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COMPETITIVENESS OF THE IT BUSINESS IN UKRAINE: CURRENT STATE AND PATHWAYS FOR ENHANCEMENT

ABSTRACT

The Ukrainian IT market has experienced significant changes due to strategic reforms designed to promote growth, innovation and efficiency. These reforms have facilitated Ukraine to attract worldwide interest as a potential new emerging tech hub. By prioritising its IT market as a main catalyst of economic growth, the Government of Ukraine has made significant efforts to increase national IT business competitiveness, including the introduction of new tax incentives for IT companies. Such efforts highlight Ukraine's ambition to become a major player, strengthening its reputation as a reliable partner in the global IT market.

The paper aims to analyse state stimulation initiatives for the Ukrainian IT market under the "Ukraine Facility" programme for 2024-2027. It also includes an assessment of their potential impact on attracting investment for the development of research development (R&D) centres, tech parks and other technological facilities in Ukraine. The article compares similar state initiatives from other countries to highlight the opportunities and challenges in improving the competitiveness of the IT market.

The study examines potential actions the Government of Ukraine could implement to foster the development of the R&D centres and attract investment to enhance the competitiveness of the national IT firms. It suggests a "triad model of cooperation" involving the government, IT business, universities and research centres to make informed decisions about versatile market stimulation mechanisms aimed at increasing IT market growth.

Additionally, the paper highlights the importance of intellectual capital by advocating for increased collaboration with international IT experts and institutions, measures to retain local talent in the face of the ongoing "brain drain", and drawing on international best practices. The article also emphasises the need for stronger intellectual property rights protection in Ukraine which is crucial for eliminating barriers that impede innovation and creativity of the IT companies.

Keywords: Information Technologies, IT market, competitiveness of the IT business, Ukraine Facility programme, R&D investments, intellectual capital

JEL Classification: E22, F43, L86, O30

INTRODUCTION

The Ukrainian information technologies (IT) market is highly export-oriented and characterised by significant innovation and robust growth, serves as an economic catalyst and provider of high-paying jobs and stable economic welfare, resilient even in challenging times. Despite this recognition, Ukraine faces challenges in its efforts to stimulate its IT market, primarily stemming from inadequate investment in research and development (R&D), insufficient financing for local IT companies from investment funds and international institutions, and limited cooperation with various stakeholders crucial for the IT market's operation. To face challenges in IT market development and to enhance competitiveness and foster innovation there is a need for an increase in resources allocated towards innovation, supporting start-ups, as well as simplifying access to funding. Ukraine, in cooperation with the EU through the Ukraine Facility programme for 2024-2027, has established a comprehensive framework to tackle the mentioned

problems and create a favourable environment for both domestic and foreign investors, aiming to enhance the competitiveness of domestic IT businesses and transition Ukraine into a more IT service-oriented economy. It's worth noting that the Ukrainian IT market has its drawbacks that deter investment, and innovation and hamper further growth. One of the key problems of the domestic IT market is the comparatively low investment appeal of its economic environment compared to other neighbouring EU countries, which is aggravated by insufficient government support for the creation of R&D facilities, laboratories and other tech-related hubs.

One of Ukraine's primary objectives is to attract investment into its domestic IT market by offering robust incentives for new and existing R&D centres, tech parks and business incubators. These incentives are intended to increase the viability of IT start-ups and the competitiveness of established IT companies as well. Hence, it is essential for Ukraine as a state to support R&D in information technology, facilitate the establishment of IT start-up incubators, and cooperate with other stakeholders, specifically IT businesses and universities. These efforts can promote further information technology development and facilitate knowledge transfer. Furthermore, Ukraine should focus its attention on attracting private funding (private equity and venture capital funds) to invest in local IT companies, simultaneously providing access to essential financing and growth opportunities. By creating a research-friendly environment and leveraging its highly skilled workforce, Ukraine can stimulate R&D activities and secure foreign investment.

Intellectual property rights protection also serves as another potential challenge that impedes the expansion of R&D activities and therefore decreases investment in the Ukrainian IT market. Therefore, this issue should be properly addressed and managed by the Government of Ukraine to encourage IT companies to embark on new R&D projects, foster innovation and development of IT new products and services and produce long-term gains to national competitiveness.

Currently, Ukraine has a great opportunity to redesign its science, information technology and innovation system to better contribute to the post-war reconstruction of its economy and society. Ensuring regulatory clarity for IT market stimulation, prioritising R&D expansion and promoting widespread information technology adoption and strengthening strategic partnerships with other countries are crucial for maintaining competitiveness and enhancing position on the regional and global IT market.

LITERATURE REVIEW

The concept of support and stimulation mechanisms for economic markets is well-established in economic literature. Specifically, studies on the IT market and its development, including growth stimulation initiatives supported by the state, have increased lately. The accumulation of these studies can be attributed primarily to the growing importance of the market amid ongoing global digitalisation processes and the increasing vitality of continuous development of information technologies, which serve as catalysts for economic growth. Domestic researchers have also contributed to the ongoing debates by comprehensively overviewing the government support mechanisms aimed at stimulating the Ukrainian IT market and unlocking its companies' competitiveness.

Voloshyn & Shekhlovych (2017) in their analytical note identified key trends in the Ukrainian IT market, highlighted its challenges, and proposed financial and economic incentives to stimulate market growth. They urged on state support mechanisms such as tax benefits to enhance value-added chains, modernisation of national legislation to attract venture capital for R&D activities, and the design of banking financing programmes. Additionally, the authors suggested introducing non-traditional financial instruments to support the growth of local IT companies. The study also emphasised the need for modernisation of the education system in Ukraine by introducing new university programmes that are aligned with global IT trends to cultivate skilful domestic IT specialists. The introduction of incentive programmes for ongoing IT professional development was also suggested in the analytical note.

