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INFORMATION AND COMMUNICATION TECHNOLOGIES MARKET AS A FACTOR IN ENHANCING THE COMPETITIVENESS OF UKRAINE'S ECONOMY

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РИНОК ІНФОРМАЦІЙНО-КОМУНІКАЦІЙНИХ ТЕХНОЛОГІЙ ЯК ФАКТОР ПІДВИЩЕННЯ КОНКУРЕНТОСПРОМОЖНОСТІ ЕКОНОМІКИ УКРАЇНИ

The current stage of national economic development is characterized by a significant strengthening of the role of information and communication technologies (ICT) in ensuring economic growth. The significance of the ICT market lies in its dual role. Today, it not only serves as the infrastructural foundation that supports innovation processes but also acts as a strategic resource that enhances the capacity of national economies, industries, and individual enterprises to compete effectively in both domestic and international markets. The purpose of this article is to study the features of the ICT market development, particularly its impact on the competitiveness of Ukraine's economy. The research revealed that when the ICT market is sufficiently large and active, it not only performs an infrastructural function for innovation development but also serves as a basis for increasing productivity and reducing costs, ensuring global integration and export attractiveness, and promoting the development of startup ecosystems and innovation. Research has shown that when there is sufficient capacity, the ICT market stimulates innovation diffusion. This means it helps spread technological innovations among businesses and industries, thereby accelerating the country's overall innovation development. As a result, it creates long-term competitive advantages at both national and international levels.. It is emphasized that the ICT market acts not only as a stimulatory foundation for innovation development but also as an environment for building a strong human capital base, including highly qualified IT specialists, engineers, and researchers. The dynamic growth of IT companies, outsourcing centers, and startups stimulates the creation of jobs for specialists, enabling the consolidation of innovations after their initial diffusion. The developed human capital ensures: effective implementation of new technologies and their adaptation to specific production or service processes, moving innovations from the experimental stage into regular practice; the dissemination of knowledge about new technologies among colleagues and other enterprises enhances the multiplicative effect of innovation diffusion. Thus, the human capital of the ICT market becomes a key factor in increasing the competitiveness of the economy through the consolidation and scaling of innovative solutions.

Сучасний етап розвитку національного господарства характеризується значним посиленням ролі інформаційно-комунікаційних технологій (ІКТ) у забезпеченні його економічного зростання. Окреслена значущість зумовлена тим, що ринок ІКТ сьогодні є не лише інфраструктурним базисом, який підтримує інноваційні процеси, але й стратегічним ресурсом підвищення здатності економік країн, їх галузей або окремих суб'єктів господарювання ефективно конкурувати на внутрішньому та міжнародному ринку. Метою статті є вивчення особливостей розвитку ринку інфор-

маційно-комунікаційних технологій, зокрема особливостей його впливу на конкурентоспроможність економіки України. За результатами дослідження виявлено, що ринок ІКТ (коли він достатньо великий і активний) виконує не лише інфраструктурну функцію для інноваційного розвитку, а й виступає основою для підвищення продуктивності та зниження витрат, забезпечення глобальної інтеграції та експортної привабливості, а також сприяння розвитку стартап-екосистеми та інновацій. Доведено, що за належної ємності ринок ІКТ набуває стимуляційної ролі, оскільки через механізм дифузії інновацій сприяє поширенню технологічних новацій серед підприємств і галузей, прискорюючи загальний інноваційний розвиток країни та формуючи довгострокові конкурентні переваги на національному та міжнародному рівнях. Звернено увагу на той факт, що ринок інформаційно-комунікаційних технологій виступає не лише стимуляційною основою інноваційного розвитку, але й середовищем формування потужного кадрового потенціалу, що включає висококваліфікованих ІТ-спеціалістів, інженерів та науковців. Динамічне зростання ІТ-компаній, аутсорсингових центрів та стартапів стимулює створення робочих місць для фахівців, що дозволяє закріплювати інновації після їхньої первинної дифузії. Сформований кадровий потенціал забезпечує: ефективне впровадження нових технологій та їх адаптацію під конкретні виробничі або сервісні процеси, що переводить інновації з експериментальної стадії у регулярну практику; поширення знань про нові технології серед колег та інших підприємств, посилюючи мультиплікативний ефект дифузії інновацій. Таким чином, кадровий потенціал ринку ІКТ стає ключовим чинником підвищення конкурентоспроможності економіки через закріплення та масштабування інноваційних рішень.

Key words: information and communication technologies; startup ecosystems; innovations; national innovation development; competitive advantages; market.

Ключові слова: інформаційно-комунікаційні технології; стартап-екосистеми; інновації; інноваційний розвиток країни; конкурентні переваги; ринок.

