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Digital Technologies as a Tool for Improving the Effectiveness of Ukraine's Social Protection System

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ABSTRACT

The article analyzes digital technologies as a tool for increasing the efficiency of the social protection system of Ukraine. In accordance with the purpose of the study, it is determined that the digitalization of social protection should be considered not as a set of separate electronic services, but as a holistic integrated system, within which electronic channels of appeal, interoperability of registers, a single information environment, data management mechanisms and performance monitoring tools are combined. It was found that in the international discourse, the effectiveness of digitalization is associated with the full chain of social service provision - from informing and registration to the appointment of assistance, support and evaluation of effectiveness. The approaches of the World Bank Group and the Organization for Economic Co-operation and Development are considered, which emphasize the importance of administrative data integration, automation of procedures, hybrid access models and reducing barriers for beneficiaries. The current state of the digital transformation of social protection in Ukraine is characterized, which is characterized, on the one hand, by the development of the "Diya" platform, the "Trembita" infrastructure, the EISSS and portal services, and on the other hand, by the presence of systemic limitations related to data quality, fragmentation of registers, digital inequality, protection of personal information and the lack of a standardized KPI system. It is proven that the implementation of AI/ML and Big Data in back-office processes, the use of blockchain solutions in niche scenarios of humanitarian coordination, as well as the formation of a public system for monitoring the effectiveness of digitalization, are promising areas of development. The conclusions are drawn that digital technologies acquire real managerial potential only under conditions of system integration, institutional coherence, legal certainty, inclusive access and proper cyber protection. Digitalization of social protection in Ukraine has the potential to become an effective tool for increasing the efficiency, accuracy, security and fairness of social support; however, its effectiveness directly depends on the completion of the institutional deployment of the EISSS, data standardization and the implementation of a multidimensional assessment system.

KEYWORDS

digitalization; social protection; EISSS; interoperability; electronic services; public administration; artificial intelligence; KPI.

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Цифрові технології як інструмент підвищення ефективності системи соціального захисту України

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АНОТАЦІЯ

У статті проаналізовано цифрові технології як інструмент підвищення ефективності системи соціального захисту України. Відповідно до мети дослідження визначено, що цифровізація соціального захисту має розглядатися не як сукупність окремих електронних сервісів, а як цілісна інтегрована система, у межах якої поєднуються електронні канали звернення, інтероперабельність реєстрів, єдине інформаційне середовище, механізми управління даними та інструменти моніторингу результативності. З'ясовано, що у міжнародному дискурсі ефективність цифровізації пов'язується з повним ланцюгом надання соціальних послуг — від інформування та реєстрації до призначення допомоги, супроводу й оцінювання результативності. Розглянуто підходи World Bank Group та Organisation for Economic Co-operation and Development, які акцентують увагу на значенні адміністративної інтеграції даних, автоматизації процедур, гібридних моделей доступу та зниження бар'єрів для отримувачів допомоги. Охарактеризовано сучасний стан цифрової трансформації соціального захисту в Україні, для якого властиві, з одного боку, розвиток платформи «Дія», інфраструктури «Трембіта», ЄІССС і портальних сервісів, а з іншого — наявність системних обмежень, пов'язаних із якістю даних, фрагментацією реєстрів, цифровою нерівністю, захистом персональної інформації та відсутністю стандартизованої системи KPI. Доведено, що перспективними напрямами розвитку виступають впровадження AI/ML і Big Data у бек-офісних процесах, використання блокчейн-рішень у нішевих сценаріях гуманітарної координації, а також формування публічної системи моніторингу ефективності цифровізації. Сформовано висновки про те, що цифрові технології набувають реального управлінського потенціалу лише за умов системної інтеграції, інституційної узгодженості, правової визначеності, інклюзивності доступу та належного кіберзахисту. Цифровізація соціального захисту в Україні має перспективу стати дієвим інструментом підвищення оперативності, точності, безпеки й справедливості соціальної підтримки, однак її результативність безпосередньо залежить від завершення інституційного розгортання ЄІССС, стандартизації даних та впровадження багатовимірної системи оцінювання.

КЛЮЧОВІ СЛОВА

цифровізація; соціальний захист; ЄІССС; інтероперабельність; електронні послуги; публічне управління; штучний інтелект; KPI.

1. Introduction

The transformation of the social protection system in Ukraine is taking place in the context of multidimensional challenges caused by hostilities, large-scale processes of internal displacement of the population, demographic losses and an increase in the volume of targeted social assistance. These factors significantly increase the burden on social policy institutions and actualize the need to increase the efficiency of the administration of social programs. According to official data, already in 2024, expenditures on social support amounted to about UAH 470 billion, while in practice, the provision of relevant services was often carried out using obsolete software solutions developed more than two decades ago [15]. In this regard, digitalization is of key importance as a system-forming factor in the modernization of the social sphere.

