined the critical importance of government interoperability frameworks, and more recent studies, including those by

Zhou et al. [5], show that departmental cooperation, government-citizen engagement, and a positive image of government are statistically associated with better performance in the digital transformation of local governments. Similarly, works on smart governance emphasize the role of digital platforms, multilateral coordination, data security, budget, and infrastructure.

A separate area of literature concerns the inclusiveness of digital public services. Djatmiko et al. [6] emphasize that digital transformation is not effective without overcoming digital barriers for vulnerable groups, developing skills, and taking into account institutional access constraints. For territorial communities, this means that information and communication support should be multichannel, barrier-free, adapted to different user groups, and combine electronic services with offline support institutions.

It is also advisable to involve the works of authors who develop an institutional and technological approach to digital governance and the integration of services in the public sector. In particular, Gil-García and Pardo substantiate that interorganizational information integration is one of the basic prerequisites for digital governance, since it ensures the coordinated use of data and changes in communication between institutions [7; 8]. Scholl considers process integration, information exchange and interoperability of systems as interconnected components of successful interagency digital projects, which is especially important for local self-government [9]. Janowski interprets the development of digital government as an evolution from digitization to transformation, engagement and contextualization, which allows us to consider digital services of communities not in isolation, but as an element of a broader governance and political system [10]. In the works of Janssen et al. [11] has been proven that the digital transformation of government bodies depends not only on technology, but also on managerial actions, organizational support, and overcoming internal barriers. At the same time, Criado and Gil-Garcia emphasize that smart technologies should be evaluated for their ability to create public value and support the co-creation of public services [12]. For the local level, the conclusions of Pittaway and Montazemi are also important [13], which highlight the role of managerial know-how and integrated enterprise systems in the digital transformation of local governments, as well as the results of Gasco-Hernandez et al. [3], which link the success of digital change in cities and communities to organizational capacity, strategy, leadership, specialized units and cross-sectoral collaboration.

At the same time, the analysis of sources gives grounds to assert that the available literature is dominated by either macro-level models of digital governance or applied studies of individual digital tools, while the complex combination of institutional and technological mechanisms in the system of information and communication support of territorial communities has not been sufficiently studied. This is especially true in the Ukrainian context, where the digitalization of communities is developing unevenly and at the same time depends on the legislative framework, centralized platforms, local management capacity, and post-war challenges.

3. Problem Statement

The article is aimed at substantiating institutional and technological mechanisms for integrating digital services into the system of information and communication support of territorial communities and developing a conceptual model of their coordinated interaction.

To achieve this goal, the following tasks have been set: firstly, to systematize modern scientific approaches to the digital transformation of local government; secondly, to determine the institutional prerequisites for the integration of digital services into the activities of territorial communities; thirdly, to identify the key technological components of the integrated service architecture; fourthly, to propose a model of interaction between the institutional, technological and communicative contours of the system; fifthly, to outline the expected results and criteria for the effectiveness of such integration.

4. Methods and Materials

The methodological basis of the study is systematic, institutional, structural-functional and service-oriented approaches, which made it possible to reveal the integration of digital services in the system of information and communication support of territorial communities as a multi-level process, within which regulatory, organizational, technological and communicative components are combined. The study uses the methods of theoretical generalization and scientific abstraction – to systematize conceptual approaches to the digital transformation of local government; analysis and synthesis – to

identify institutional prerequisites and technological components of an integrated service architecture; benchmarking – to compare international and national approaches to digital governance; structural-logical modeling – to develop a conceptual model of interaction of institutional, technological and communicative contours. The empirical and source base of the study was scientific publications on the problems of digital governance, analytical materials of international organizations, regulations of Ukraine in the field of e-governance, digital transformation and electronic interaction, as well as up-to-date data on the digitalization of territorial communities.

5. Results and Discussion

In the modern scientific discussion, the digital transformation of local governance is no longer reduced to a simple transfer of individual administrative procedures into electronic form. Current international approaches interpret it as a comprehensive change in the way the public sector functions, in which digital technologies, data, services, feedback mechanisms and tools for interaction with citizens are integrated into a single system for creating public value. The importance of the local level is explained by the fact that local self-government bodies are most often the first institutional contact between a person and the state, and therefore, the level of digital maturity of the community directly determines the accessibility, inclusiveness and effectiveness of public services. At the same time, international reviews record a persistent gap between national digital portals and local services, which reinforces the need for a special study of the digital transformation of territorial communities [14].

