

**Шевченко Ірина Олександрівна**,  
кандидат економічних наук, доцент,  
докторант Західноукраїнського  
національного університету

**Shevchenko Iryna**,  
PhD in Economics, Assistant Professor,  
West Ukrainian National University,  
<https://orcid.org/0000-0001-8188-3551>

## КОМПЛЕКСНИЙ ПІДХІД ДО ФОРМУВАННЯ ПОЛІТИКИ В ЕПОХУ ЦИФРОВИХ ТЕХНОЛОГІЙ A COMPREHENSIVE APPROACH TO POLICY FORMATION IN THE ERA OF DIGITAL TECHNOLOGIES

Шевченко І. О. Комплексний підхід до формування політики в епоху цифрових технологій. *Український журнал прикладної економіки та техніки*. 2023. Том 8. № 2. С. 115 – 121.

Shevchenko I. A comprehensive approach to policy formation in the era of digital technologies. *Ukrainian Journal of Applied Economics and Technology*. 2023. Volume 8. № 2, pp. 115 – 121.

Ця стаття пропонує комплексний підхід до формування політики в епоху цифрових технологій задля забезпечення ефективного розвитку суспільства. Автор розглянув роль цифрових технологій у сучасному світі. Мета дослідження полягає у створенні комплексного підходу до формування політики в епоху цифрових технологій. Стаття аналізує основні виклики в епоху цифрових технологій, включаючи проблеми кібербезпеки, приватність даних, віртуальну реальність і штучний інтелект. Автор наголошує на необхідності розроблення нових стратегій і політичних інструментів, які б враховували особливості цифрової епохи. Розроблено інтегровану основу дії, мета якої полягає в тому, щоб цифрова трансформація працювала на зростання та добробут. Розроблена інтегрована структура дій може бути використана для керівництва оглядами цифрової трансформації, застосування якої допоможе органам влади здійснити самооцінку свого рівня, що підтримує реалізацію національних стратегій у цифрову епоху, і полегшити аналіз цифрової трансформації в різних сферах діяльності. У дослідженні розкрито застосування нових технологій до фінансових послуг. Також проаналізовано, які перешкоди можуть бути в період цифрової трансформації та запропоновано шляхи їх вирішення. Структурні наслідки цифрової трансформації полягають у перешкоджанні цілей цифровізаційних умов і спричиняють застій у розвитку цифрової трансформації. На основі досліджень у роботі також окреслено комплексний підхід до формування політики в епоху цифрових технологій, який полягає у врахуванні таких ознак: рамкова політика, доступ, використання, інновація, довіра, робочі місця, добробут, цифрова адміністративність і стратегія. У комплексному підході також враховано ефект від його реалізації, який полягає у зменшенні ризиків, міжгалузевій синергії та об'єднанні державних і бізнес-лідерів. Впровадження та використання запропонованого комплексного підходу дасть змогу вийти за межі розрізненого досвіду та забезпечить загальну урядову цифрову трансформацію економіки та суспільства в умовах сталого розвитку.

**Ключові слова:** цифровізація, державне регулювання, цифрова економіка, цифрова трансформація, інклюзивна трансформація.

This article proposes a comprehensive approach to policymaking in the digital age with the aim of fostering effective societal development. The study focuses on developing a holistic approach to policymaking in the context of digital technologies. The author presents an integrated framework for action, which aims to leverage digital transformation for economic growth and overall well-being. The research also explores the application of new technologies in the financial services sector. The article analyzes potential obstacles that may arise during the period of digital transformation and suggests solutions to address them. The structural consequences of digital transformation are identified as hindrances to the goals of digitalization, leading to stagnation in its development. The research emphasizes the need for a comprehensive approach to policymaking in the digital age, considering aspects such as policy framework, access, usage, innovation, trust, employment, well-being, digital administration, and strategy. The integrated approach also recognizes the importance of reducing risks, fostering cross-industry synergy, and promoting collaboration between government and business leaders. The implementation and use of the proposed integrated approach will make it possible to go beyond the boundaries of scattered experience and ensure the government-wide digital transformation of the economy and society in conditions of sustainable development.

