TRENDS IN THE DEVELOPMENT OF UKRAINE'S IT INDUSTRY: EXPERIENCE AND CHALLENGES

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ABSTRACT. *The article considers the role of information technology in Ukraine in the period from 2014 to 2022. It describes the experience of using IT in the university and solving the problems associated with relocation. It is shown that the IT-industry can become a key driver of economic recovery in Ukraine, and the state is actively investing in this area. The ultimate goal is to transform the economy of Ukraine and form a qualified specialist capable of competing in the international market.*

KEYWORDS: *Digital transformation, Education, Employment Creation, Research Institutions*

JEL CLASSIFICATION: *J2, I2*

INTRODUCTION

The development of the digital economy is one of the key factors in economic growth. Digital technologies create new opportunities for businesses, contribute to the emergence of new industries and jobs, and enhance productivity and competitiveness of the country. It enables government agencies to provide efficient and convenient public services to citizens and businesses, simplifies interaction processes, reduces bureaucracy, and increases transparency.

It accelerates the research process, promotes the development of new technologies and innovative products, thus contributing to the advancement of science, technology, and industry in the country. Education can also be modernized through digital transformation. It provides new opportunities for distance learning, access to educational resources, improvement of the quality of education, and development of digital skills for students and teachers. Digital transformation contributes to sustainable development by developing digital infrastructure, optimizing resource utilization, reducing negative impact on the environment, and improving citizens' quality of life. All these factors make digital transformation necessary for the overall development of the country.

BODY OF PAPER

During the period from 2014 to 2022, Ukrainians gained tremendous practical experience in the use of information technology. A vivid example of this is Donetsk National University named after Vasyl Stus, which has been internally displaced within Ukraine since 2014. After relocating to Vinnytsia, the university faced the problem of lacking necessary infrastructure to carry out its activities: insufficient space and classrooms for conducting classes, lack of dormitories for accommodating students and faculty, technical and equipment resources for financial operations, and absence of internet connectivity. Essentially, they had to build the necessary business procedures from scratch.

Due to the shortage of housing, it was practically impossible for all interested individuals to relocate to Vinnytsia, which greatly complicated determining the actual number of faculty and students. However, the university accepted the challenge posed by the aggression of the Russian Federation in 2014, recognizing the opportunities associated with digitalizing various aspects of its operations. Thanks to the existing professional staff in the university at that time, it was possible to quickly deploy and restore the financial management information system in the Microsoft cloud, which contained records of movements and credentials of individuals employed or enrolled in the university. The next step was to update the database by removing employees and students who chose not to continue their affiliation with Donetsk National University in Ukraine. Within two months of meticulous work, the first salaries and scholarships were paid out.

Parallel to the restoration of financial operations, technologies related to distance learning were being adopted: Moodle, MS SharePoint, Google Classroom, MS Teams, and others – anything that could facilitate remote communication between students and teachers, anything that could support a high-quality learning process. Having gained bitter experience as displaced individuals, Donetsk National University successfully underwent the process of digital transformation and, after the aggression of the Russian Federation on February 24, 2022, was prepared for new challenges in remote work with students and teachers. Many years later, this experience proved useful, and now we share it with other Ukrainian educational institutions facing similar situations [1].

Ideas of digital transformation in Ukraine as a whole have been in existence for a long time and are considered at various levels of government. The following tasks are set to ensure citizens' access to information services and technologies, as well as to enhance the efficiency of public administration:

1. Development of information infrastructure.

2. Simplification of access to information through information and communication technologies.

3. Utilization of the latest technologies for sustainable development of the national economy, including e-economy and e-commerce.

4. Ensuring transparency and openness in the activities of government agencies, as well as citizens' and organizations' involvement in the formation and implementation of public policy.

5. Implementation of information and communication technologies in various fields, including education, culture, archival affairs, healthcare, and environmental protection.

6. Ensuring information security.

7. Enhancement of human resources in the field of information and communication technologies.

Implementation of a system of indicators for the development of the information society in Ukraine [2-5].

