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DIGITALISATION AS A TOOL FOR MANAGING SOCIAL AND HUMANITARIAN PROJECTS

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The concept of “digitalization” is systematized according to the principle of characterization. The concept of digital transformation from the point of view of representatives of the social and humanitarian sector is singled out. This article examines the concept of ‘digitalisation’ as a management tool and provides its own definition of this term. It expands on the internal and external factors influencing digital transformation in the public sector. The dynamics of public organizations registered and formed by notification in accordance with the Law of Ukraine “On Public Associations” in the period 2014–2024 has been studied. Positive trends in the general work of the public sector are substantiated, since electronic cabinets and online platforms significantly reduce the time for legal actions during registration, amendments to statutory documents, speed up work with the documentation of organizations and simplify the procedure for submitting reports. It analyses the dynamics of digitalisation among Ukrainian non-profit organisations between 2014 and 2024. The activities of the NGO ‘Siaivo Nadii’ were studied, including the strengths and weaknesses of the organisation, the issues faced by the team, and the level of implementation of digitalisation tools in its current activities. Opportunities for improving the organisation's capacity through the implementation of digitalisation were identified. Ukraine's place in the global context of digitalisation has been analysed. Ukraine's advantages in implementing social and humanitarian projects have been identified. The existing needs of public organizations in the areas of increasing efficiency are reflected; improving the quality of services provided to beneficiaries; improving interaction and getting new opportunities to educate the team. The main factors influencing the effectiveness of the implementation of social and humanitarian projects in both countries have been highlighted. Actions to improve the performance indicators of Ukrainian organisations have been proposed.

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ЦИФРОВІЗАЦІЯ ЯК ІНСТРУМЕНТ УПРАВЛІННЯ СОЦІАЛЬНО-ГУМАНІТАРНИМИ ПРОЄКТАМИ

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Ключові слова: цифровізація, цифрова трансформація, оцифрування, цифрова освіта і компетентність.

Систематизовано поняття «цифровізація» за ознаковим принципом. Виокремлено поняття цифрової трансформації з погляду представників соціально-гуманітарного сектору. У статті досліджено поняття «цифровізації» як інструменту управління та надано власне визначення даної дефініції. Розширено фактори внутрішнього та зовнішнього впливу цифрової трансформації на діяльність громадського сектору. Досліджено динаміку громадських організацій, зареєстрованих та утворених шляхом повідомлення відповідно до Закону України «Про громадські об'єднання» у період 2014–2024 років. Обгрунтовано позитивні тенденції загальної роботи громадського сектору, оскільки електроні кабінети та онлайн платформи значно зменшують час на юридичні дії при реєстрації, внесенні змін в статутні документи, пришвидшують роботу з документацією організацій та спрощують порядок подання звітності. Проаналізовано динаміку зміни цифровізації кількості українських неприбуткових організацій за період 2014–2024 років. Досліджено діяльність ГО «Сяйво надії», сильні та слабкі сторони організації, проблеми з якими зіткається команда та рівень впровадження в поточній діяльності інструментів цифровізації. Визначено можливості підвищення спроможності організації через впровадження цифровізації. Проаналізовано місце України в глобальному сенсі цифровізації. Визначено переваги України у впроваджені соціально-гуманітарних проєктів. Відображено існуючі потреби громадських організацій за напрямками щодо підвищення ефективності; покращення якості надання послуг бенефіціарам; покращення взаємодії та отримання нових можливостей для освіти команди. Запропоновано дії для підвищення індикаторів діяльності українських організацій.

Problem statement

An essential aspect for the successful implementation of social and humanitarian projects is the speed of organisational processes and the level of communication with partners. The Ukrainian civil society sector, which was formed mainly in response to the challenges posed by the full-scale invasion, finds it difficult to digitise its processes due to its low organisational capacity. Unlike Ukraine, non-governmental organisations in the United Kingdom have no problem using digital tools in their daily activities, significantly increasing their efficiency.

Research and study of these issues will help identify the main challenges and obstacles facing Ukrainian non-governmental organisations and determine effective ways to improve their activities through digitalisation tools.