**Keywords:** Digitization, state regulation, digital economy, digital transformation, inclusive transformation.

### Formulation of the problem

Digital transformation affects all aspects of the economic process in the world. The economic system, administrative guidelines, and society are the aspects that should be considered when developing policies in digital technologies. Policy development should cover many policy areas and involve all actors (individuals, companies, public authorities, trade unions, civil society, and other stakeholders). The involvement of citizens and the support of companies in the role of catalysts of transformational changes contribute to the development of digital transformation policy.

Also, it is essential to consider stakeholders in overcoming traditional separation and going beyond administrative levels to define a comprehensive approach to policy making.

### Analysis of recent research and publications

Recently, a lot of attention has been paid to the issue of digital transformation, which is explained by the presence of the digitalization process in the world. To achieve this goal, the author analyzed the works of scientists who reveal the features of digital transformation in various conditions, Vlasenko T. A., Revenko O. V. [1; p. 44-49], Ptashchenko O. V. [2; p. 172-178], Kurbalija J., Höne K. [5], Macchi M., Roda I., Fumagalli L. [6], Naumenko M., Valiavska N., Saiensus M., Nikitiuk V., Saliuk A. [7; p. 54-64], Popkova E. G., Bernardi P., Tyurina Y. G., Bruno S. S. [9], Trincado-Munoz F., Meeteren M., Rubin T. H., Vorley T. [10].

However, despite these scientific achievements, the issue of policy formation in the age of digital technologies still needs to be studied.

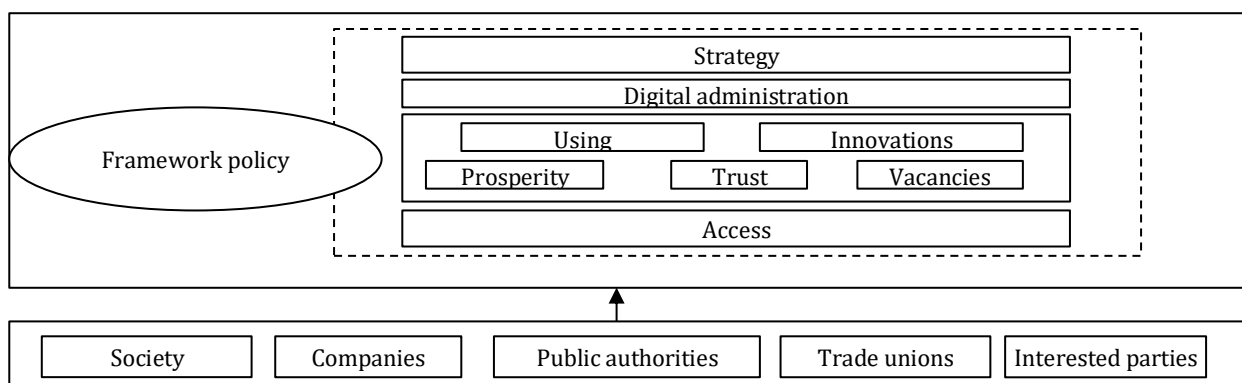
### The purpose of the article

This research aims to develop a comprehensive approach to shaping policies in the era of digital technologies.

### The main material of the research

One of the goals of the integrated basis of the project for actions related to digital transformation is to change the mindset of decision-makers in this area and thus shape policies in the era of digital technologies. This involves supporting an approach that is now fragmented but comprehensive, as reforms implemented in one place can have consequences in another. It is important to remember the overlaps and interdependencies and consider them when determining digital policies.

The author has developed an integrated basis of actions to ensure that digital transformation contributes to growth and prosperity (fig. 1).



**Fig. 1. An integrated framework of actions to ensure the digital transformation of politics (author's development)**

An integrated action structure has been developed that can be used to guide reviews of digital transformation, the application of which will help government agencies assess their level (including using a range of key indicators of digital transformation), supporting the implementation of national strategies in the digital age, and facilitating the analysis of digital transformation in various areas of activity from a holistic perspective.

Digital transformation is not an isolated phenomenon: it is shaped by and impacts the economy and society. A framework policy is essential in meeting the conditions for crystallizing digital transformation.

Open trade and investment regimes offer new ways to modernize technology, enhance skills, and increase specialization quickly.