We are still at the beginning of our journey, but today the concepts of e-democracy, e-economy, e-commerce, e-services, e-culture, e-education, and e-medicine are firmly rooted in our society. They have become inseparable from our daily lives and have a tremendous impact on various spheres of activity. E-democracy allows us to participate in decision-making and express our opinions through online platforms. E-economy and e-commerce provide opportunities for online trading and digital payments, greatly simplifying our lives. E-services offer convenient ways to access information and communicate with government agencies and private companies. E-culture and e-education have provided new opportunities for accessing knowledge and cultural values through online resources. And e-medicine already allows for virtual consultations and treatment, providing a more convenient and efficient way to take care of our health [6].

It can be stated that Ukraine has embarked on an accelerated digital transformation. This is also evidenced by the presence of a wide range of government programs aimed at turning the country into a highly advanced digital state.

The IT industry in Ukraine was one of the most promising sectors even before the war. Figure 1 shows that the growth of the IT industry in Ukraine before the war was at a rate of 25-30 percent per year, accounting for 4 percent of the GDP. Even after the Russian invasion on February 24, 2022, it remains the only industry showing positive dynamics.

The IT industry demonstrates phenomenal resilience and is the only export sector that operates fully during wartime while also supporting the country's economic foundation, actively assisting the military.

Developers come together and, driven by patriotic feelings, create startups aimed at addressing the challenges faced by the military, displaced persons, and various other issues. As a result of the challenges associated with the war, Ukrainian soldiers have been able to demonstrate a high level of military skills and knowledge within a year and have mastered the

use of high-tech tools for conducting military operations. This progress became possible thanks to the assistance provided by European NATO member countries, which supported the rapid transformation of the Ukrainian army according to NATO standards in the shortest possible time. Despite the numerical superiority of Russian forces, Ukrainian troops achieve significant successes on the battlefield due to better technical equipment, specialized software, and high professionalism.

IT industry of Ukraine

Before the war

Growth: **25-30%**
GDP: **4%**

2022 year

Growth: **2,2%**

formal education and retraining

- Demonstrates phenomenal stability
- The only export industry that fully works in wartime
- The economic front of the country is maintained
- Actively helps the army
- Supports a powerful volunteer movement
- They continue to work and implement projects in the conditions of blackouts
- Pays taxes on time

Figure 1. Trends in the Development of Ukraine's IT Industry

These examples suggest that the IT industry could become a key driver of Ukraine's economic recovery after the war. Our government recognizes this trend and actively invests in this sector. It is impressive, for instance, to see a significant allocation of budgetary positions in universities for IT specialties, which are already in high demand: information technology, computer science, software engineering, and cybersecurity.

One example of projects supported by the Ukrainian government is related to the international product IT company Genesis. This Ukrainian company has a market capitalization of over one billion dollars and is considered one of the industry's "unicorns." With the support of the government, Genesis has introduced a series of educational courses aimed at familiarizing university professors with the latest trends in the IT industry, providing them with relevant teaching materials, and thus creating conditions to meet the demand of the IT market for qualified specialists. The first course focuses on the process of creating and developing IT products, and its content includes idea generation, product management, and analysis and evaluation of IT products. Special attention is given to assessing the prospects of IT startups. Among the program's speakers are representatives from the Ministry of Digital Transformation of Ukraine and various IT industries. In this way, professors have the opportunity to learn from the opinions and experiences of various specialists in the field and transform their educational process to meet the real requirements of the modern IT market. This is followed by a marketing program in which teachers acquire knowledge in the field of product IT marketing and analytics, including the study of marketing strategies and product analysis in the IT sector.

Interested teachers are required to confirm their qualifications by successfully completing the specified courses and obtaining the corresponding certificate. Upon meeting these requirements, Genesis provides access to a distance learning platform where teachers act as administrators. They can enroll students in relevant courses and monitor their progress in completing assignments, supporting the learning process with classroom training. Each year, there are plans to update teaching materials and ensure the teachers' knowledge is up to date. Implementing such programs into the educational process and transferring practical experience

to university professors can significantly contribute to the competitiveness of graduates and become a driver of any country's economy.