Recent research analysis

The digitisation of social and humanitarian sector and its impact on the quality of implementation of socially significant projects has been the subject of numerous studies by a large number of scientists and practitioners. This is evidenced by the scientific research of V. Dmytrenko [1]; T. Kostyshyna [2]; Y. Safonov [3]; I. Sushyk [4]; S. Tulchynska [5]; O. Popelo [6]; L. Chahovets [7]; and others. In its study 'Digitalisation: Advantages and Ways to Overcome Challenges,' the Razumkov Centre noted that digitalisation is one of the defining trends in the development of human civilisation, that shapes a more inclusive society and better management mechanisms, expands access to healthcare, education and banking, improves the quality and coverage of public services, extends the ways in which people can cooperate, and allows them to take advantage of a greater variety of goods at lower prices [8].

In their works, the above-mentioned researchers studied the theoretical aspects of digitalisation, their impact on the overall performance indicators of the organisation in the context of current internal processes and external economic indicators of the country.

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The articles by Gamova O. V. [9], Golchanska V. and Lynenko A.V. [10] reveal the advantages of using digital tools in the process of land management and in the industrial market in the context of military challenges and digital transformation

The aim of this article is to study the level of digitalisation of Ukrainian organisations as a tool for managing social and humanitarian projects, using the example of the NGO 'Siaivo Nadii' and comparing it with organisations in the United Kingdom.

Presentation of the main material

The digitisation of the non-governmental sector, as a tool for managing social and humanitarian projects, is one of the factors contributing to organisation's capacity. Currently, due to changing donor requirements, non-governmental organisations face several challenges reflected in the internal policies and external activities of established institutions, which directly affect the progress of projects implemented by organisations.

Researchers have different approaches to defining the concept of 'digitalisation'. To form the concept of digitalisation in this work, we considered the opinions of various authors.

Research into the issue of 'digitalisation' can be traced back to the 1950s and 1960s in the works of renowned economists A. Maslow [11] and A. McAfee. Robert Watchel [13] used the term 'digitalisation' as early as 1971 to explain the concept of 'digitalisation of society'. In the second half of the 1990s, we encountered the next, already rephrased wave of digitalisation. Due to the rapid development of IT technologies and mobile communications, the concepts of 'digitalisation' and 'electronic economy' were first applied by Canadian Professor D. Topscott [14]. Since 2019, these terms have been used by specialists in various fields to describe the process of using computer technologies in the day-to-day activities of an organisation. This is considered to be the third wave of digitalisation. In addition, renowned domestic and foreign researchers have worked on defining the essence of digitalisation. P. Weill, C. Boue´e, S. Schaibl, A. Hrytsenko, R. Lisova, K. Markevych, I. Strutynska, A. Khokhlov [15, 16, 17, 18, 19, 20, 21]. Table 1 provides a general characteristic systematisation of the concept of 'digitalisation'.

Nowadays, there is a wide range of opinions on the impact of digitalisation on the public sector, prompting an analysis of these views, divided into two categories: academics and managers of non-governmental institutions. This approach takes into account the different professional orientations of the participants. Scientists, as researchers, study this phenomenon through analysis and observation. At the same time, managers of non-governmental institutions form their understanding and vision of the process based on their own experience of implementing digital initiatives and concepts for the development of their organisations. Table 2 presents a systematisation of digital transformation concepts from the perspective of social and humanitarian sector representatives.