Kutsyk & Protsykevych (2019) have also outlined various forms of financial support for implementing investment projects in the IT market, including the establishment of domestic funds with the aim to co-invest in national IT projects, initiation of public-private partnerships for priority IT projects, implementation of grant programmes, and attraction of venture capital, among others. In their updated monograph (2022), the authors expanded their analysis by identifying current issues with state-supported mechanisms aimed at stimulating the Ukrainian IT market. The authors urged the need for Government of Ukraine to prioritise creating an investment-friendly environment as the primary task to foster sustained market growth.

Other Ukrainian researchers Karyy, Halkiv & Tsapulych (2021) have also examined strategic priorities of state policy for the IT market development in Ukraine. They suggested that the government should design IT stimulation programmes that are aimed at the promotion of sustainable growth, production of societal benefits, ensuring planning and predictability,

effectiveness and control. According to the authors, effective state stimulation policy should strengthen the overall market position in the national economy, foster international IT cooperation, digitalise social services and e-governance, improve the business climate in the IT market and related sectors, and enhance investment and innovation processes.

Kundytskyj & Senyshyn (2020) in their study not only analysed the development of the Ukrainian IT market but also highlighted the experiences of other countries in stimulating their IT markets through state-supported incentive programmes – the United States, the European Union, and Asian countries. Their Ukrainian colleague Shymayeva (2015) also conducted a brief analysis of similar policies aimed at developing the IT market in selected countries: the US, Canada, the EU, and Japan.

In foreign academic literature, numerous researchers have analysed various government policies aimed at stimulating the IT market in different countries. For example, Kenneth & Dedrick (2000) examined the IT market liberalisation processes in developing countries (Brazil, Mexico, India, and Turkey). The authors emphasised the active role of government in state-support policies and discussed different types of state incentives tailored to each country's unique circumstances. They argued that successful policies were those that enhance national capabilities, including education of IT specialists, investment in digital infrastructure and support for science and technology.

Wallsten (2001) studied the role of the government in regional technology development, specifically the author examined two common policy approaches: public venture funds and direct government subsidies for small high-tech companies to stimulate entrepreneurship. The paper has found that public funding seemed to have no impact on technological development and could even crowd out private venture capital that is more effective.

Pillai (2006) studied the stimulation policies initiated by the Government of India to respond to IT market growth. The author identified that such policies had a significant emphasis on investment in education and IT-related infrastructure. Owczarczuk (2013) also examined government incentives aimed at attracting foreign direct investment in R&D activities in Eastern Europe (Czech Republic, Hungary, Poland and Slovakia). The study revealed that these countries implemented policies that were mainly focused on providing favourable conditions for economic activities, including cash grants, R&D tax benefits, solutions for job creation and infrastructure solutions.

Meanwhile, Erh (2023) examining Singapore's government experience, identified several factors contributing to IT market growth. The key among them was strong collaborative ability across government agencies and extensive development of partnerships with multinational companies. Ruhlig (2023) also contributed to the discussion on state-led stimulation initiatives for the IT market based on Chinese experience, identifying that one of the key pillars of the successful policy should aim to attract talented specialists.

Despite the abundance of existing research on state incentives for IT market development, a gap remains in the domestic literature regarding the stimulation policies based on updated government agenda with the introduction of comprehensive programmes such as the Ukraine Facility programme which aims to boost national competitiveness. Additionally, there has been limited research comparing Ukraine's experience with global best practices in 1) R&D stimulation efforts and 2) attraction of top talent in the IT market. Furthermore, there is a lack of research on mechanisms of government cooperation with other market stakeholders to effectively implement initiatives and understand market peculiarities from different perspectives.

AIMS AND OBJECTIVES

The purpose of this study is to explore retrospective state mechanisms that support the development of the domestic IT market, as well as current initiatives aimed at stimulating the market in the coming years. It aims to develop key guidelines for implementing these initiatives based on international experience and best practices. This will provide a comprehensive picture of the competitiveness of Ukraine's IT business, the market's prospects, and its potential challenges. To achieve this, the following steps need to be undertaken:

- investigate the current environment of the national IT market, identify potential challenges, and review state-support reforms in hindsight and future stimulation initiatives under the Ukraine Facility programme;
- compare proposed initiatives with the experiences of other countries;
- propose a mechanism for cooperation to unlock the full potential of stimulation initiatives;
- research and propose guidelines based on global best practices on how to effectively implement state initiatives to support IT market growth and increase the competitiveness of IT companies.

METHODS

In this research, we used a mixed-method approach to deepen the understanding of Ukrainian IT market development, including its prospects and challenges. The study combines qualitative and quantitative data analyses. Secondary data analysis was used to generate reproducible knowledge and draw conclusions based on quantitative data, with tables and figures employed to visualise the obtained data. Descriptive research, incorporating analysis and synthesis, induction and deduction methods, and historical and logical generalisations was conducted to synthesise existing knowledge on state-support initiatives for IT market development. Thematic analysis was used to interpret patterns and meanings in the data. The qualitative research, through generalisation, identified key imperatives for stimulating investment in R&D activities and potential mechanisms for cooperation in the current conditions of the country. Additionally, the case study method enabled a comparison of global best practices for implementing stimulation mechanisms to expand R&D activities and attract investment and talent in the IT market.