It is important to note that these programs are not only oriented towards IT product developers but also towards other professions that can find their place in this industry. The experience gained through the courses provided by Genesis allows us to assert that 85% of professionals in the IT product industry are not IT developers (Figure 2).

Figure 2 presents examples of positions that specialists from various fields can hold, indicating the breadth of the IT field. Countries like Ukraine can utilize the available opportunities and become full-fledged participants in the global IT business sphere. We understand that facing competition in the European Union market can be challenging. However, statistics show that Ukraine already has eleven international IT companies with a capitalization exceeding one billion dollars. These companies started from scratch, continue to develop, and demonstrate their competitiveness. The proposed concept, based on the opinions of practitioners directly involved in the development of such IT products, indicates that the IT industry is not limited to major companies like Microsoft, Google, and Apple. These companies are interested in the development of the IT field worldwide, hiring teams for development and outsourcing tasks. They do not always rely on their own employees for project implementation and often utilize external resources.
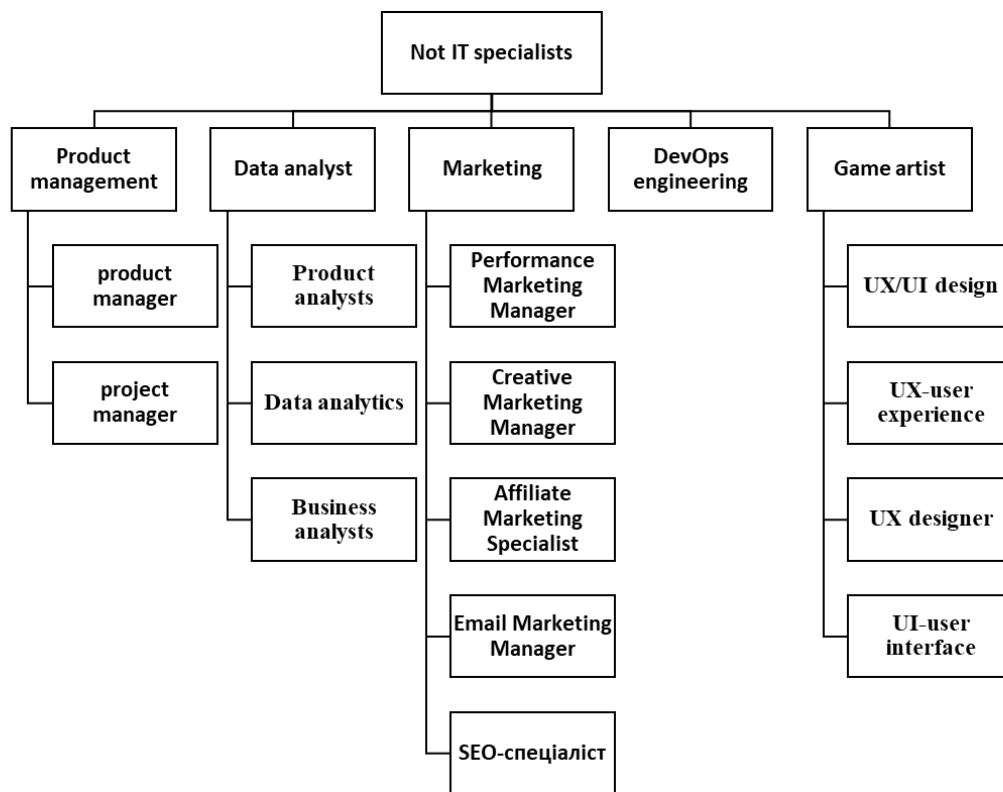

Figure 2. Not IT specialists

CONCLUSION

Ukrainian state management aims to prepare a wide range of professionals capable of project management and assessing their prospects for successful implementation in Ukraine and the international market. Our goal is to transform Ukraine's economy and utilize a promising industry that continues to develop even in times of war, as demonstrated earlier.

Our government strives to ensure an adequate number of qualified specialists who can compete in the international market.

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