Efficient and open financial markets help inject funds into companies investing in digital transformation. Competitive product markets promote consumer welfare, allowing new businesses to challenge existing ones, enabling efficient firms to grow, and prompting less profitable companies to exit the market. Likewise, well-functioning labor markets can also accompany inevitable structural changes. Appropriate intellectual property policies create value in digital transformation while supporting innovation and disseminating its results. More generally, sound macroeconomic policies help reduce uncertainty and create conditions conducive to successful digital transformation. Sometimes, it will be necessary to check whether the policy framework is appropriate for the digital era.

Communication networks, broadband services, data, software, and hardware constitute an efficient, reliable, and widely available digital infrastructure, the backbone of digital transformation. In this context, public authorities must ensure investment in digital infrastructure and promote

competition in the provision and deployment of broadband networks and services while maximizing the use of critical complementary levers such as fiber connectivity, sufficient spectrum, and the gradual deployment of the IPv6 addressing protocol, as well as the resilience of critical network infrastructure. For the potential of digital transformation to benefit as many people as possible, individuals, businesses, and public authorities must have reliable, affordable, and widespread access to digital technologies and services. It is equally important that public leaders and all stakeholders work together to reduce the possible digital divide, which can disproportionately affect groups such as women, migrants, disabled individuals, and the disadvantaged.

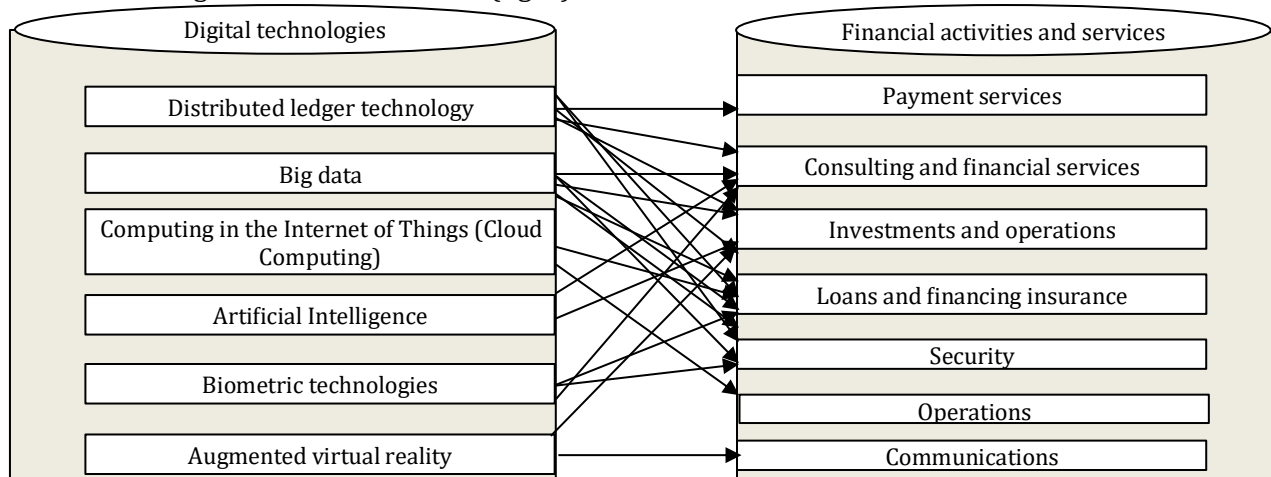
Digital infrastructures and services provide the technical basis for the digital transformation of the economy and society, but they only sometimes guarantee their proper use. Therefore, teacher and student training and skills play a crucial role. To effectively utilize digital technologies, companies must also consider the risks in decision-making and operational processes, particularly regarding digital security (breach of trade secrets, business interruption, damage to reputation, financial losses, etc.), and privacy protection.

Moreover, public authorities should support the diffusion and adoption of digital technologies by promoting investments in data, research and development, worker and management team skills, and other elements of intellectual capital, such as organizational change. Public authorities must encourage and enable companies to take advantage of digital technologies by providing a supportive regulatory framework that facilitates innovation while protecting the interests of all stakeholders.

In conclusion, while digital infrastructures and services are necessary for digital transformation, their successful deployment depends on various factors, including education, risk management, and regulatory support.

This is especially true for small and medium-sized enterprises. Although many need the know-how, their participation in the digital transformation is vital to benefit everyone. A sluggish business sector can hinder the efficient use of digital technologies in the economy and lead to the coexistence of low-performing firms that use little ICT with high-performing firms.