RESULTS

The Ukrainian IT market is highly export-oriented remaining in strong demand and stands out among domestic markets due to its significant innovations, robust export performance, and promising future growth prospects. The IT market also offers beneficial employment opportunities and attracts highly skilled IT specialists who develop world-famous start-ups. In recent years, the IT market has emerged as a crucial driver of economic growth during times of peace and a vital supporter of the national economy even amidst wartime conditions. Please, refer to Figure 1 for more details on performance indicators of the Ukrainian IT market throughout 2020-2023.

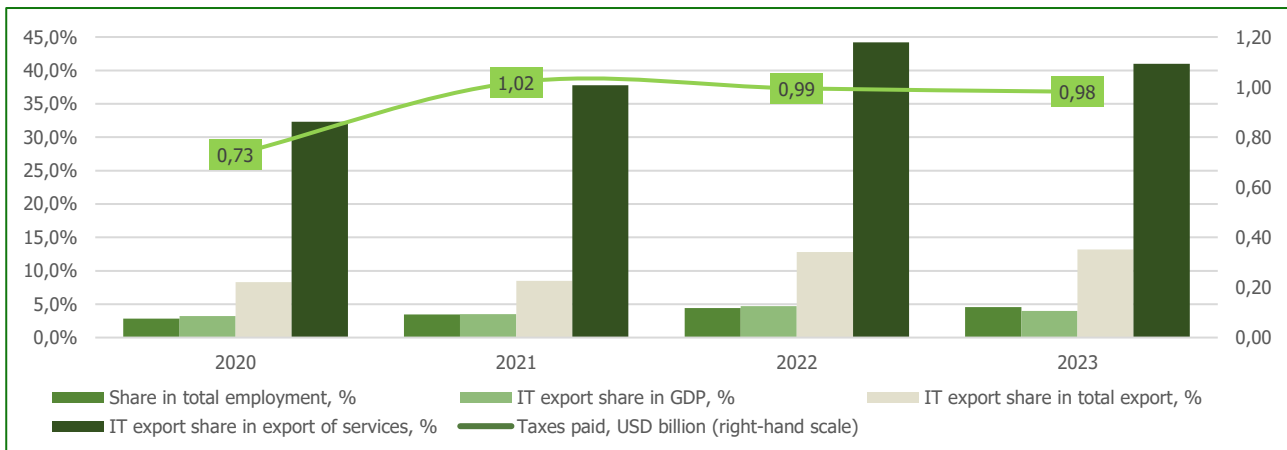


Figure 1. IT market's share of the total Ukrainian economy. (Source: calculated by the authors based on data from the National Bank of Ukraine, IT Ukraine Association, State Statistics Service of Ukraine, and State Tax Service of Ukraine)

Due to this rapid development and swift advancement, Ukraine attracts the attention of foreign investors and partners because of its efficiency in software development and high level of technological expertise, as evidenced by numerous ratings (IT Ukraine Association, 2023). Figure 2 represents some of the key global respect ratings that stress Ukraine's digital competitiveness over the past years.

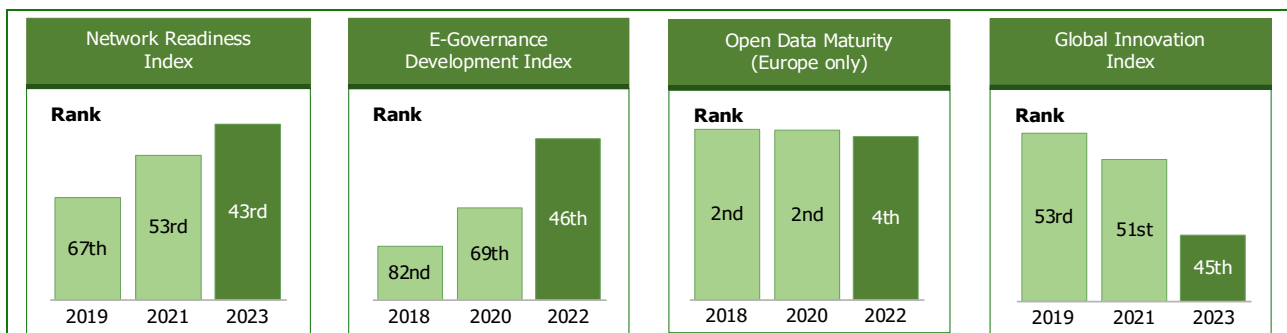


Figure 2. Ukraine's key milestones on technological development. (Source: Portulans Institute, United Nations, World Intellectual Property Organization, EU database)

According to the aforementioned ratings, Ukraine performed notably well, particularly in improving its Network Readiness Index, which reflects its innovation and technological potential. Furthermore, Ukraine became the first lower middle-income country to rank in the top 50 of the Network Readiness Index. Ukraine's efforts to increase the accessibility and effective use of open data are reflected in a stable high ranking on the European Commission's Open Data Maturity Index which places Ukraine in the index's "trend-setter", meaning that it has an advanced open data policy with a strong coordination of open data activities (The Economist Group, 2022). However, Ukraine's ranking on another important index, the Global Innovation Index, has declined – this may indicate potential drawbacks that hinder innovation growth, including challenges in the domestic IT market, primarily due to limited government stimulation and limited business opportunities in the wartime economy.