Institutional support for digital transformation is formed by the Cabinet of Ministers of Ukraine, the Ministry of Social Policy of Ukraine and the Ministry of Digital Transformation of Ukraine, whose activities are aimed at the formation of an integrated digital environment of social protection. This approach involves the rejection of fragmented information resources and paper document flow in favor of a single information infrastructure that provides automated processing of requests, inter-register interaction and optimization of budget costs.

At the same time, the relevance of the study is enhanced by global trends in the development of digital governance. In particular, according to the United Nations, Ukraine ranked 30th in the e-governance development index (EGDI) in 2024, which indicates significant progress in the digital transformation of public administration [14]. At the same time, achieving a nationwide level of digital maturity does not guarantee the appropriate efficiency of certain sectors, in particular the social protection system, which is characterized by high data sensitivity, procedural complexity, and a focus on the most vulnerable social groups.

The purpose of the article is to analyze digital technologies as tools for improving the efficiency of Ukraine's social protection system.

2. Literature Review

In modern international political and managerial discourse, the digitalization of the social protection system is conceptualized primarily through the category of delivery systems as tools for the delivery of public goods. In particular, S. Wilcock and G. van Toorn interpret such systems as a complex operating environment that ensures the integration of households and state institutions, the implementation of social benefits and services, as well as the formation of mechanisms for monitoring and evaluating their effectiveness [18]. In this context, the key structural components of digital delivery systems are defined as digital payment instruments, social registers, management information systems (MIS), electronic identification tools, interoperability of information resources and performance evaluation systems [3].

The analytical approaches of the Organization for Economic Co-operation and Development supplement this conceptual framework with the introduction of “non-take-up issues”, which reflect the phenomenon of incomplete coverage by social programs of persons who formally have the right to receive them. Scientific sources emphasize that the complexity of administrative procedures, the lack of information and the excessive bureaucratization of application processes lead to the exclusion of a significant part of potential beneficiaries from the social security system. At the same time, the integration of administrative datasets, the use of mechanisms for pre-filling applications and automatic assignment of payments can increase the level of coverage, provided that an inclusive design is implemented and alternative offline access channels are preserved [10].

A separate direction of scientific analysis is formed within the framework of the concept of “digital welfare state”, which is actively developing in modern Western literature. According to S. Wilcock and G. van Toorn, this concept, despite its wide popularity, remains insufficiently theoretically articulated. At the same time, critical studies focus on the ambivalence of the consequences of digitalization of social policy, i.e., along with the increase in the availability and efficiency of services, strengthening of social monitoring tools, and algorithmic sorting of recipients, there are risks of digital exclusion and concentration of control over data [18].

Empirical studies carried out by A. Nylander Vujovic, G. M. Jonathan and S. Hacks demonstrate that the digitalization of mechanisms for identifying and delivering social benefits can increase the effectiveness of social programs, simplify verification procedures and reduce the time spent on processing appeals. At the same time, in the absence of proper institutional coordination, technical infrastructure, and a sufficient level of digital literacy of the population, such transformations can deepen digital and financial exclusion [9].

In the domestic scientific discourse, there is a gradual shift in emphasis from the general problems of digitalization of public administration to the analysis of the human-centered transformation of the social protection system. In particular, O. Yevtushenko considers digitalization as a key tool for the modernization of public administration, linking it with the automation of managerial decisions, the development of electronic services, the introduction of electronic identification systems, data analytics and the formation of digital competencies [20].

Therefore, based on the generalization of scientific views, we can state that there is a consensus on the potential of digital technologies in increasing the effectiveness of the social protection system.

3. Problem Statement

In the current conditions of digital transformation of public administration, the effectiveness of the functioning of the social protection system is determined not so much by the availability of individual electronic services as by the level of integration of its structural and functional components. It is about the integrity of the digital circuit, which covers all stages of the provision of social services from the identification of the recipient and submission of an appeal to the adoption of a management decision, the implementation of financial transactions, the purpose of services, providing feedback, audit and legal protection. In this regard, the adoption of the Law of Ukraine "On the Unified Information System of the Social Sphere" acquires conceptual significance, since it consolidates the legal and organizational foundations of the functioning of the integrated organizational and technical environment aimed at uniting electronic information resources of the social sphere. According to the legislative framework, its enactment is envisaged from 27.05.2026 [11].