The technologies that drive digital transformation often have their roots in science and innovation: all of them, including the Internet, result from a long tradition of public investment in basic research. Hence, the need to continue investing in public and private innovation to support digital transformation and create and spread new technologies and applications, products and business models, and organizational structures (fig. 2).



**Fig. 2. Application of new technologies to financial services (author's vision)**

Similarly, adopting and using digital technologies, including data analysis, are consequences of successful economic innovation. Digital technologies can also facilitate vocational education and training and provide cross-border education services, thereby improving the skills base for science and innovation.

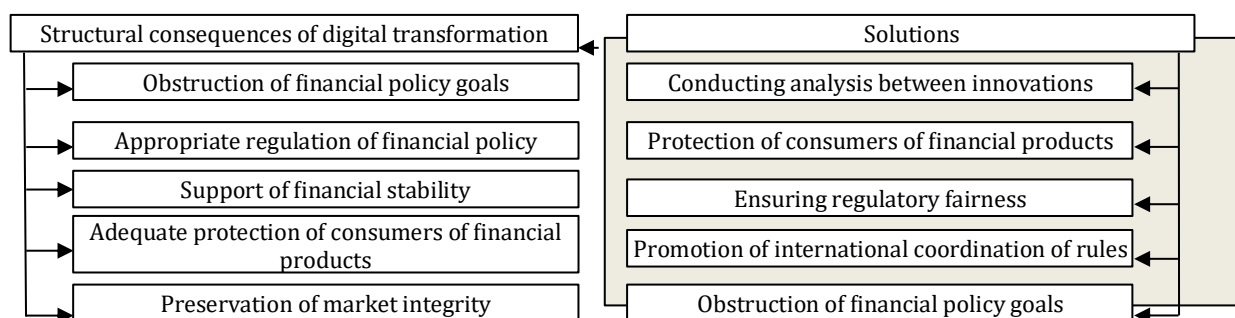
Therefore, innovative companies are more likely to use digital technologies, depending on the year and type of technology and innovation considered. Moreover, technology, intelligent applications (including data analytics), and other innovations are helping to improve services and solve problems in a wide range of areas, such as education, finance, health, transport, energy, agriculture, and fisheries, both nationally and internationally. Digital technologies help to innovate in goods and services, as well as in processes, economic models, organizational aspects, and the process of science and innovation itself.

Experimentation is also essential to drive innovation. It includes developing measures for step-by-step problem solving; operational monitoring and evaluation of intermediate results; and constant

feedback, learning, and adjustment. The idea that decision-makers can and should learn from their failures is fundamental to experimentation.

Fintech innovations raise specific privacy, digital security, and operational risk issues. New technologies can increase vulnerabilities that may compromise the confidentiality of financial consumers and businesses and weaken critical economic infrastructure with possible systemic consequences. Using big data analytics in lending and insurance practices can also result in discriminatory outcomes, such as evaluating a consumer's insurance or creditworthiness or targeting product and marketing information.

Although the digital transformation of financial services can bring benefits, it can also have structural consequences that require attention. It is essential to address these consequences and propose solutions to mitigate them (as shown in fig. 3).



**Fig. 3. Structural consequences of digital transformation and ways to overcome them (author's vision)**

As shown in fig. 3, the structural consequences of digital transformation hinder the goals of digitalization conditions and can cause stagnation in the development of digital transformation. Therefore, the author proposes distinguishing innovation, on the one hand, and consumer protection and market integrity, on the other hand. This allows for the implementation of competition and encourages innovation while increasing the confidence of investors and consumers, as well as preserving the fairness and efficiency of the markets. It is essential to protect consumers of financial products and micro and small enterprises (including potential risk groups) through robust mechanisms, risk awareness, and financial education.

Separately, attention must be paid to ensuring regulatory fairness, but with some proportionality – more flexible rules (at least temporarily) to allow innovators/newcomers to enter the market – this principle, however, must be applied fairly and without favoring national or foreign companies.

Promoting the international coordination of rules strengthens the ability to understand and adapt to innovations.