The first approach, which should be singled out, is instrumental and service. Within its framework, digital transformation is considered primarily as the modernization of service delivery channels, the automation of administrative procedures, the reduction of transaction costs and the increase in the efficiency of processing requests. This logic has historically grown out of e-government models focused on converting services into the format of websites, e-cabinets, self-service kiosks, and mobile applications. The strong point of this approach is its applied measurability; however, its limitation is that it often leaves departmental fragmentation unchanged: services become digital in form, but not integrated in content. That is why digitalization, built only as “digitization of procedures”, does not provide a high-quality transition to a new model of local governance.

The second approach can be defined as platform-interoperable. Within this logic, digital governance is understood as the construction of “Government as a Platform”, i.e. a model in which the state and the community create not a set of isolated electronic services, but a core of reusable digital components on the basis of which various services can be built. The OECD refers to such components as digital identification, digital payments, basic registers, data exchange systems, digital alerts and single digital gateways of access to services. The advantage of this approach is that it shifts the emphasis from a single service to an architecture of interaction between services, data, and institutions. For territorial communities, this is of fundamental importance, since it is interoperability that makes it possible to overcome the disunity between local units, ASCs, sectoral information systems and state registers [15].

The third approach is human-centered. In it, digital transformation is evaluated not by the number of platforms created, but by the ability of the system to take into account the needs of different user groups at all stages of design and service delivery. The World Bank emphasizes that citizen-centric services should include the needs and concerns of users at the design, development, testing, and implementation stages, as well as take into account the risks of digital exclusion of vulnerable groups. In the applied dimension, this means a transition from the logic of “the service exists in the system” to the logic of “the service is convenient, accessible, understandable and passes through a single user route”. For local governance, this approach is especially important, because it is the community that faces the most heterogeneous composition of users – from young people and entrepreneurs to the elderly, internally displaced persons and persons with limited access to digital infrastructure [16].

The fourth approach should be described as communicative-participatory. It goes beyond the provision of services and considers digital transformation as a mechanism for expanding the participation of residents in the development of local solutions, control over power, joint formation of development priorities and strengthening the accountability of local governments. The OECD records that digital tools, including civic tech, are increasingly being used to inform citizens, provide online consultations, participate in policy-making, and increase government accountability. In the context of territorial communities, this approach is fundamental, since the system of information and

communication support cannot be reduced only to the transactional interaction “request-service-result”; It should include channels of trust, consultation, messaging, feedback, and digital participation.

The most productive seems to be integrated optics, in which digital services are considered as part of a broader system of information and communication support of the community, where technological architecture, institutional ordering and interaction with residents form a single outline of digital governance. It is this interpretation that creates a theoretical basis for further substantiation of the mechanisms for integrating digital services into the activities of territorial communities.

The integration of digital services into the system of activities of a territorial community is not so much a technical as an institutional process. Its success is determined not by the very fact of the availability of a software product or an electronic cabinet, but by the degree of formation of rules, roles, procedures, responsibilities and coordination mechanisms, within which digital solutions can function without duplication, conflict of competencies and information gaps. Therefore, institutional prerequisites should be considered as a set of regulatory, organizational, managerial, competency, resource and trust conditions that make the integration of digital services a sustainable and reproducible practice of local government.

The first institutional prerequisite is the regulatory certainty of digital interaction. In the Ukrainian case, it is formed, in particular, by the Law “On Electronic Identification and Electronic Trust Services” [17], which establishes the legal and organizational principles of electronic identification, authentication and electronic interaction, as well as the Law “On Public Electronic Registers”, which establishes the legal, organizational and financial principles for the creation and operation of public registers. Combined with the government decree on the functioning of the Register of Public Electronic Registers, this creates an institutional framework for data standardization, the use of classifiers, the legal recognition of digital transactions, and the transition from a paper-departmental model to a model of register interaction. Without this premise, any digital integration would remain only a set of local IT solutions without proper legal force and interoperability.

The second prerequisite is the organizational and coordination capacity of local self-government bodies [18]. Studies on the digital transformation of local self-government in Ukraine emphasize that the implementation of digital solutions requires a rethinking of the organizational and functional structure of local authorities, since a significant part of them continues to rely on outdated technologies and fragmented procedures. This means that the integration of services requires not only the purchase of software, but primarily a clear definition of process owners, data administrators responsible for information security, communication with residents, and support for digital changes. In other words, a digital service becomes institutionally viable only when it is “embedded” into the community governance structure, rather than existing as an external technical add-on to traditional bureaucracy [19].