So far, Ukraine has already made substantial efforts to grow the size and competitiveness of its digital economy, specifically the IT market. The country prioritises its IT market as a key component of its economic development strategy and possesses significant growth potential. Ukraine's ambitions in this regard were set out in a new legislative and regulatory framework, established through the laws "On Stimulating the Development of the Digital Economy in Ukraine", and "On Amending the Tax Code of Ukraine to Stimulate the Development of the Digital Economy in Ukraine" (The Economist Group, 2022). As a result, Ukraine is recognised as a reliable and skilled partner for IT consulting and the development of complex products in the global IT market.

Moreover, in recent years, Ukraine has established one of the most favourable legal and tax environments for IT businesses globally (IT Ukraine Association, 2023), which is supported by the Diia City regime initiated in 2022. This tool created a unique space for low tax rates, flexible employment guarantees on intellectual property rights protection and tools to facilitate access to investments (The Economist Group, 2022); also, the regime has made Ukraine an attractive hub for global tech giants seeking expansion opportunities while benefiting from operational efficiency and reduced costs (Ministry of Economy of Ukraine, 2024). Samsung, Siemens, Oracle, IBM, Intel, Microsoft, Huawei and other key technological companies have already set up international research and development (R&D) centres in Ukraine due to the unique tax benefits.

For competitiveness of tax benefits of the Diia City regime, please refer to Table 1.

Table 1. Comparison of taxes payable in different countries with special frameworks (EUR per annum). Notes: ¹ PIT – Personal Income Tax; ² Calculations were based on an example of a company with EUR 200.000 in revenue and a staff of 10 employees with an average salary of EUR 1.200 per month. (Source: Ministry of Economy of Ukraine, 2024)

Country	Diia City	India	Kazakhstan	USA	Georgia	Poland
Income tax		5.500	-	2.175	-	-
Exit capital tax	1.800	-	-	-	1.000	-
PIT1 (+Military)	9.360	7.200	9.360	4.976	28.800	7.200
Social security tax	5.400	5.760	14.400	22.032	2.880	30.925
Total taxes	16.560	18.460	23.760	29.680	32.680	38.125

The Government of Ukraine will further strive to create all necessary conditions for stable business operations and growth opportunities in the IT market. This includes the modernisation of digital infrastructure, legal reforms for the stimulation of the business environment, and other incentive programmes. Ukraine in cooperation with the European Union has already laid out a comprehensive framework for these initiatives under the Ukraine Facility programme for 2024-2027 with a focus to create a conducive environment for both domestic and foreign investors. This programme would not only enhance the competitiveness of domestic IT businesses but also elevate their impact on the national level, transforming Ukraine into a more IT service-oriented economy. Consequently, this would give impulses to structural changes in the outdated economic framework and create an investment-friendly climate for promoting the growth of investment in national intellectual capital.

Below are presented key initiatives under the Ukraine Facility that are aimed to strengthen and transform Ukraine's IT market throughout 2024-2027 (Ukraine Facility Plan, 2023) and simultaneously reinforce the competitiveness of domestic IT businesses, including IT start-ups:

- *infrastructure development*: investing in the creation and modernisation of tech parks, clusters, and hubs with the aim to foster a conducive environment for innovative enterprises and research institutions; this includes establishing robotics laboratories, artificial intelligence (AI) and big data research labs, semiconductor manufacturing clusters, and implementing cloud technologies;

- *favourable ecosystems*: creating ecosystems that integrate businesses, universities, research centres, and government agencies to encourage collaboration, technology transfer, knowledge sharing, and resource exchange;
- *support for start-ups and small and medium enterprises (SMEs)*: providing financial and technical assistance to start-ups and small businesses to help them grow, enter new markets, attract expertise, organise business processes, and conduct research;
- *targeted grants*: offering grants to promising technical teams and organisations to support research efforts, promote innovation, and sustain economic growth; international partnerships can broaden the horizons of Ukrainian R&D teams;
- *access to resources*: providing access to high-tech equipment, laboratory facilities, and scientific resources to facilitate research and innovation;
- *commercialisation of research*: facilitating the transformation of research into commercial products through co-funding R&D, implementing pilot projects, and promoting the dissemination and commercialisation of successful innovations;
- *acceleration programmes*: strengthening acceleration programmes for the IT market to develop and scale startup projects, promote start-up culture, stimulate corporate innovation, and attract venture capital and investments;
- *investment funds*: increasing investment volumes by creating specific investment funds that can indirectly invest in portfolio companies through other Ukrainian investment funds specialising in IT investments;
- *enhanced digital infrastructure*: deploying high-speed internet, developing 5G and cloud infrastructure, ensuring stable network connectivity, enhancing the resilience of electronic communications networks, and advancing cybersecurity measures to ensure the stable and resilient operation of IT businesses in Ukraine.

Initiatives under the Ukraine Facility have significant potential to transform the Ukrainian IT market in the coming years. Comparing Ukraine's stated objectives with the mechanisms of other countries aimed at stimulating their domestic IT markets, one can infer that Ukraine's objectives resemble a combination of the US and Asian stimulation models for the IT market, adapted to its unique characteristics. Following the US model, Ukraine aims to expand and enhance its overall information and technological landscape, with IT being a strategic factor in developing and constructing information infrastructure. This involves modernising digital infrastructure, promoting R&D development, and disseminating technological achievements throughout the economy. On the other hand, like Japan and China, Ukraine is positioning its IT market as a critical technological driver of economic growth by creating necessary conditions for investment in priority IT products.