PROBLEM STATEMENT

The current stage of national economic development is marked by a significant enhancement of the role of information and communication technologies (ICT) in driving economic growth. The national economy is understood as the totality of all economic relations and production processes within a country aimed at the creation of goods and services, their distribution, and consumption. The highlighted importance stems from the fact that today's ICT market forms an infrastructural basis supporting innovative processes and a strategic resource that enhances the ability of national economies, their sectors, or individual economic entities in both domestic and international markets.

The impact of ICT on economic efficiency and competitiveness has been studied by numerous international and national organizations, as well as research institutions, including the World Bank, the Organisation for Economic Co-operation and Development (OECD), the International Monetary Fund (IMF), national research institutes and universities, and international analytical firms such as Gartner, McKinsey, PwC, and Deloitte. Their studies have repeatedly demonstrated that the implementation of ICT contributes to increased labor productivity, optimization of production and management processes, reduction of transaction costs, and stimulation of entrepreneurial

activity. Furthermore, digital technologies facilitate the rapid dissemination of knowledge and create conditions for the emergence of new business models, thereby generating competitive advantages at both the micro and macro levels.

In the case of Ukraine, data from the Kyiv School of Economics (KSE) and the Institute for Economics and Forecasting of the National Academy of Sciences of Ukraine indicate that the ICT sector has long become one of the drivers of its economic development. The ICT industry consistently generates an increasing volume of export revenues, ranks among the leading sectors in terms of growth rates, and is integrated into global value chains. According to the annual international ranking assessing the level of innovation development of countries worldwide (Global Innovation Index), in 2024, Ukraine ranked 60th out of 133 countries, demonstrating that even under the conditions of the Russian military invasion, the country retains potential in the field of innovation and technology, particularly in areas of human capital and technological outputs [4]. At the same time, infrastructural and institutional barriers limit the achievement of even higher positions. Furthermore, according to the Global Startup Ecosystem Index, in 2024, Ukraine entered the top 50 countries for startup ecosystem development (46th place) and in 2025 rose to 42nd place. The growth rate of Ukraine's startup

Table 1. Aspects of the ICT market that contribute to enhancing the competitiveness of Ukraine's economy

Features of the ICT market	Market Orientation / Function	Market outcome / Effect	Impact on the competitiveness of Ukraine's economy
Acts as an infrastructural foundation for innovative development	The market provides digital infrastructure (internet, mobile communication, cloud services, data centers), without which modern production processes, e-commerce, or the provision of public services would be impossible.	Creates an environment for the rapid dissemination of innovations and the formation of new competitive advantages	Technologies create a cascading effect, as well as interactivity and feedback
Action to increase productivity and reduce costs	The market is aimed at expanding supply and integrating digital technologies into business processes, allowing for the automation of operations, reduction of transaction costs, and improvement of resource management.	Directly increases enterprise efficiency and enhances their competitiveness	
Action for global integration and export attractiveness	The market generates export revenues (primarily through IT services and outsourcing). * The market actively integrates the country into global economic and technological processes. **	Strengthens the country's position in international markets and integrates its economy into global value chains	
Action to promote the development of the startup ecosystem and innovation	The presence of a dynamic ICT market creates favorable conditions for the emergence of startups that develop innovative products and technologies.	Reinforces technological modernization of the economy and promotes increased innovation activity	

Note

* The Ukrainian ICT sector has already demonstrated its ability to generate significant export revenues (primarily through IT services and outsourcing).

** This is achieved through participation in international value chains, establishing cooperation with multinational corporations, influencing standards and technological trends, as well as through financial and investment integration.

Source: compiled based on [1; 5–6].

ecosystem is among the highest for countries ranked 41st–50th.

ANALYSIS OF RESEARCH AND PUBLICATIONS

The problems and specific features of the development of the information and communication technology (ICT) market have been studied by scholars such as Y. Larina, A. Dichenko, I. Nikolenko, N. S. Liba, O. O. Korolovych, and V. F. Proskura. In particular, these researchers have systematically examined the variability in the use of ICT in the economy and its impact on the efficiency of production and management processes.

N. V. Savran also emphasizes issues related to the use of a wide range of ICT technologies, specifically those that transform processes

for collecting, processing, storing, transmitting, and using information to enhance the efficiency of enterprises, industries, and the state as a whole.

At the same time, the market capacity and the specifics of ICT market development as a factor in improving the competitiveness of Ukraine's economy have been practically unexplored by existing research. Information on market volumes, investment levels, revenues, and export earnings is often fragmented or unsystematized, which complicates quantitative assessment of the market.

Understanding the particularities of ICT market development, especially regarding its impact on the competitiveness of Ukraine's economy, contributes to the formulation of strategic decisions for stimulating:

1. Innovation and startup ecosystems.

2. Attracting investment into the technology sector, increasing enterprise productivity.

3. Integrating Ukraine into global economic and technological value chains.

FORMULATION OF THE ARTICLE'S OBJECTIVES

This article aims to study the particularities of the development of the information and communication technology (ICT) market, in particular, its impact on the competitiveness of Ukraine's economy.