The third prerequisite is to have an orderly data management mode. The platform-interoperable model of digital governance relies on basic registers and data exchange systems as authoritative sources of information necessary for the design, delivery and monitoring of services. The OECD explicitly classifies security and trust systems, basic registers, data exchange systems, alerts, and single digital gateways among the key types of digital public infrastructure. For territorial communities, this means the need to streamline local data sets, synchronize with state registers, standardize directories, and switch to the principle of one-time data entry with subsequent reuse in various service circuits. In the absence of such a regime, even well-designed electronic services will inevitably produce duplication of information, errors and repeated appeals from citizens.

The fourth prerequisite is the personnel, competence and resource provision of digital changes. The World Bank, when analyzing citizen-centric digital services, emphasizes the importance of digital talent in government, and the OECD emphasizes the need for strategic management of digital public infrastructure, long-term financing of its development, operation and renewal. For territorial communities, this is of particular importance due to the asymmetry of their financial and personnel capabilities: the formal availability of powers does not mean the presence of specialists capable of ensuring the integration of registers, service design, cyber protection, data analytics and change management. It follows that the institutional prerequisite for integration is not only the internal human resources potential of the community, but also the possibility of attracting intermunicipal cooperation, state methodological support and standard solutions suitable for scaling.

The fifth prerequisite is the institutionalization of trust, security, and inclusivity. Ukrainian legislation requires the use of electronic identification means with an appropriate level of trust and

provides for a risk-based approach to authentication in systems owned by state and local governments. At the same time, international sources emphasize that human-centered service design is impossible without taking into account the digital divide, accessibility barriers, and the risks of excluding certain groups. Therefore, institutionally mature integration of digital services in the community should combine secure digital identification, data protection, alternative access channels, digital literacy of the population, and user support mechanisms. Otherwise, digitalization increases the formal manufacturability of the system, but does not expand real access to services.

The sixth prerequisite should be considered the availability of mechanisms for monitoring and comparative assessment of the digital development of communities. The publication by the Ministry of Digital Transformation of the results of digitalization of regions and territorial communities on the Diia.Digital Community platform indicates a transition from fragmented initiatives to more systematic monitoring of the state of digital transformation at the subnational level. For the topic under study, this is important for two reasons. First, the institutional environment for the integration of digital services requires not only norms and procedures, but also indicators that allow us to identify bottlenecks. Secondly, it is based on such monitoring systems that an adaptive model of managing the digital transformation of the community becomes possible, when decisions are made not intuitively, but based on comparable data [20].

Thus, the institutional prerequisites for the integration of digital services into the activities of territorial communities include legal certainty of digital interaction, organizational and coordination capacity, orderly data management, human resources, trust and security regimes, as well as performance monitoring mechanisms. Their totality gives grounds to consider digital integration not as a separate technological project, but as an institutionally formalized process of restructuring local governance. It is from this point that it is logical to move on to the third task of the study - the identification of key technological components of the integrated service architecture of the community.

It is advisable to distinguish the technological components of the integrated service architecture of a territorial community not in the logic of the list of individual IT solutions, but in the logic of a multi-level infrastructure for creating, routing, providing and maintaining digital services. This approach is consistent with the modern understanding of digital public infrastructure, within which the basic elements are digital identification, digital payments, data exchange systems, digital mail, digital alerts and basic registers. At the same time, the European approach to public interoperability emphasizes that digital services should be designed immediately as intersystemic, with built-in mechanisms for assessing legal, organizational, semantic, and technical consequences. Additionally, UN DESA at the local level evaluates digital services not only by technology, but also by institutional framework, service capacity, participation, digital literacy and content, which confirms the multidimensionality of the community's architecture.

In this context, the integrated community service architecture should be built as a combination of three layers: front-office, integration-data, and managerial-analytical. The front office layer covers all channels of access of a resident or business to the service; the integration-data layer provides data exchange, verification and orchestration of processes; The management and analytical layer is responsible for monitoring performance, quality management, safety and service improvement. It is this model that allows you to move from disparate web pages or e-forms to a full-fledged service system, in which digital interaction becomes part of the community's management cycle [21].