According to the official position of the Verkhovna Rada of Ukraine, the implementation of this law provides for the integration of more than thirty state registers and databases, minimization of duplication of social benefits and information errors, the formation of a personalized "social history" of the recipient, as well as increasing operational efficiency by automating administration procedures. In view of this, the subject of scientific analysis is transformed from the consideration of isolated digital tools to the study of the system architecture of public management of the social sphere [16].

In the applied dimension, individual components of the relevant architecture have already been formed in Ukraine. The Unified Information System of the Social Sphere (UISSS), according to government materials, functions as a tool for optimizing and automating the processes of providing social support; as of October 2023, it ensured the implementation of key functions, including support for internally displaced persons, verification of recipients of assistance through the eDopomoga service, confirmation of the status of persons with disabilities, electronic exchange of documents through the Diia platform and maintaining a register of social service providers. An important component is the introduction of electronic case management and personalized electronic cabinets, which is consistent with the integrated case management practices typical for the countries of the Organization for Economic Co-operation and Development [19].

At the same time, the current state of digitalization of social protection in Ukraine reveals a systemic contradiction between the high dynamics of the development of e-governance at the macro level and the insufficient level of formation of tools for assessing the effectiveness of digital transformations within the social system itself. There is no unified set of key performance indicators (KPIs) in the public domain, which would provide systematic monitoring of the main parameters of the functioning of social programs, in particular, the duration of processing requests, the level of decision automation, the frequency of adjustments and false refusals, the scale of repeated requests, losses from duplication of payments, the cost of administration, the workload on staff, and the consequences of cyber incidents. It is this analytical gap that determines the need for its scientific understanding and determines the content of the research problem.

4. Methods and Materials

The research methodology is based on the integration of documentary analysis, comparative institutional approach, functional analysis of digital architecture and regulatory analysis, which provides a comprehensive understanding of the digitalization of social protection as an integral management system. The empirical base is formed on the basis of official regulations, government materials, analytical reports of international organizations, as well as peer-reviewed scientific publications. sources of the World Bank Group, Organization for Economic Co-operation and Development and the United Nations, as well as the works of S. Wilcock, G. van Toorn, A. Nylander Vujovic

Analytical processing of the material is carried out through content analysis of official documents, which allows us to identify digital tools and indicators of the system's functioning, as well as through a comparative analysis of international practices and synthesis of approaches to the formation of KPIs and monitoring systems based on the concepts of delivery systems and digital governance.

At the same time, the limitations of the study due to the fragmentation of open data in the field of social protection are taken into account, which makes it impossible to use full statistical series of KPIs. In this regard, the paper fixes such limitations and proposes the use of model analytical data sets suitable for further empirical verification.

5. Results and Discussion

The digitalization of the social protection system in modern scientific discourse is interpreted as a multi-level integrated system, and not as a set of isolated electronic services. In the approaches of the World Bank Group, digital delivery systems include a full chain of service provision from informing and registration to the assignment of assistance, support and performance evaluation, where the key components are digital payments, social registers, management information systems (MIS), electronic identification tools, interoperability, and monitoring systems [3]. At the same time, analytical materials of the Organisation for Economic Co-operation and Development show that efficiency gains are achieved under the conditions of integration of administrative data, which ensures the reduction of barriers to access, pre-filling of information and the transition to automatic or proactive assignment of social support [3].

In the context of Ukraine, there is the formation of a digital foundation for social protection, the development of which is carried out in the direction of moving from fragmented solutions to a holistic system architecture. According to the Ministry of Digital Transformation of Ukraine, in 2025, the Diia digital platform covered more than 23 million users (77% of smartphone owners), while 59% of the population used state electronic services, in particular in the field of pensions and subsidies, which indicates the mass use of digital channels of interaction, which, however, is not identical to their full functional integration [17].

The development of channels of access to social services is characterized by a combination of digital and traditional forms of interaction. The social web portal of electronic services provides multi-channel authorization (BankID, Diia.Signature, electronic key) and the ability to submit appeals even in conditions of limited identification, which is aimed at reducing access barriers. At the same time, the network of administrative service centers integrates digital self-service tools: in 2024, 871 ASCs used appropriate solutions, which confirms the feasibility of a hybrid model of access in the social sphere.

Interoperability is a key infrastructural principle of the functioning of the digital state. The Trembita system provides a scalable data exchange between state registers: in 2025, the number of transactions exceeded 12 billion, which is accompanied by an expansion of interaction between information resources and creates prerequisites for the implementation of the principle of minimizing citizen participation in data confirmation and reducing administrative procedures [1].