Financial technology's rise promotes financial inclusion for the most disadvantaged groups worldwide. However, individuals who are not tech-savvy require assistance to prevent new forms of exclusion. This highlights the need for focused financial education and appropriate safeguards. Additionally, schemes may need to be implemented for low-income consumers or other vulnerable populations who may be overlooked by credit and insurance algorithms or otherwise unable to take advantage of fintech services. Furthermore, since fintech enables borrowers to obtain loans they cannot repay, it is essential to regulate and counter the risks of over-indebtedness.

Many factors, including identity theft and potential problems with identity in electronic transactions, can undermine trust in the digital world once this trust is difficult to restore. Trust is essential to digital transformation: without it, individuals, companies, and governments will not adopt digital technologies, leaving untapped the enormous potential for growth and social progress.

It is essential to promote best practices in digital security risk management, consider the interdependence of countries and sectors, and foster trust within and between private operators to share information about threats, vulnerabilities, and incidents. For this reason, the responsibility for digital security must be shared among individuals, businesses, and government agencies.

As digital transformation advances, privacy, and data protection are becoming increasingly important. Protecting privacy is a fundamental value and a necessary condition for the free movement of personal data across borders. Privacy includes data protection, and people increasingly want to know what personal data is stored, how that data will be used in the future, and whether they can access it. Technological advances can build trust by pre-embedding or pre-coding privacy settings into technology.

Countries will benefit from increased international cooperation if they adopt, after consultation with all stakeholders, comprehensive and coherent national digital security and privacy strategies related

---

to the protection of personal data (including data breaches), the protection of trade secrets, the sustainability of essential services (water, energy, finance, health, and safety), creation of incentives (cyber insurance, public procurement), support and appropriate skills development. At the same time, it is essential to continue to act to effectively protect consumers in the context of e-commerce and other online activities and encourage the use of identification, authentication, and electronic signature to promote trust.

Building trust in the digital economy will require public-private exchanges, social dialogue, and cooperation. The participation of public authorities, citizens, and other critical actors in the digital security debate, including at the international level, will be essential in fostering the necessary confidence in adopting digital technologies. Promoting cross-sector synergies and bringing government and business leaders together to address digital security challenges is crucial.

Digital transformation is already beginning to change the nature and structure of business and markets, raising important questions about which jobs are at risk of disappearing and which sectors are creating new ones, and therefore with what characteristics and skills are needed, the main losers from this change and measures, which are likely to contribute to the creation of new jobs and adapt the development of skills to the evolution of the skills needed. Observations show that the labor market polarization, where jobs become rarer in the middle of the skill scale and are concentrated at both ends, is a phenomenon common to all countries. Much of this polarization occurs within the sectors of activity themselves, and the decline in absolute terms of middle-skilled employment in the manufacturing sector is due to the increased use of ICTs, including robots. However, in the future, the greatest threat will be low-skilled jobs, and the content of the work of many employees should be changed by further automation.

Technological progress has given rise to new work forms often categorized as atypical employment. This type of employment is characterized by non-standard working arrangements, such as part-time work, temporary work, freelancing, and gig work, which may not fit into traditional social protection systems built on the archetype of long-term outcome. Atypical employment is often associated with increased job and income instability and may not provide regular employment standards and social safety nets. These developments are also likely to promote the outsourcing and offshoring of tasks.

The changes brought about by digital transformation highlight the need for effective mechanisms to help individuals navigate job transitions and develop new skills. This includes developing general cognitive and complementary skills such as problem-solving, creativity, communication, collaboration, emotional intelligence, ICT, and general and technical skills. A strong aptitude for continuous learning is also required. Social protection, employment regulation, and skills policies can help those who are slow to transition or unable to adapt to new skills and jobs. Effective social dialogue among different stakeholders is vital in jointly determining the future of the world of work.

Digital transformation is profoundly impacting the way people from diverse cultures access information, communicate with each other, and live in society. Digital technologies are facilitating social inclusion, making healthcare more accessible through online services, creating opportunities for skills development through access to education, and allowing more flexibility in managing work hours to balance family responsibilities. They can also help vulnerable groups integrate into society. However, the growing diffusion and use of certain technologies can lead to decreased interaction between people, potentially exacerbating isolation for some individuals. Additionally, digital services can form closed groups united by a common perspective, such as news channels that filter certain types of content that may affect groups. Moreover, security and privacy protection are becoming pressing concerns with the proliferation of the Internet of Things and the advent of intelligent connected objects, such as autonomous cars. Along with other factors, "general" and digital skills are crucial to overall well-being.