Furthermore, Ukraine aims to involve universities and research institutions in R&D investment creation which can enhance the credibility of IT market stimulation by ensuring all stakeholders are engaged and foster stronger collaboration and technology transfer. This approach draws from the experiences of some "Asian Tiger" economies, which have benefited from cooperation between government, market, and universities (Dedrick & Kraemer, 2000; Liu, 2001). Hence, it is crucial for Ukraine to stimulate cooperation between domestic universities and IT businesses in educational and research activities by introducing effective motivational mechanisms and aligning these efforts with the requirements of the globalised scientific space (Kholiavko et al, 2021). Table 2 gives more insights into some key aspects of government stimulation initiatives of the IT market across various regions.

Table 2. Peculiarities of state-led IT market stimulation initiatives by region. (Source: Kundytzkyi & Senyshyn, 2020; Shestack et al, 2023; Shymayeva, 2015; Pillai, 2006; Bryzhko, 2009; Everlegal, 2021; Myoken, 2008; Erh, 2023; Ouyang, 2006)

American model	Focus on the promotion of R&D activities within the national IT market, with subsequent dissemination of technological achievements for market innovation; modernisation of IT infrastructure; assurance of the availability of grant programmes and other state support for IT businesses, with a strong focus on promoting private IT businesses rather than state-owned enterprises.
European model	Provision of a safe operating environment for IT market development, focusing on data protection and innovation growth to enhance the competitiveness of local IT businesses; and creation of a robust legal framework for intellectual property rights protection.
Japanese model	Prioritising the use and development of the IT market as a technological driver of economic growth while simultaneously integrating information technology across all sectors of public life, the Government of Japan aims to achieve a high level of investment in priority innovative developments and modernise IT infrastructure. This effort is aimed at enhancing the national competitiveness of local IT businesses and the overall state economy.
Chinese model	The Chinese model is very similar to the Japanese approach, focusing primarily on creating favourable conditions for investing in the innovative potential of the domestic IT market, with a significant emphasis on public-private partnerships.
Indian model	Prioritising the development of IT tech parks and related infrastructure with a strong focus on public funding/subsidies and encouraging foreign investment to come in.
"Asian Tigers" model	The strong collaboration of government, private sector, both local and foreign, and universities for unanimous solutions for IT market development with the option to attract foreign advisors for monitoring purposes; government's preferential incentives for IT business development, including preferential loans, tax benefits, technology and management assistance, deregulation programmes, etc.; establishment of cooperation systems with other countries.

Referring again to the stated Ukraine Facility objectives in IT market enhancement mechanisms, one of the most crucial tasks for the country, which binds all other tasks together, is attracting investment in Ukraine's IT market from both external and internal sources. This includes expanding existing R&D centres and laboratories and creating new ones to foster innovation and promote an IT-driven culture within Ukrainian businesses. Outdated digital infrastructure, limited integration into trans-European IT research cooperation and low R&D investment rates, including the underdevelopment of a robust IT start-up environment even before the full-scale war, pose significant challenges that could hamper the further innovation and competitiveness of the Ukrainian economy. In contrast to its European neighbours, whose R&D share (as a percentage of GDP) has increased, Ukraine has reduced its investment from 0.72% to 0.33% of GDP during the 2013-2022 period, significantly limiting the potential for developing new innovative information technology. For more information on R&D expenditures see Figure 3.

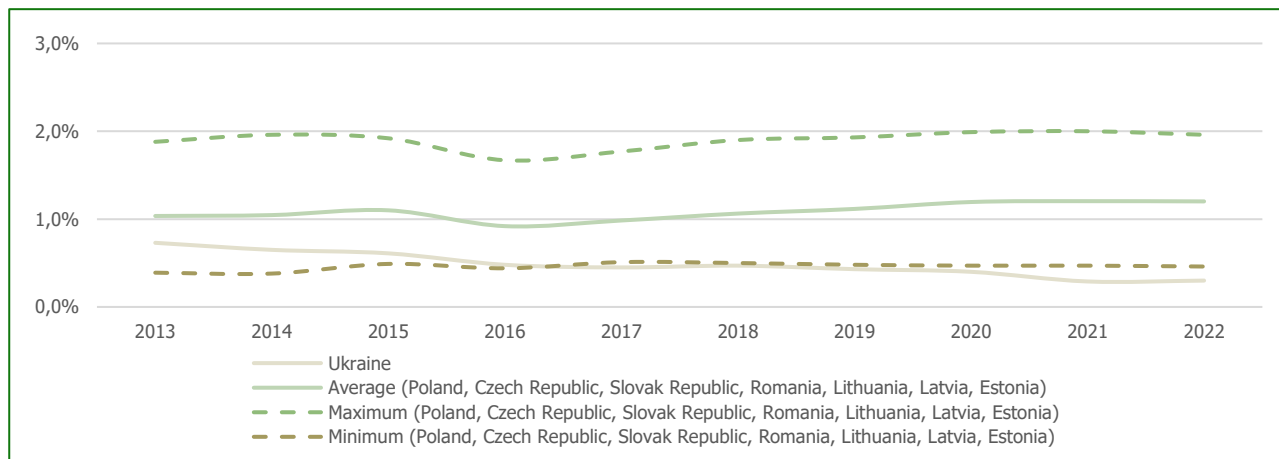


Figure 3. Ukraine's and selected EU countries' R&D expenditures in 2013-2022, % of GDP. Notes: *Based on the latest available public data. (Source: World Bank Database, State Statistics Service of Ukraine, Eurostat)

Investment in the IT market can significantly boost the country's digital competitiveness and make local businesses more competitive. The entire economy could benefit from the investment spill over effects through economic multiplier (Kusairi et al, 2023) which leads to increased consumption and demand. Based on KSE calculations (2020) every USD invested in the IT market can potentially increase Ukraine's GDP by UAH 3.2, indicating that an additional UAH 2.2 can be generated throughout the economy. Investments in IT market development should focus on designing and developing new cutting-edge technologies with increased effectiveness and significant potential for future growth, such as AI, Internet of Things (IoT), quantum computing, the metaverse, and cloud data.