The first component of such an architecture is *a single user login*, i.e. a portal, mobile application, electronic cabinet or other front-office interface. Its function is not only to publish forms or certificates, but to form a single route for obtaining a service based on life events, application statuses and the logic of "one-stop access". The functionality of the Diia Portal directly provides for electronic identification, the use of adapted interfaces, and the submission of documents to local authorities, automatic filling of forms based on data from state resources, as well as search, classification and analysis of information to monitor the quality of services. This means that it is critical for the community not to create another local website, but to integrate its own services with those front-office solutions where the resident is already present and where a single entrance to public services is implemented [22].

The second component is *digital identity and trust services*, without which neither legally significant transactions nor secure access to personalized services are possible. The OECD classifies digital identity as the core of DPI, and the Ukrainian portal Diia embeds identification and authentication directly into the logic of access to services. For the community, this means that any integrated architecture must rely on standardized e-identity solutions, rather than local, incompatible login

mechanisms. Otherwise, technological integration disintegrates already at the level of user access to the system [23].

The third component is *the interoperable layer of data exchange*, i.e. the environment in which different information systems, registers and services can interact without duplication of requests to a person. It is here that the Ukrainian context is especially indicative: the regulatory framework of the system of electronic interaction of state electronic information resources “Trembita” creates a legal basis for intersystem exchange, and the update of “Trembita 2.0” is presented by the government as a step towards faster provision of services and higher data security. In a technological sense, this means that the community should not design its own services as closed verticals; on the contrary, they must be attached to a wider integration circuit. European practice additionally shows that interoperability should be evaluated at the design stage of the service, and not after its launch [24].

The fourth component is *basic registries and master data management*. The OECD defines basic registers as authoritative sources of key data on individuals, organizations, places or assets that constitute the “backbone” of digital public infrastructure. For a territorial community, this means the need to move from dispersed local databases to a model where data has a defined source of truth, is reused across different services, and is accompanied by metadata, directories, and update rules. Without this, it is impossible to ensure the principle of once-only, No automatic form filling, no reliable analytics. A local-level empirical study in Indonesia showed that in the absence of interagency integration and full-fledged metadata, interoperability remains partial, and a significant proportion of institutions operate without proper data integration [25].

The fifth component is the *service orchestration and process management module*, i.e. a technological mechanism that connects a user request, data verification, inter-register interaction, decision-making, notification, and transaction completion user, not just the point of submission of the application. Therefore, it is critically important for the community to model not individual documents, but entire service scenarios: registration, appeals, local taxes, social services, housing and communal issues, ASC services, notifications of infrastructure problems, etc.

The sixth component is *messaging, digital mail, and payment services*. They are often perceived as auxiliary, but they are the ones that turn a one-time transaction into a managed service cycle. The OECD emphasizes that digital notifications and digital mail are separate components of DPI, and messages allow you to inform the user about the progress of the administrative procedure, the need to update documents or the completion of the service. For communities, this is of particular importance in local taxes, payment for administrative services, utilities, records, appeals and life event services.

The seventh component is *analytics, quality monitoring, and feedback loops*. The functionality of the Diia Portal directly provides for the classification, search and analysis of information for monitoring and evaluating the quality of services, and at the level of communities there is a separate measurement tool – “Diia.Digital Community”, where the results of the digital transformation of regions and territorial communities are displayed in real time. service time, the share of automatic checks, refusals, repeat requests, user satisfaction, load on the front office, and the effectiveness of communication channels [26].

The eighth component is *cybersecurity and digital resilience*, which should be seen as a built-in rather than an additional option. UN DESA explicitly points to a zero-trust approach, in which every access request must be authenticated, authorized, and continuously validated. For Ukraine, the issue of resilience is especially important because of the war risks and the high value of public sector data; The government’s positioning of Trembita 2.0 also directly links modernization to increased data security. Therefore, the community architecture should include access control, activity logging, redundancy, service continuity, and alignment with national cyber policy (Table 1).

Analytically, the connections between the circuits must be bidirectional. From the institutional to the technological, rules, standards and security requirements come; From technological to institutional -event logs, load analytics, quality metrics and bottleneck signals. From the technological to the communicative circuit, services, statuses, messages, cabinets, participation interfaces are received; from communicative to technological – data on route errors, incompleteness of services, interface complexity, accessibility barriers. Community requests, service evaluation, requests for new participation formats, and information on trust in the authorities are returning from communicative to institutional. It is this feedback system that distinguishes the integrated model from the static scheme “the authorities have implemented the service – the citizen uses it”.