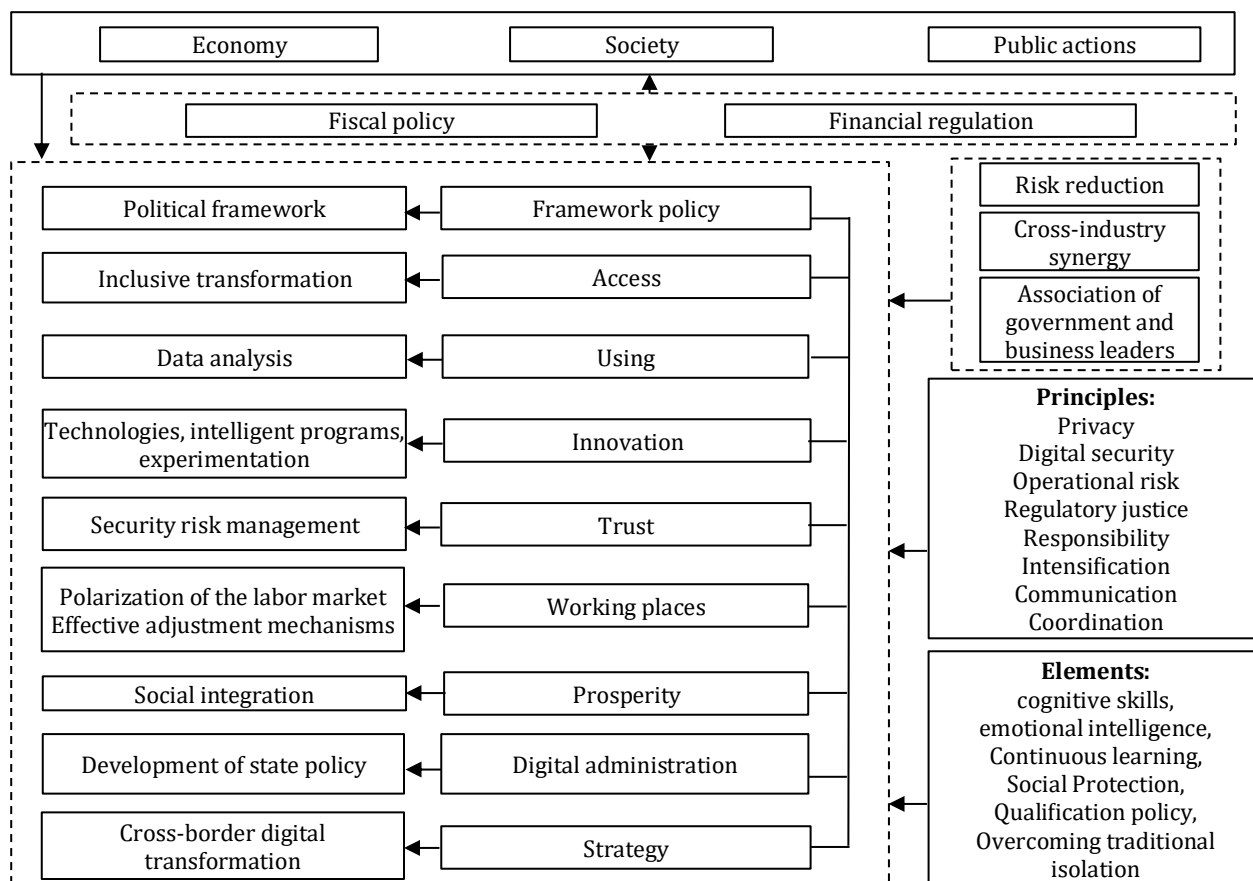
The digital transformation of public administration and services requires new forms of partnership and collaboration and new skills, initiatives, and accountability models for the public sector. Digital technologies can enhance the accessibility, scope, and quality of public services and improve the design of public policies and benefits by making these processes more user-friendly. To fully leverage the opportunities presented by digital technologies and big data in the public sector, the design of public services and policies must be user-driven and based on the needs and demands of users.