Summarising the opinions of various authors, we believe that 'digitalisation' as a management tool is the ability of an

Table 1 – Systematisation of the concept of 'digitalisation' according to the general characteristic

Author	Definition	Characteristic
P. Weill [15]	The essence of digital transformation is not in technology, but in change. The main thing is... to offer customers something new and attractive... and create a goal that customers will want to achieve	Focus on innovation and setting goals that will attract the attention of beneficiaries and stakeholders
C. Boue´e, S. Schaibl [16]	Digital transformation is the sequential network of all sectors of the economy and the adaptation of players to the new realities of the digital economy. Decisions in network systems include data exchange and analysis, calculation and evaluation of options, as well as initiation of actions and implementation of consequences	Emphasis on consistent interaction between all components of the network system, including data exchange and analysis, calculation of possible options, and decision-making
A. Hrytsenko [17]	The use of technologies based on a discrete code system for processing and transmitting information in the production, distribution, circulation and consumption of goods	Focus on technologies for transferring, processing and storing information
R. Lisova [18]	Profound and disruptive changes caused by the application of breakthrough technologies, which in turn change how value is created and obtained	Focus on the impact of modern technologies on changing ways of creating and obtaining value
K. Markevych [19]	Digitalisation is one of the defining trends in the development of human civilisation, shaping a more inclusive society and better management tools	Focus on building a more inclusive society and improving management algorithms through the use of digital tools
I. Strutynska [20]	Digital transformation is the transition to digital technologies and user-centricity. The emergence of new customer interaction tools, such as chatbots, self-service terminals, and online accounts, is changing consumer behaviour	Focus on implementing consumer-oriented digital technologies that influence consumer behaviour and improve the lives of individual beneficiaries, business representatives and grant providers
A. Khokhlov [21]	Digitalisation should be understood not only as a technological phenomenon, but also as a process of social and cultural transformation	A process that expands the scope of possibilities not only through technological devices, but also as a relational model that involves various spheres of life

Source: this table was compiled by the authors.

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Table 2 – Digital transformation concepts from the perspective of social and humanitarian sector representatives

Author	Definition
Mariana Semenyshyn, Team leader in the sustainable development department of the 'U-LEAD with Europe' programme	'Together with the Ministry of Digital Transformation, the Ministry of Recovery, and SocialBoost, we have set three main goals for this initiative,' she says. "First, to improve the digital skills of specialists so that every community has a team that can implement digital projects. Second, to prepare concepts for digital transformation projects that will help communities promote recovery and modernisation locally. Third, to create a community of like-minded people who can promote digital transformation ideas"
Andrii Khorvat Deputy Director of the 'U-LEAD with Europe' programme from GIZ	'Strengthening the capacity of Ukrainian communities in the field of digital transformation is one of the key areas of activity. Digital transformation has already made a significant contribution to Ukraine's resilience. He notes that a set of important and necessary measures is currently planned to support current and future digital leaders in communities in developing digital transformation projects at the local level
Oleksandr Sperchun Deputy Head of NGO 'Misto Syly'	Today, we have identified digital transformation as one of our organisation's key priorities. This enables us to adapt to rapidly changing conditions and improve the way we deliver aid. We strive to be a modern organisation that is constantly improving, and in this regard, the implementation of digital solutions significantly increases our efficiency
Kateryna Markevych Expert on economic and social programmes at the Razumkov Centre	Digitalisation is one of the defining trends in the development of human civilisation, shaping a more inclusive society and better governance mechanisms. Digitalisation is not limited to the exclusive use of technology; it is characterised by a cultural shift integrated into all work areas and a transformation in the management of different teams
NGO 'Zvilnymo'	The public sector is at the crossroads of digitalisation. Many innovations are ahead, from blockchain integration to the introduction of quantum computers. Analogue work is a thing of the past. Digitalisation is the first step towards getting rid of tedious routine tasks. Customised algorithms and AI can easily transform mountains of paperwork into an organised data stream that moves faster

organisation to use its internal potential to accelerate work processes, expand opportunities and increase capacity by using digital tools in its current activities.

Every year, Ukraine improves its position in terms of overall digitalisation. According to the 2024 international E-Government Development Index study, which is developed by the UN and assesses the level of digitalisation in 193 countries, Ukraine ranked fifth in terms of the development of digital public services and first in terms of E-Participation, which indicates the willingness of citizens to engage in the use of online platforms. In addition to the rapid transformation of digitalisation in government processes, the non-governmental sector is also undergoing changes. Table 3 shows the number of non-governmental organisations registered and established by notification in accordance with the Law of Ukraine 'On Public Associations' in the period 2014–2024. Due to the fact that electronic portals and online platforms significantly reduce the time required for legal actions during registration, amendments to statutory documents, speed up work with organisational documentation and simplify the reporting process, this positively impacts the overall work of the public sector.