At the same time, the digitalization of social protection is taking on signs of a comprehensive legal and ethical transformation. The legislative regulation of the functioning of the UISSS determines the principles of centralization, processing and protection of data of recipients of social support. At the same time, the scaling of digital solutions, in particular in the field of big data analytics and artificial intelligence technologies, actualizes the issues of secure access to information, consent management, separation of powers, audit of actions and ensuring the cyber resilience of information systems [12].

In the context of these requirements, the architecture of electronic social services in a mature digital system should be formed as a formalized, legally defined and maximally automated process aimed at minimizing the administrative burden on the recipient. This approach is consistent with the methodological provisions of the Organization for Economic Co-operation and Development on simplifying enrollment procedures, as well as with the national practice of introducing the concepts of "social history", case management and the development of portal mechanisms for the provision of services [10].

Within the technological dimension of digitalization, the use of AI/ML and Big Data is of significant importance, the potential of which lies in increasing the efficiency of operational activities by reducing routine procedures, speeding up document processing and increasing the accuracy of verification processes. Analytical materials of the Organization for Economic Co-operation and Development, in particular using the examples of Catalonia, Germany and Finland, demonstrate the use of artificial intelligence for eligibility checks, classification of unstructured data and automation of document flow, which implies the presence of a developed digital infrastructure, data interoperability and clearly defined management mechanisms [10]. In this regard, for Ukraine, it is advisable to associate the introduction of relevant technologies with the preliminary standardization of data within the UISSS, the formation of audited datasets and the introduction of procedures for explaining algorithmic decisions and mechanisms for their appeal.

In addition, when evaluating innovative technologies, it is advisable to take into account the potential of blockchain, which is not universal in the social protection system, but can be effective in specialized scenarios. According to the Organization for Economic Co-operation and Development, the number of cases of large-scale application of blockchain solutions remains limited, while in the humanitarian field, the experience of the Building Blocks World Food Programme platform, which ensures the coordination of assistance between organizations and minimizes the risks of its duplication, is indicative [10].

In view of the above, the use of blockchain technologies in Ukraine should be considered as an auxiliary tool, in particular in the processes of humanitarian coordination, tracking inter-organizational transfers and verification of the immutability of individual register events. Similar approaches can be traced in UNICEF practices, where blockchain is used in cash assistance programs with an emphasis on speed, transparency and accountability, as well as the ability to function in conditions of limited technical infrastructure [6].

In the comparative international dimension, the digital transformation of social protection systems is considered as the result of consistent institutional and technological integration, and not as a consequence of the implementation of individual digital solutions. The experience of Estonia, Denmark, Finland and Canada demonstrates that a high level of performance is ensured by the coordinated functioning of key components of the digital infrastructure, in particular electronic identification systems, interoperable data exchange, automation of back-office processes and the development of multi-channel models of access to services.

In particular, the Estonian model is based on the use of the X-Road infrastructure, which provides secure inter-register data exchange and acts as a backbone element of the e-state. Combined with the full digitalization of public services and the use of blockchain technologies (KSI) to guarantee data integrity, this creates prerequisites for the functioning of a highly effective digital ecosystem of public administration [4]. In turn, Denmark's experience is characterized by the institutionalization of mandatory digital channels of interaction (Digital Post, self-service), which ensures large-scale coverage of the population with electronic services and a gradual decrease in the share of citizens who need additional support when using them [2].

The Finnish model demonstrates the effectiveness of integrating electronic identification, personalized digital services (OmaKela) and electronic messaging systems, which contribute to a significant increase in the share of online requests and the gradual abandonment of paper communication channels [7]. At the same time, the Canadian approach is focused on a comprehensive modernization of the system of social benefits through the introduction of the "single sign-in" and "tell-us-once" principles, which ensure the integration of services, reduction of the processing time of appeals and partial automation of the assignment of assistance [5; 13].

Generalization of the practical experience of European countries allows us to formulate several conceptually significant provisions. Firstly, the determining factor of efficiency is the level of data interoperability, which ensures the integrity of the system and minimizes the need for repeated

presentation of information. Secondly, digital access channels should be complemented by a developed support infrastructure, including consulting services, offline services and mechanisms for individual user support. Thirdly, the automation of processes should be aimed at reducing the administrative burden on the recipient, and not at transferring it due to interdepartmental dysfunctions. Fourthly, trust in digital governance is formed by combining the functional convenience of services with guarantees of security and control over personal data.

According to the analytical materials of the World Bank Group, the group of technical risks includes the incompatibility of data formats, the asynchrony of their updating modes, the heterogeneity of directories and semantic structures, as well as the limited level of interoperability of information systems. At the same time, the research focuses on the presence of additional challenges, in particular, risks of unauthorized access to data, algorithmic biases in the processes of using Big Data and artificial intelligence technologies, as well as the phenomenon of digital exclusion, which is formed under the dominance of exclusively digital channels of interaction with recipients of social services [8].