Table 1. Conceptual model of interaction of institutional, technological and communicative contours

Outline	Main actors	Basic mechanisms	Result of functioning	Key indicators
Institutional	local council, executive bodies, digital transformation managers, process administrators, ASCs	regulations, data standards, security policies, budgeting, KPIs, audits	Agreed rules for the integration of services	availability of regulations; share of services with a defined owner; share of processes with approved SLAs; Interoperable Availability Level
Technological	is administrators, technical administrators, registry holders, integrators, data analysts	e-identification, registers, API/data exchange, BPM, notifications, payments, event logs, cyber protection	Continuous, secure, and scalable service delivery	service time; share of automatic checks; the number of repeated data requests; uptime; Security incidents
Communicative	residents, businesses, IDPs, NGOs, support services, participation moderators	e-appeals, messages, consultations, cabinets, chat channels, surveys, service evaluation, participatory tools	trust, accessibility, participation and feedback	user satisfaction; share of completed services; the proportion of responses on time; number of consultations/participants; Share of services with available instructions

Source: Author's development.

In a practical sense, this model allows you to form several design principles. First, interoperability by design: the service is designed from the beginning to interact with other systems. Second, once-only and data reuse: the user does not have to resubmit data already available in public resources. Third, security by design: security and access control are built into the architecture, rather than added after launch. Fourth, Citizen-centered design: the route, language, interface, and support are built around the real user. Fifth, feedback by design: each service should contain a mechanism for evaluating and informing about the outcome of the review or implementation of the decision.

Thus, the proposed model of interaction of institutional, technological and communicative contours gives grounds to interpret the integration of digital services as a systemic mechanism for modernizing information and communication support of territorial communities. Its key advantage is that it combines regulatory orderliness, technological compatibility and direct user orientation. It is on this basis that it is logical to further form the expected results of integration and criteria for its effectiveness.

It is advisable to assess the effectiveness of the integration of digital services into the activities of territorial communities not by the number of implemented platforms or electronic forms, but by a set of changes in the quality of public services, coordination of management processes, availability of services, intensity of feedback, level of trust and the ability of the system to continuous improvement. This approach is consistent with the modern international framework for assessing digital governance. In particular, the OECD Digital Government Index assesses the digital state in six dimensions - digital by design, data-driven public sector, government as a platform, open by default, user-driven and proactiveness, while the World Bank GovTech Maturity Index covers four blocks: shared digital infrastructure and core systems, digital public services, digital citizen engagement and GovTech enablers. In turn, the UN E-Government Survey 2024 emphasizes the importance of the Local Online Service Index for the local level, and in the 2024 edition expands the LOSI to 95 indicators and adds an e-government literacy component, which directly links the effectiveness of digital integration not only with technology, but also with inclusion and the user's ability to actually use the service [27].

It follows that the expected results of the integration of digital services in communities should cover at least five interrelated planes: service, organizational-managerial, technological-given, communicative-trust, and inclusive-resilient. In the service plane, we are talking about reducing the time and complexity of obtaining a service, increasing the share of fully online transactions, reducing the need for resubmission of documents and switching to seamless routes for life events. In the managerial plane, the expected result is a clearer distribution of roles, increased coordination, and the emergence of uniform standards for the design and maintenance of services. In the technologically given plane - interoperability, data reuse, stability of critical services and better analytics capabilities. In the communicative plane - increasing responsiveness, transparency and the ability of local authorities not

only to receive, but also to process and return the results of feedback to the community. In inclusive and resilient environments, reducing digital barriers, supporting vulnerable groups, and ensuring the continuity of services even in times of crisis or military load.

Significantly, international standards are increasingly shifting the focus from the formal “existing or absent service” to the quality of user experience and the ability of the system to learn from data. In 2025, the OECD explicitly emphasized that human-centered administrative services require service standards, user research, a life-event approach, systematic measurement of user experience, and the use of the data obtained to publish reports and improve the service. Moreover, according to the OECD, 28 out of 33 countries covered by the relevant study already have national service standards, and 20 out of 28 apply a life-event approach to at least part of the services. This means that for territorial communities, performance criteria should reflect not only the degree of digitalization, but also the degree of standardization, convenience, and integrity of the service route [28].