Among the factors contributing to this growth, in addition to digital processes, there is support for public initiatives, changes in legislation that encourage the creation of organisations, and an increase in the number of sectors requiring non-profit support.

Therefore, based on the research conducted, it can be assumed that digitalisation is a continuous process of social transformation that has an influence and integrates into all spheres of life, including the NGO 'Siaivo Nadii' activities.

The NGO 'Siaivo Nadii" was established in 2016 in Berdiansk. Its primary focus is supporting families through informal education and culture. In 2022, after the full-scale invasion, the organisation relocated to Zaporizhzhia, where it continued its activities. The organisation has a team of specialists with whom it has established long-term partnerships, including art therapists, psychologists, teachers, animators and educators who have been working with children and young people with disabilities for many years. In addition, the organisation has a solid material and technical base for implementing its activities, namely, the 'Vilni Space – space for children and youth' has already been opened in Zaporizhzhia, which is barrier-free, located

Table 3 – Number of non-governmental organisations registered and established by notification in accordance with the Law of Ukraine 'On Public Associations' in the period 2014-2024

Type of public association	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Non-profit organisations	64,526	70,321	75,988	80,461	84,608	88,882	92,470	94,353	99,556	208,385	216,342
Trade unions and trade union associations	25,853	26,321	27,070	27,601	28,026	28,486	28,713	28,849	28,757	28,785	28,754
Charity organisations	13,579	15,384	16,837	17,726	18,433	19,112	19,812	20,144	26,846	26,932	27,032
Religious organisations	24,957	23,261	24,072	25,233	26,075	26,437	26,651	26,758	27,091	28,132	28,145
Housing cooperative	15,719	17,109	26,080	27,999	29,916	32,700	35,353	36,223	38,606	38,678	38,674
Public association	526	753	1497	1254	1455	1718	1875	1962	2212	2189	2345

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in the city centre, allowing easy access from any district of Zaporizhzhia, has separate sanitary facilities, and is equipped with Braille signs and auxiliary lighting. In addition, the centre is equipped with the necessary office equipment and furniture for training. Currently, the organisation has 20 laptops, a projector, a speakerphone, printers, etc. All team members have relevant education and have undergone additional certification from UNICEF for working with children.

The team has implemented 13 projects to support children with disabilities. These include educational activities, interactive entertainment programmes, art therapy master classes, and events aimed at stabilising the psycho-emotional state through artistic activities. In Berdiansk, this NGO actively cooperated with the Territorial Centre for Children with Disabilities, holding events aimed at children and their parents. Currently, in Zaporizhzhia, it cooperates with the Department of Labour and Social Protection of the Population and supports families with children with disabilities. In addition, it works on the socialisation of internally displaced children into the host community and conducts activities to overcome educational losses.

Until 2025, the NGO 'Siaivo Nadii' had never received support for its organisational capacity. The organisation's team has achieved everything based on leadership experience and partner support. The organisation works continuously with children and young people, and its chair is a mentor for UNICEF's Upshift programme and the founder of two youth hubs. Since the beginning of 2024, 1,023 children aged 3 to 18 have visited the space, 33.5 % of whom are children with disabilities, whom the staff adapts and socialises through the above-mentioned practices. Accounting was done manually without the use of modern software, as grant programmes did not cover the cost of the licence software, and the organisation did not have its own funds in the form of sponsors or membership fees. This significantly slowed down work processes. The lack of specialised software for document management and digital signature services also had a negative impact on the workflow.

In 2025, the team won a grant to improve the organisation's capacity, which enabled them to purchase licensed software for the Vchasno service, the BOOCHKEEPER accounting programme and the ZOOM programme.