This investment approach will enhance the innovation potential of Ukraine's IT businesses, potentially leading to the emergence of new unicorns with access to both domestic and global IT markets which is expected to enhance the market's export potential and businesses' competitiveness (Cetin & Erkisi, 2023). Besides, continuous investment in the IT market and its infrastructure could stimulate local market participation by pushing companies into more vigorous competition with each other. This notion aligns with Schumpeter's concept of dynamic competition which contributes to increased production efficiency (Yasko, 2020). At the same time, disruptive innovations that are driven by substantial and continuous investments can shift market dynamics, making previous business models obsolete and creating new competitive advantages (Osiyevskyy et al, 2023; Osiyevskyy, Umantsiv & Biliavska, 2023).

However, Ukraine should exercise caution regarding overreliance on state-supported investment mechanisms. Despite the popularity of public funding for creating IT infrastructure, R&D facilities and tech parks – evidence suggests that they do not always guarantee success (Wallsten, 2001). Therefore, the focus should be on private investment and venture capital, which are often more effective and more active mechanisms. The government can play a proactive role by implementing supportive policies to facilitate these investments rather than driving them directly. Ukraine, as a state mechanism, should play the roles of both "enabler" and "regulator," sending incentives for the creation of favourable conditions for IT market development. It should connect all other stakeholders, including private businesses and private capital, research institutions and universities.

Such stimulation will unite the efforts of all stakeholders and boost internal cooperation, fostering the expansion of R&D activities and investment. Strong collaboration between state agencies and multinational corporations, along with consistent engagement from academia and the top management of local IT companies through the formation of committees,

has significantly impacted the development of Singapore's IT market (Erh, 2023). Recognising the viability of this cooperation mechanism in R&D expertise expansion, Ukraine should adopt a similar approach.

The proposed scheme of cooperation is presented in Figure 4.

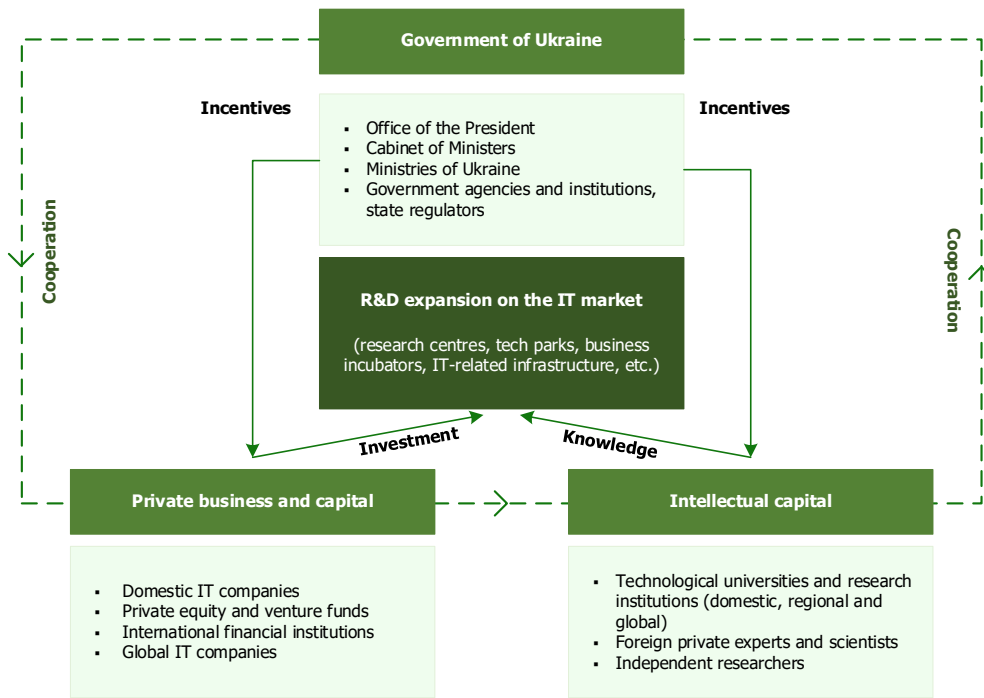


Figure 4. Possible triad cooperation for R&D Expansion in the Ukrainian IT market.

By collaborating with other stakeholders who are engaged in operations within the domestic IT market, the Ukrainian government can gain a comprehensive understanding of all prospects and challenges from multiple perspectives. This will warrant that incentives and stimulation programmes are suitable and effective. For instance, businesses that are strongly aware of current market conditions can provide valuable insights to the government, including regulators (Tirole, 2023), and other stakeholders about necessary actions. Additionally, for proposed incentives that require significant resources, a thorough analysis and pilot tests from all stakeholders should be conducted to ensure their feasibility and effectiveness before actual implementation.