It is equally important that the criteria for the effectiveness of integration cannot be limited to the “digital offer”, since the practical experience of the user often remains mixed. A Ukrainian study of the interaction between the digital state and ASCs shows that even for the most popular services, there is a high share of face-to-face requests. Thus, 7.5 million online cases were recorded to be extracted from the register of the territorial community during the first nine months of 2024, but about 29% of users still contacted ASCs in person; 61% of respondents knew about the availability of this service online, but only 16% tried to get it online before visiting the ASC. Among the key barriers are technical difficulties, the need for a paper document, the complexity of the procedure and the need for advice. For the entire sample of surveyed users of administrative services, only 14.4% tried to get the necessary service online before contacting the ASC, and the most common reasons for failures were technical errors, problems with logging into Diia and signing an application. This means that the real effectiveness of integration should be measured through a reduction in paper dependency, a reduction in the number of incomplete digital scenarios, a reduction in technical failures and the need for offline intermediation [29].

In this context, it is advisable to interpret the expected results of integration as a multi-level system of changes, where each level has its own group of criteria and indicators. Accordingly, the assessment should combine administrative data, technical journals, analytics portals, user surveys, feedback platform data, and external monitoring results. This approach is in line with the logic of the OECD Recommendation on Human-Centred Public Administrative Services, which emphasizes four interrelated blocks: strategic vision, core foundations, seamless and accessible services, measurement, engagement and improvement [30]. For Ukraine, an additional argument is that the Diia.Digital Community platform has already been built as a tool for regular monitoring of digitalization on the ground, where digital leaders of communities and regions submit data by groups of indicators, and the results are used to track the dynamics and prioritize further decisions (Table 2).

Table 2. Expected results of integration of digital services into the system of information and communication support of territorial communities

Result plane	Expected result	Meaningful manifestation
Service	Increasing the availability and quality of services	reduction of the time of receiving the service; reducing the number of steps; an increase in the share of fully online scenarios; omnichannel access
Organizational and managerial	Strengthening coordination and manageability of services	clear distribution of roles; availability of service standards; identification of process owners; Using Delivery Targets
Technologically	Increasing interoperability and data quality	Data reuse; reducing duplication; stable exchange between registers; Higher quality analytics
Communicative and trusting	Strengthening responsiveness and accountability	increase in the quality of feedback; regular reporting of results; publication of service indicators; trust in service interaction
Inclusive and resilient	Reducing barriers and sustainability of services	lower dependence on paper documents; fewer technical failures; better access for vulnerable groups; continuity of work in crisis conditions

Source: Systematized by the author based on the OECD Digital Government Index, OECD Recommendation on Human-Centred Public Administrative Services, Government at a Glance 2025 [31].

For practical operationalization of the proposed results, it is advisable to switch to a system of performance criteria. Within the article, the criterion should be understood as a measurable feature that allows for establishing whether the integration has occurred not nominally, but functionally. On this basis, five groups of criteria are proposed: availability and completion of the service; speed and process efficiency; interoperability and data quality; feedback and trust; inclusivity and sustainability. This

configuration is a logical synthesis of the OECD approach to user-driven and proactivity, the World Bank's approach to service delivery and citizen engagement, the UN approach to LOSI and e-government literacy, as well as Ukrainian practices for monitoring the digitalization of communities (Table 3).

Table 3. Criteria for the effectiveness of the integration of digital services and indicative indicators of their evaluation

Criterion	Indicative indicators	Empirical significance for the community	Sources of verification
Availability and completion of the service	share of fully online services; the proportion of completed applications; the share of users who received the service in the desired channel; the share of life events implemented in the end-to-end format	shows whether the service has become realistically achievable and complete without offline duplication	analytics portal, transaction logs, user surveys
Speed and process efficiency	average time to receive the service; the number of steps in the route; share of automatic checks; the number of repeated data requests; Front office workload	reflects whether the transaction costs of the citizen and the community have decreased	BPM/CRM systems, register journals, ASC data
Interoperability and data quality	the share of services connected to data exchange; the number of cases of repeated submission of documents; the number of errors due to inconsistent data; uptime critical registers	demonstrates whether the architecture works as a single system rather than as a set of isolated modules	Technical logs, incident reports, data auditing
Feedback and trust	share of services with built-in assessment; number of appeals and complaints per 1000 transactions; the share of appeals to which a response was provided on time; level of satisfaction; Level of perception of responsiveness	shows whether digitalization has turned into a dialogical and accountable system	surveys, feedback platforms, contact centers, public reports
Inclusivity and sustainability	The proportion of users who need offline assistance. the share of services where a paper document is required; frequency of technical failures; availability of instructions and support; availability of alternative channels	records how suitable the system is for different groups and whether it can withstand the crisis load	user research, ASC analytics, technical monitoring, availability audit

Source: Author's development.