THE PAPER MAIN BODY

Within the framework of the study, the authors emphasize that the information and communication technology (ICT) market, particularly its capacity, is currently a key factor in enhancing the competitiveness of Ukraine's economy [2]. This is because the ICT market can be viewed not only as an infrastructural foundation for innovative development but also as a basis for [3; 5]:

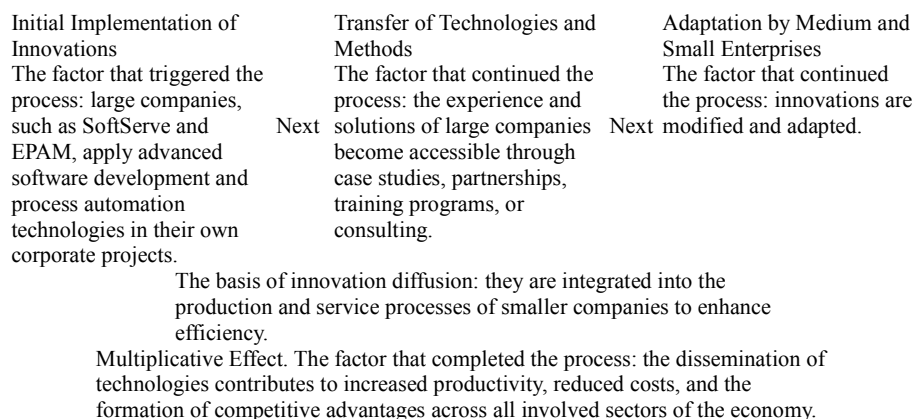


Figure 1. Illustration of the features of the innovation diffusion process driven by the development of the ICT market

Source: compiled by the author.

- increasing productivity and reducing costs;
- global integration and export attractiveness;
- promoting the development of the startup ecosystem and innovation.

It is worth agreeing with the views of N. S. Liba, O. O. Korolovych, and V. F. Proskura [3] that such a foundation, when sufficiently developed, is stimulative, as it enhances the competitiveness of individual sectors of the economy through the diffusion of innovations — the spread of technological innovations among enterprises and industries in ways that accelerate the overall innovative development of the country (see Table 1).

Among the features of innovation diffusion through the ICT market in Ukraine, which lead to

increased competitiveness of individual economic sectors, we highlight the cascading effect, as well as interactivity and feedback [1]. Specifically, innovations initially implemented in leading companies are gradually adopted by other enterprises and sectors, creating a multiplicative effect on the economy.

For example, Ukrainian IT companies such as SoftServe and EPAM implement advanced software development and process automation technologies. Initially, these innovations are applied in large corporate projects and later adapted by medium and small enterprises, which use similar methods to enhance the efficiency of their own production and services.

Regarding interactivity and feedback, the basis of diffusion is the use of digital platforms, which allows companies to quickly receive data from users and rapidly improve technologies and products.

Through these platforms, companies such as SoftServe and EPAM obtain information on the effectiveness of new solutions, enabling them to promptly adjust processes and scale successful technologies across other divisions and sectors of the economy.

In other words, the process of technology diffusion follows the scheme: an innovation starts in large companies → is transmitted through knowledge, experience, and practices → is adapted by smaller enterprises → impacts productivity and the overall competitiveness of the economy (see Figure 1).

In addition to creating a stimulative foundation, the ICT market serves as an environment in which a strong human capital potential is developed — highly qualified IT

Table 2. Features of the ICT market that make it an environment for developing strong human capital

Features of the ICT Market	Orientation / Function of the ICT Market	Results of the ICT Market
Dynamic growth of IT companies and outsourcing centers.	Creation of new jobs for programmers, analysts, engineers, and researchers	Increase in the number of highly qualified specialists and improvement of employee competencies.
Development of innovative startup ecosystems	Emergence of startups requiring specialists in IT and engineering.	Formation of an environment for the practical application of knowledge, development of professional skills, and technological creativity.
Availability of educational and training programs in the ICT field	Support for remote learning, professional development courses, and retraining programs	Ensuring a steady supply of highly qualified specialists to the labor market and the opportunity to implement innovations across various economic sectors.
Functionality of digital platforms for learning	Use of interactive systems and online platforms for knowledge sharing, training, and skills enhancement.	Acceleration of new technology adoption, rapid feedback acquisition, and consolidation of innovations in specialists' practical activities.

Source: compiled based on [1; 3; 5].

specialists, engineers, and researchers. According to the Ukrainian IT Report 2024, the number of employees in the IT sector in Ukraine has exceeded 300,000, with the majority holding higher education and possessing high qualifications.