This can lay the groundwork for sustained competitiveness of Ukraine's IT businesses in future and be achieved by the collaboration of multiple ministries and government agencies to promote special R&D programmes aimed at creating disruptive IT innovations originating in Ukraine and promoting high-risk, high-impact R&D to address long-term societal innovation challenges. These R&D programmes should be prioritised by the Ukrainian government and offer significant benefits to all participants, including private businesses, universities and investment funds.

Ukraine should improve the investment climate for R&D by identifying and addressing the strengths and weaknesses of the national innovation system, while simultaneously strengthening its image as an R&D hub for IT development. The government can influence R&D investment through inward investment promotion which aims to reduce transaction costs for foreign investors. This can be done by providing detailed information on business opportunities, laws, regulations and costs, as well as assisting with bureaucratic procedures – this is crucial in encouraging and attracting international capital flow (Harding & Javorcik, 2011).

Also, the government of Ukraine should pursue to entice international financial institutions to participate directly in financing private equity and venture capital funds that will invest in the creation of R&D centres and business incubators in Ukraine for IT companies. This can be accomplished through state support assistance programmes aimed at providing benefits such as 5–10-year exemptions from corporate income tax, exemption from VAT for import of new equipment, full or partial compensation of interest rates on project-related financing, etc. (Ministry of Economy of Ukraine, 2024). Such incentives could also include not only grants, preferential loans, and other guarantees but also measures such as IT infrastructure-related assistance, including transfer of public land at a favourable price, preferential economic-technological zones, and government promotion. Additionally, Ukraine can grant initiators of R&D investment more autonomy in various aspects, including reducing control by local authorities.

Strengthening the competitiveness of IT companies should not only rely on capital attraction and the establishment of R&D centres. But also, on prioritising the retention of highly skilled specialists within the country who are willing to participate and build a stronger national IT market. Human resources serve as a crucial innovative mechanism that enhances competitiveness in the current market and boosts company performance (Civelek et al, 2023; Kmecova & Androniceanu, 2024). Achieving this goal is challenging due to the ongoing "brain drain" exacerbated by the full-scale war, better working conditions abroad, and the unattractiveness of continuing education and employment in domestic institutions. It is crucial to address these issues by designing benefit programmes and creating a conducive environment to nurture and retain local IT specialists. These may include reforms in general HR policies and specific supports such as housing assistance and employment support for R&D centres, giving strong financial incentives for Ukrainians and removing of major administrative hurdles for foreigners. Specific policies can gradually reverse "brain drain" and instead promote "brain circulation" by creating favourable conditions for returnees.

Ukraine can also direct efforts towards promoting international cooperation in R&D and attracting professionals and researchers from all over the world. Such an initiative already exists in Japan under the Japanese flagship "Moonshot R&D programme" which aims to facilitate collaboration with foreign researchers in joint research projects in the most promising IT products such as AI and robotics (Japanese Cabinet Office, 2024). Similarly, China's "Thousand Talents Programme" attracted nearly 7,000 scholars to participate in the most prominent technological R&D projects during 2008-2018, including in the IT market, by offering honorary titles, well-paid positions, visa privileges and substantial resources for academic research (Ruhlig, 2023; Jia, 2018). Hackathons are another collaborative platform that possesses a great opportunity to promote innovation, bringing together developers, designers, and other industry professionals to work on collaborative technology projects. However, Ukraine's weak integration into the European and global research space, as well as regulatory framework incompatibilities in the form of bureaucratic and financial constraints, pose barriers to participating in international R&D projects (OECD, 2022).

Figure 5 summarises the described state incentives that could stimulate R&D investment in the Ukrainian IT market.