It will be necessary to explore how to utilize these new opportunities to support the new mode of operation of the public sector to achieve this. This requires reflection on the governance of the use of ICT in the public sector, the regulatory framework of these potentially disruptive new areas, and public engagement. Overcoming organizational and regulatory barriers to the integration, sharing, and horizontal decision-making across the public sector is essential, as is ensuring that progress towards more digital governance does not create new digital divides.

Digital transformation affects the economy, society, and public actions. For its benefits to fully materialize, public authorities must overcome traditional separation, go beyond administrative levels,

and define a common approach for all management. This involves greater coordination for decision-making and implementation between different ministries and groups of government, as well as the more active involvement of all significant stakeholders, including the business world, trade unions, civil society, and technical Internet communities, in developing measures and their implementation and monitoring. By identifying the interdependencies between the areas of activity related to digital transformation, it will be easier to link ministries and government agencies that need to be coordinated to ensure that their policies are mutually reinforcing. At the same time, governments must also connect and cooperate internationally on the critical challenges of cross-border digital transformation.

National digital strategies are an essential component of any whole-of-government approach. Strategy development is often led by a ministry or agency that is not solely responsible for digital issues; in fact, only a small number of countries to date have entrusted this mission to a church or organization specializing in digital affairs.



**Fig. 4. A comprehensive approach to policy formation in the era of digital technologies (author's vision)**

Good coordination is essential for developing and implementing a national digital strategy using a whole-of-government approach.

Developing effective policies for the digital economy and society demands a more profound comprehension of current technological advances, the flexibility to keep up with innovation, a comprehensive strategy, and a redoubled effort on measurement, evidence, and analysis. All countries must collaborate to close the data gap to advance benchmarking, evidence collection, policy development, and the identification and prioritization of actions and policies to be reviewed. Simultaneously, digital technologies are opening new doors for opportunities through big data analytics and informal data sources. The comprehensive approach considers the review of fiscal policy and the transition of financial regulation from an institutional approach to a service-based approach, which is due to the reduction of risks.

### Conclusions

Digital transformation affects many aspects of everyday life and, in general, the organization and functioning of the economy and society. Digital transformation offers new opportunities to modernize and improve efficiency by improving tax compliance and enabling more inclusive spending policies. Digital transformation allows more data to be collected in electronic format, including on payments and

transaction participants, and the development of multilateral platforms is increasingly attracting users who previously worked in the informal economy. By gaining access to this information, tax authorities can mobilize previously uncollected revenue, increase taxpayer registration, and combat the informal economy. The increase in third-party data makes it easier to pre-fill tax returns and makes it easier for taxpayers to meet their tax obligations. Increasingly complex information allows tax authorities to conduct risk assessment activities more effectively. While digital transformation brings many benefits, it creates new challenges, such as software piracy, invoice fraud, and using cryptocurrencies and distributed ledger technologies for illegal activities. Tax administrations and civil servants must remain vigilant as these issues can develop quickly due to technological advancements.

Another important area for research is the impact of digital transformation on critical infrastructure and essential services that rely on global digital infrastructure. Understanding how digitalization affects the sustainability of these services and infrastructure, in the long run, is necessary.