It occurs because the dynamic growth of IT companies, outsourcing centers, and startups stimulates the creation of jobs for programmers, analysts, engineers, and researchers (as also demonstrated by the author using data in Table 2).

The developed human capital is a key factor in consolidating innovations after their initial diffusion, as highly qualified specialists can:

- Effectively implement new technologies, adapt them to specific processes, and maintain stable operation, allowing innovations to move from the experimental stage to regular practice.

- Serve as knowledge carriers of new technologies, which they can transfer to colleagues or other enterprises, enhancing the multiplicative effect of innovation diffusion.

Information and communication technologies (ICT) are a universal tool that, through the diffusion of innovations, find application in all key sectors of the economy. By consolidating innovations after their initial diffusion, they enhance the competitiveness of products and services. In the scientific literature, this process is often referred to as "innovation consolidation" or "innovation anchoring" [1].

The mechanism of innovation anchoring lies in the fact that after the initial implementation of a technology, specialists and enterprises adapt it to their own processes, integrate it into products and services, share knowledge with colleagues, and create a systematic foundation for its continuous use [2]. In this way, an innovation ceases to be experimental and becomes a stable component of economic and technological development, forming a long-term competitive advantage.

In industry and transportation, this process is facilitated by the implementation of automated control systems, "smart" production lines, and transport logistics platforms. Initially, these innovations are applied in specific departments or individual enterprises. However, through adaptation by specialists, integration into standardized processes, and knowledge transfer between teams, they become established as a permanent part of production and logistics systems. Thus, innovations stop being experimental and become consistently used technologies, creating a long-term competitive advantage for both enterprises and the industry as a whole.

In the financial sector, innovation anchoring manifests through the introduction of digital platforms, online banking, and financial technologies (FinTech). Initially, new services and technologies are applied to certain products or a limited group of clients, but through adaptation by specialists, integration into standard banking operations, and the dissemination of knowledge among employees, these innovations become stably integrated into financial products and services. As a result, new technologies cease to be experimental and become a systemic part of banking operations, enhancing service efficiency, market transparency, and the competitiveness of financial services [3].

In the education and science sector, the process of innovation anchoring occurs through the implementation of remote learning platforms, electronic libraries, and digital laboratories. Initially, new tools are applied in individual courses or educational institutions, but through adaptation by instructors, integration into curricula, and sharing of methodologies with colleagues, these innovations become stably embedded in the educational process. As a result, students and young specialists gain continuous access to modern technologies and practical skills, contributing to the development of a highly qualified workforce and enhancing the competitiveness of educational products and future professionals in the labor market.

In the trade sector, innovation anchoring takes place through the introduction of e-commerce, supply chain management systems, and digital platforms for sales accounting and analytics. Initially, new technologies are applied in individual stores or retail chains, but through adaptation by specialists, integration into standard business processes, and knowledge transfer between departments, innovations become consistently embedded in daily enterprise operations. This allows for faster order processing, optimized inventory management, improved customer interactions, and increased competitiveness of products and services in both domestic and international markets [5].

Thus, the development of the ICT market in Ukraine generates a multiplicative effect, manifested in increased efficiency and innovativeness of individual economic sectors and the stimulation of productivity growth and competitiveness of the national economy as a whole.

CONCLUSIONS

The study established that the information and communication technology (ICT) market, particularly its capacity, is a key factor in enhancing the competitiveness of Ukraine's economy.

The research revealed that when the ICT market is sufficiently large and active, it not only serves an infrastructural role for innovation development but also forms the basis for increasing productivity and reducing costs, ensuring global integration and export attractiveness, and promoting the growth of startup ecosystems and innovation. It has been demonstrated that with adequate capacity, the ICT market plays a stimulatory role, as through the mechanism of innovation diffusion it facilitates the spread of technological innovations among enterprises and industries, accelerating overall national innovation development and creating long-term competitive advantages at both the national and international levels.

The ICT market acts not only as a stimulatory foundation for innovation development but also as an environment for developing a strong human capital base, including highly qualified IT specialists, engineers, and researchers. The dynamic growth of IT companies, outsourcing centers, and startups stimulates the creation of jobs for specialists, enabling the consolidation of innovations after their initial diffusion. The developed human capital ensures:

- Effective implementation of new technologies and their adaptation to specific production or service processes, moving innovations from the experimental stage into regular practice;
- Dissemination of knowledge about new technologies among colleagues and other enterprises, enhancing the multiplicative effect of innovation diffusion.

Thus, the human capital of the ICT market becomes a key factor in increasing the competitiveness of the economy through the consolidation and scaling of innovative solutions.

The prospects for further research lie in the quantitative assessment of the impact of the ICT market's capacity and structure on the competitiveness of individual economic sectors, as well as the effectiveness of innovation diffusion mechanisms at both the national and international levels.

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