According to the observations of the organisation's management, this accelerated the process of exchanging documents with partners and positively impacted financial specialists' work. In addition, the use of digitalisation tools also had a positive effect on programme activities. Thanks to the ZOOM licenced software, coaches, involved in project activities, can create and conduct long conferences with a large number of participants and record them. All this has made it possible to expand the geography of the activities of the NGO. Today, the organisation's coaches are active throughout Ukraine and abroad. However, the organisation still lacks other modern tools to increase the effectiveness of its activities.

The existing needs of the organisation can be divided into the following areas:

Software: database management systems, customer relationship management (CRM) systems, enterprise resource planning (ERP) systems, software for automating promotional activities, project management software.

Hardware: more powerful computers, server, network equipment, mobile devices, and other equipment necessary for processing and storing digital data.

Digital platforms: online services and platforms enabling interaction between users, access to information, and performing specific tasks.

Intelligence: artificial intelligence, machine learning, and other technologies that enable process automation, data analysis, and decision-making based on digital information.

The availability of digitalisation tools would facilitate the establishment of the following processes, namely:

1. Increased efficiency – reduced time spent on information processing, assistance with routine processes.
2. Improving the quality of services provided to beneficiaries – personalised approach, speed of processing requests and redirects, easy to use.
3. Improved collaboration – fast shared access to information, real-time collaboration, accelerated communication.

New opportunities for team education – access to educational resources and platforms, personalised learning.

Conclusions

For Ukraine, digitalisation is an opportunity to use the experience of international partners, adapting it to local conditions and needs. Ultimately, the successful digitalisation of non-governmental organisations can significantly increase their ability to address social issues, attract new supporters and ensure sustainable development in challenging conditions. Both countries have the potential to achieve significant success in this area if they are willing to cooperate and exchange their experiences.

References

1. Dmytrenko V. Problems and prospects for the development of construction companies. Scientific notes of KROK University, 2020 (2 (58), P. 120 127. https://doi.org/10.31732/2663-2209-2020-58-120-127 URL: https://snku.krok.edu. ua/index.php/vcheni-zapiski-universitetu-krok/article/view/302
2. Kostyshyna T. Social protection in the context of digital economy development. Economic Analysis. 2021. Volume 31. No. 1. P. 279–288. URL: file:///C:/Users/Admin/Downloads/1919-6565657733-1-PB.pdf
3. Safonov Y. Analysis of regulatory policy in the context of sustainable development of Eastern European countries. International Journal of Sustainable Development and Planning. 2022. Vol. 17, No. 7, P. 2189–2197. URL: https://archer.chnu.edu.ua/bitstream/handle/123456789/6568/17.07_19.pdf?sequence=1&isAllowed=y