## Список літератури

1. Власенко Т. А., Ревенко О. В. Особливості цифрової трансформації бізнесу в умовах невизначеності. *Вісник Одеського національного університету*. 2022. № 3(93), С. 44-49.
2. Птащенко О. В. Ризик-орієнтована система фінансового забезпечення в умовах розвитку інформаційних технологій. *Бізнес Інформ*. 2021. №11. С. 172-178. <https://doi.org/10.32983/2222-4459-2021-11-172-178>
3. Шевченко І. О. Стратегія розвитку цифрової економіки в умовах глобалізації. *Журнал стратегічних економічних досліджень*. 2022. № 6(11). С. 35-42.
4. Шевченко І. О., Імнадзе І. Н. Застосування управлінських та маркетингових інноваційних технологій для забезпечення розвитку цифрової торгівлі на глобальних ринках. *Інтелект XXI*. 2023. № 1. С. 47-53.
5. Kurbalija J., Höne K. The era of digital foreign policy: Comprehensive approaches to digitalization. *DIPLO*. 2021. URL: <https://www.diplomacy.edu/resource/the-era-of-digital-foreign-policy-comprehensive-approaches-to-digitalisation/>
6. Macchi M., Roda I., Fumagalli L. On the focal concepts of Maintenance in the Digital era. *IFAC-PapersOnLine*. 2020. № 53(3). URL: <https://www.sciencedirect.com/science/article/pii/S2405896320301579>
7. Naumenko M., Valiavska N., Saiensus M., Ptashchenko O., Nikitiuk V., Saliuk A. Optimization Model of the Enterprise Logistics System Using Information Technologies. *International Journal of Management*. 2020. № 11 (5), pp. 54-64.
8. OECD Digital Economy Outlook. Going digital: An integrated approach to policy making in the digital age. 2020. URL: <https://www.oecd-ilibrary.org/sites/c5b3ea5d-en/index.html?itemId=/content/component/c5b3ea5d-en>
9. Popkova E. G., Bernardi P., Tyurina Y. G., Bruno S. S. A theory of digital technology advancement to address the grand challenges of sustainable development. *Technology in Society*. 2022. № 68. URL: <https://www.sciencedirect.com/science/article/abs/pii/S0160791X21003067>
10. Trincado-Munoz F., Meeteren M., Rubin T. H., Vorley T. Digital transformation in the world city networks' advanced producer services complex: A technology space analysis. *Geoforum*. 2023. URL: <https://www.sciencedirect.com/science/article/pii/S0016718523000477>.

## References

1. Vlasenko, T. A., Revenko, O. V. (2022). «Peculiarities of digital business transformation in conditions of uncertainty». *Visnyk Odeskoho natsionalnoho universytetu*. vol. 3 no. 93, pp. 44-49. <https://doi.org/10.32782/2304-0920/3-93-8>
2. Ptashchenko, O. V. (2021). «A risk-oriented system of financial support in the conditions of the development of information technologies». *Biznes Inform*, vol. 11. pp. 172-178. <https://doi.org/10.32983/2222-4459-2021-11-172-178>
3. Shevchenko, I. O. (2022). Stratehiia rozvytku tsyfrovoy ekonomiky v umovakh hlobalizatsii [Strategy for the development of the digital economy in the conditions of globalization]. *Zhurnal stratehichnykh ekonomichnykh doslidzhen* [Journal of strategic economic research] (electronic journal), vol. 6, no. 11, pp. 35-42.
4. Shevchenko, I. O., Imnadze, I. N. (2023). «Application of management and marketing innovative technologies to ensure the development of digital trade on global markets». *Intelekt XXI*, vol. 1, pp. 47-53.
5. Kurbalija, J., Höne, K. (2021). The era of digital foreign policy: Comprehensive approaches to digitalization. *DIPLO*. Available at: <https://www.diplomacy.edu/resource/the-era-of-digital-foreign-policy-comprehensive-approaches-to-digitalisation/>
6. Macchi, M., Roda, I., Fumagalli, L. (2020). On the focal concepts of Maintenance in the Digital era. *IFAC-PapersOnLine* (electronic journal), vol. 53, no. 3. Available at: <https://www.sciencedirect.com/science/article/pii/S2405896320301579>
7. Naumenko, M., Valiavska, N., Saiensus, M., Ptashchenko, O., Nikitiuk, V., Saliuk, A. (2020). Optimization Model of the Enterprise Logistics System Using Information Technologies. *International Journal of Management*, vol. 11, no. 5, pp. 54-64. Available at: <http://www.iaeme.com/IJM/issues.asp?IType=IJM&VType=11&IType=5>
8. OECD Digital Economy Outlook. (2020) Going digital: An integrated approach to policy making in the digital age. Available at: <https://www.oecd-ilibrary.org/sites/c5b3ea5d-en/index.html?itemId=/content/component/c5b3ea5d-en>
9. Popkova, E. G., Bernardi, P., Tyurina, Y. G., Bruno S. S. (2022). A theory of digital technology advancement to address the grand challenges of sustainable development. *Technology in Society*, vol. 68. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S0160791X21003067>
10. Trincado-Munoz, F., Meeteren, M., Rubin, T. H., Vorley, T. (2023). Digital transformation in the world city networks' advanced producer services complex: A technology space analysis. *Geoforum*. 2023. Available at: <https://www.sciencedirect.com/science/article/pii/S0016718523000477>.

Стаття надійшла до редакції 02.03.2023 р.