In the national context, these challenges are confirmed in the practice of functioning of the social protection system, which is characterized by the use of outdated local software solutions, fragmentation of registers, insufficient level of inter-register interaction and the need to strengthen the protection of personal data. In this regard, digitalization barriers are considered as multidimensional constraints covering the technical, legal, organizational, financial and social levels, and their solution involves the introduction of unified data dictionaries and master data management systems, improvement of regulatory regulation of the circulation of sensitive information, the formation of a unified governance model, the provision of long-term financing for digital transformation, the development of hybrid access channels to services, improving data quality through regular cleaning and auditing, as well as introducing modern approaches to cyber protection, including multi-level authentication and access segmentation [8].

The identified barriers necessitate the conceptualization of approaches to assessing the effectiveness of digitalization of social protection. In modern theoretical and methodological approaches of the World Bank Group and the Organization for Economic Co-operation and Development, efficiency is interpreted as an integral characteristic of the quality of functioning of the full delivery chain, which includes all stages from identification and registration to adoption management decisions, providing support and further monitoring of its effectiveness.

In this regard, it is necessary to apply a comprehensive system of indicators, including the level of coverage of the population, the availability and inclusiveness of services, the speed of processing appeals, the accuracy of decisions made, the share of automated procedures, the volume of duplication or illegal payments, the frequency of appeals, the level of user satisfaction, the cost of administration, as well as anti-corruption and cyber protection effects [3].

The outlined approaches make it possible to form a multidimensional framework of key performance indicators (KPIs), within which the assessment is carried out in such areas as accessibility (share of online requests), inclusiveness (share of supported requests), speed (average processing time), payment discipline (timeliness of payments), accuracy (share of decisions without adjustment), coverage (non-take-up level), anti-corruption effectiveness (detection of duplications and fraud), legal protection (proportion of appeals), cyber resilience (incidents and recovery times) and cost-effectiveness (costs per case). This approach is in line with modern practices of performance monitoring, SPARKS and GovTech analytics and provides the ability to comprehensively measure the effectiveness of the system [3].

At the same time, the analysis of open sources indicates the lack of a full-fledged integrated public system for monitoring these indicators in Ukraine. In this regard, it is advisable to introduce a regular public monitoring tool (dashboard) of the UISSS at the level of public policy, which will include anonymized indicators by programs, territories, access channels and social groups. Such a system should combine technical event logs, user survey results, selective audits of decisions and mechanisms of independent public control provided for by current legislation.

6. Conclusions

Thus, based on the study, we can say that the digitalization of the social protection system of Ukraine can be considered as an effective tool for increasing the effectiveness of public administration, provided that it is implemented in the format of a holistic, integrated management system. The key

determinant of efficiency is the level of consistency and interaction of the structural components of the digital infrastructure, in particular, electronic interaction channels, a single information core, interoperability of registers, data management mechanisms, hybrid access models, analytical tools for detecting non-take-up, as well as integrity control and performance monitoring systems.

The current state of digital transformation of social protection in Ukraine is characterized as a stage of institutional formation with a high potential for further development. The formation of the basic elements of the digital ecosystem, in particular, large-scale electronic interaction channels, interoperable data exchange infrastructure, the functionality of the UISSS and the relevant regulatory and legal support, creates prerequisites for the transition to a system management model. At the same time, several structural constraints remain regarding the quality and consistency of data, ensuring their protection, inclusive access to services, and the institutional capacity of actors at the local level, as well as the lack of standardized approaches to performance assessment.

Generalization of the results of the study allows us to determine the priority areas for further transformation of the system. These include the completion of the deployment of the UISSS as an integrated information environment of the social sphere; standardization of data based on unified directories, procedures for their updating and quality criteria; institutionalization of the system of performance indicators with the provision of their regular public representation; development of hybrid models of access to services that combine digital and offline tools; phased introduction of artificial intelligence technologies in compliance with the principles of transparency, accountability and the ability to appeal decisions; strengthening personal data protection regimes through mechanisms for controlling access and informing users; as well as the integration of cybersecurity measures with business continuity systems.

Thus, the digitalization of social protection acquires the status of an effective instrument of state policy only under the conditions of its systematic implementation, when the transformative effect is manifested in increasing the efficiency, accuracy, fairness, security and accessibility of managerial decision-making, which corresponds to modern conceptual approaches to digital governance and reflects the strategic guidelines for the development of the national social protection system.

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