4. Sushyk I., Sushyk O. Digital services and portals for migrants in the social security system. Social Economics. 2023. Issue 65. P. 44–57. doi: https://doi.org/10.26565/2524-2547-2023-65-04 URL: file:///C:/Users/Admin/Downloads/22307-Article%20Text-41533-1-10-20230908.pdf
5. Tulchynska S., Korzun L. Digitalisation as a means of transforming Ukraine's economy // Modern issues of economics and entrepreneurship: collection of scientific works. 2020. Issue 25. P. 52–59. URL: http://eipt.khpi.edu.ua/index.php/2310-5534/article/view/199972
6. Popelo O., Harafonova O., Tulchynska S., Derhaliuk M., Berezovskyi D. Functions of public management of the regional development in the conditions of digital transformation of economy. Amazonia Investiga. 2021. № 10 (43). P. 49–58. URL: https://amazoniainvestiga.info/index.php/amazonia/article/view/1681
7. Chahovets L., Chahovets V. Digitalisation as a factor in socio-economic development and economic security of the state. Municipal Economy of Cities. 2023. Volume 6. Issue 180. Pp. 21–26. URL: https://repository.hneu.edu.ua/bitstream/123456789/30754/1/%D0%A7%D0%B0%D0%B3%D0%BE%D0%B2%BE%D0%B2%D0%B5%D1%86%D1%8C% 20%D0%92.%D0%92.%202023.pdf
8. Official website of the Razumkov Centre. Research paper "Digitalisation: advantages and ways to overcome challenges" URL: https://razumkov.org.ua/statti/tsyfrovizatsiia-perevagy-ta-shliakhy-podolannia-vyklykiv
9. Гамова О. Цифровізація управління земельними ресурсами: перспективи для аграрного сектору України. Фінансові стратегії інноваційного розвитку економіки, 2025 № 4 (68), 36–40. https://doi.org/10.26661/2414-0287-2025-4-68-06 URL: https://journalsofznu.zp.ua/index.php/economics/article/view/ 4939
10. Голчанська В., & Линенко А. (2025). Особливості стратегій комунікації та просування на промисловому ринку в умовах воєнних викликів і цифрової трансформації. Фінансові стратегії інноваційного розвитку економіки, 2025 № 4 (68), 73–76. URL: https://doi.org/10.26661/2414-0287-2025-4-68-13 https://journalsofznu.zp.ua/index.php/economics/article/view/4946
11. Maslow A. Humanistic Theory of Personality URL: https://osvita. ua/vnz/reports/psychology/9766/#google_vignette
12. The Platform Revolution: How Network Markets Are Transforming the Economy – and How to Make Them Work for You. Geoffrey Parker, Marshall Van Alstyne, Sangeet Choudary. URL: https://worldbank.org.ua/4947-kniga-revolyutsiya-platform-yak-merezhevi-rinki-zminyuyut-ekonomiku-i-yak-zmusiti-yikh-pratsyuvati-na-vas.html
13. Mary K. Pratt, Jason Sparapani, (2021) Digital transformation. URL: https://searchcio.techtarget.com/definition/digital$transformation?ga=2.173960$227.1880214391
14. Tapscott D. (1994), The Digital Economy. URL: http://dontapscott.com/books/the$digital$economy
15. Weill, P. Digital Transformation: How to Survive and Succeed in the New Era. URL: https://megakniga.net.ua/tsyfrova-transformatsiia.-yak-vyzhyty-i-dosiahty-uspikhu-v-novu-epokhu/?srsltid=AfmBOoqQdMJ8_XdaZrLvGHjZhoYarXuX7r4NUlk9tDiBpNrI_GdyJSWx
16. Boue'e C., Schaible S. Die Digitale Transformation der Industrie. Roland Berger Strategy Consultans und Bundesverband der Deutschen Industrie, 2015. 52 p. URL: https://www.researchgate.net/publication/ 393395473_Management_Mechanism_and_Formation_of_a_Strategy_for_Adapting_Enterprises_in_the_Context_of_Digitalization_of_the_Economy
17. Hrytsenko, O. Digital economy: contemporary challenges for economists and legal scholars. Economic Theory and Law. 2018. No. 2. P. 77–90. URL: http://www.irbis-nbuv.gov.ua/cgi-bin/irbis_nbuv/cgiirbis_64.exe?I21DBN=LINK&P21DBN=UJRN&Z21ID=&S21REF=10&S21CNR=20&S21STN=1&S21FMT=ASP_meta&C21COM=S&2_S21P03=FILA=&2_S21STR=Vnyua_etp_2
18. Lisova R. The impact of digitalisation on business models: stages and tools of digital transformation. Scientific Bulletin of Uzhhorod National University. Series: International Economic Relations and World Economy. 2019. Issue 24 (2). P. 114–118. URL: http://nbuv.gov.ua/UJRN/Nvuumevcg_2019_24%282%29__24
19. Markevych K. Digitalisation: advantages and ways to overcome challenges. Razumkov Centre. URL: https://razumkov.org.ua/statti/tsyfrovizatsiia-perevagy-tashliakhy-podolannia-vyklykiv
20. Strutynska, I. Definitions of the concept of 'digital transformation' / I. Strutynska // Black Sea Economic Studies. – 2019. Issue 48(2). P. 91–96. URL: http://nbuv.gov.ua/UJRN/bses_2019_48(2)__19
21. Khokhlov A. Digitalisation: the object and instrument of the educational process in Bavarian schools. URL: http://www.spilnota.net.ua/ru/article/id-468

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