Analytically, the above criteria mustn't be applied in isolation. For example, a formal increase in the share of online appeals does not mean successful integration if, at the same time, there are high rates of pending applications, low user satisfaction, constant technical failures, or the requirement to duplicate the result with a paper document. That is why the study proposes to use a combined assessment model, in which process, effectiveness, confidence and inclusive indicators are analyzed simultaneously. This logic is in line with the OECD approach, according to which digitalization can increase service satisfaction, but this connection is not automatic; Speed, convenience, the ability to receive service in the desired way, and the ability of institutions to respond to public feedback are crucial.

Therefore, it is advisable to consider the expected results of the integration of digital services into the system of information and communication support of territorial communities as a complex set of services, management, technological, trust and inclusive changes. Accordingly, the effectiveness of such integration should be measured through a system of criteria that combines accessibility, process efficiency, interoperability, responsiveness, trust, inclusion and sustainability. It is this multi-criteria model that makes it possible to move from stating the fact of digitalization to verifying its real managerial and social value.

6. Conclusions

The article proves that the integration of digital services into the system of information and communication support of territorial communities cannot be reduced to the technical connection of individual electronic tools. Modern international approaches interpret the digital transformation of local governance as a comprehensive restructuring of service, institutional and communication architecture, where digital solutions, data, feedback and management rules should function as a single system. This interpretation is confirmed by the OECD Digital Government Index, the World Bank GovTech Maturity Index, and the UN E-Government Survey 2024, which assesses digital development

simultaneously through service quality, infrastructure, participation, data, inclusion, and institutional environments.

The systematization of scientific approaches made it possible to identify four basic logics of digital transformation of local government: service, platform-interoperable, human-centered, and communicative-participatory. It is substantiated that their integration is the most productive for territorial communities, since the community simultaneously acts as a space for the provision of services, data organization, public communication and participation of residents in decision-making.

It has been determined that the institutional prerequisites for the integration of digital services include legal certainty of digital interaction, organizational and coordination capacity, data management regime, human resources, trust and security, as well as mechanisms of continuous monitoring. It is institutional maturity that determines whether digital services will work as an element of a sustainable local government system, rather than as fragmented technological add-ons. OECD 2025 further highlights that a clear definition of roles, responsibilities and competencies is a fundamental condition for human-centred services, and most countries already have designated bodies responsible for improving administrative services.

As a result of the study, the key technological components of the integrated community service architecture are identified: single user login, digital identification, interoperable data exchange, basic registers, process orchestration, messages and payments, analytics and cyber resilience contours. It has been proven that only in this configuration digital services are able to provide seamless interaction between citizens, local authorities, registers and service units.

The proposed conceptual model of interaction of institutional, technological and communicative circuits allows us to consider digital integration as a closed adaptive cycle. The institutional outline sets rules, standards and indicators; technological transforms them into service processes and data; Communicative provides two-way interaction with residents and returns signals about barriers, mistakes, expectations and satisfaction levels to the system. It is the presence of such feedback that is the determining condition for the transition from simple electronization to truly integrated digital governance.

It is substantiated that the expected results of integration should be evaluated through a system of multidimensional criteria, which includes service availability and completion, process efficiency, interoperability and data quality, feedback and trust, inclusiveness and sustainability. Ukrainian empirical data on the use of digital services and ASCs confirm the practical feasibility of this approach: even with the availability of online channels, barriers related to technical failures, paper dependence, complexity of the procedure and the need for consulting support remain significant. Therefore, the real effectiveness of integration should record not only the digital availability of the service, but the degree of its seamlessness, reliability, clarity and social acceptability.

The practical significance of the results obtained lies in the fact that the proposed model and system of criteria can be used by local governments as a methodological basis for designing a digital service architecture, self-assessment of the level of digital maturity of the community, the formation of local digital transformation programs and the construction of a system for monitoring the effectiveness of the integration of digital services. In scientific terms, the article develops an approach to the digitalization of territorial communities as an institutional and technological process in which service architecture, data management, and communication with the community should not be considered separately, but as interrelated components of a single system of local governance.

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