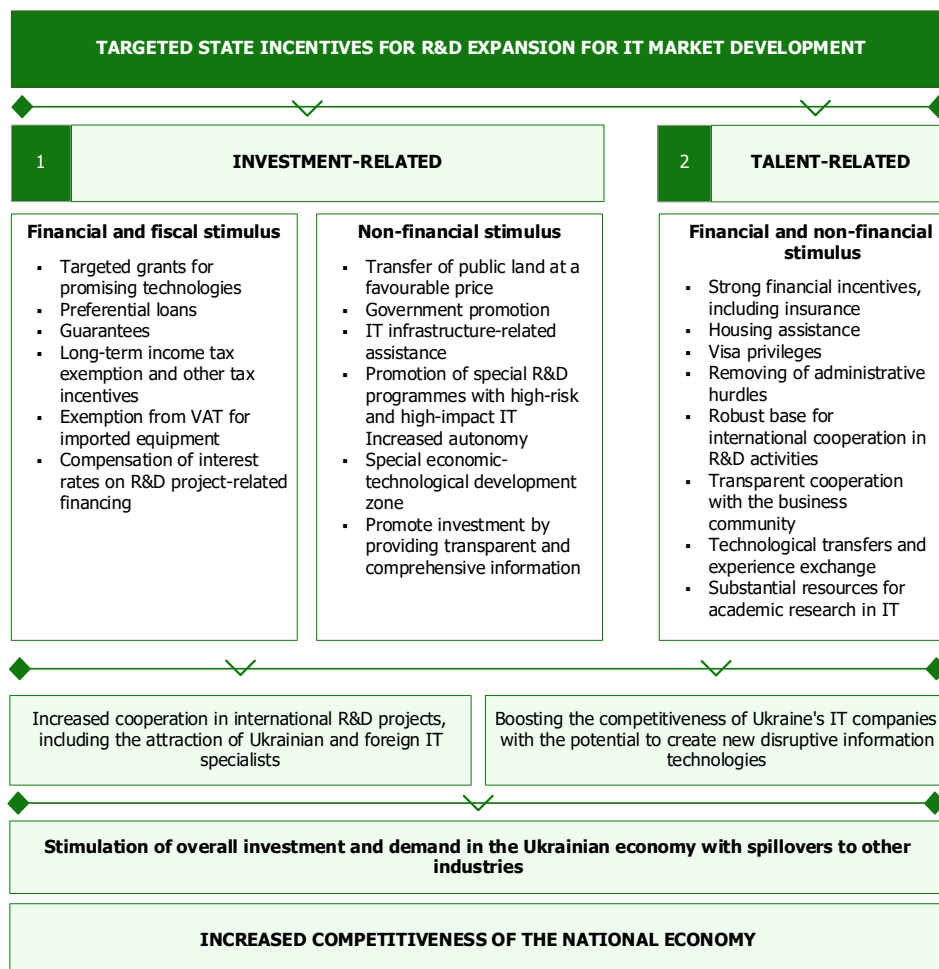


Figure 5. State incentives for R&D development in the IT market and their impact on the Ukrainian economy.

Another critical point that has not been addressed directly and with full respect through the Ukraine Facility is the development of a robust legal environment, including one for intellectual property rights protection. Attracting foreign investors to local R&D facilities also depends on the government's attention to protecting intellectual property rights. A study by Park & Ginarte (1997) showed that appropriate protection of intellectual property rights had a strong and positive impact on physical investment and R&D spending, which as a result stimulated economic growth.

Intellectual property is crucial for innovation as it enables companies to protect their ideas and creations from unauthorised use. To safeguard the interests of Ukrainian IT companies, it is essential for the Government of Ukraine to demonstrate a strong commitment to security measures for the digital assets of businesses which are often the source of their competitive advantage. A robust and predictable legal framework in intellectual property rights protection can empower companies: 1) to plan and invest confidently in R&D activities and make profits from them, 2) provide protection against legal uncertainties and 3) allow to concentrate on core business operations. Besides, such a legal framework can also promote entrepreneurship and innovation by creating a supportive environment for start-up development.

A legal framework that emphasises transparency and accountability can help firms build trust with their customers and stakeholders (Mitchell & Mishra, 2018; Tareck, 2023); and affect global tech companies' decisions on where to invest and whether to transfer advanced information technologies.

Currently, the intellectual property rights market in Ukraine remains underdeveloped, as evidenced by the lack of concrete data on its capacity, supply and demand volumes, and unhindered "patent migration". Ukraine has an ineffective system of legislation regarding the protection of intellectual property rights, resulting in domestic companies registering their intellectual property rights abroad. Among the key problems is the lack of adequate mechanisms for detecting intellectual property violations, ineffective tools for protecting intellectual property rights (institutional failures in law enforcement agencies), insufficient judicial protection, and inadequate mechanisms for applying legal liability measures (Lavrenenko, Kyrylenko & Tereshchenko, 2021; Hryhorchuk et al, 2023). Another critical argument is that Ukraine's EU candidate status poses new challenges and opportunities for the development of intellectual property rights protection mechanisms in post-war recovery. From this standpoint, Ukraine should focus on strengthening the legal environment to foster the proper development of intellectual property rights, which will ensure the preservation of internal competitiveness for IT companies. Therefore, such challenges should be properly addressed and managed by all necessary means.

DISCUSSION & CONCLUSIONS

The competitiveness of nations, bolstered by state incentive mechanisms, has long been a key topic in development discussions. Many countries prioritise enhancing the competitiveness of their technological companies as a primary source of economic growth and a means to strengthen their positions in the global economy on the verge of a new digital era. A country with a favourable investment climate attracts businesses and talent, creating a positive cycle of economic growth, expanded R&D activities and job creation.

Based on studies by domestic scholars on government incentives for IT market development, it can be argued that the proposed methods lack emphasis on the necessity of R&D incentives for both local and foreign private investors, supplemented by appropriate management from the government. Additionally, this shortcoming is exacerbated by outdated information on government stimulation policies and new policy measures introduced under the Ukraine Facility programme in 2024. The programme offers a new scope for academic research to i) evaluate whether appropriate initiatives were introduced, ii) their novelty and suitability, iii) alignment with global best practices, and iv) their potential effects on the IT market and the overall economy. A rigorous dispute among researchers, businessmen, and politicians can further arise concerning the sufficiency of introduced initiatives and the feasibility of their implementation mechanisms, considering existing expertise and foreign experience.

In this article, we examine the proposed initiatives for IT market stimulation under the Ukraine Facility programme and explore how these state incentives, aimed at stimulating investment in the expansion of R&D facilities in Ukraine – particularly for IT companies – can be further developed to foster faster innovation, growth, and increased competitiveness. The study limits its scope mostly to state incentive initiatives on R&D activities and related factors, viewing these as primary sources of technological competitiveness, as well as knowledge and market expertise accumulation.

The cornerstone of implementing such initiatives should be based on a cooperative approach involving various stakeholders, forming a "triad model of cooperation" that includes the government, private businesses, and intellectual capital in the form of researchers, scientists, technicians, and academia. Drawing on the experiences of other countries (e.g., the

“Asian Tigers” economies, India, Japan, and China), stakeholders’ cooperation can significantly enhance government efforts to attract both local and foreign investors by providing fiscal and non-fiscal incentives for R&D inflows. To strengthen the competitiveness of IT companies, Ukraine must retain highly skilled specialists by creating benefit programmes, reforming HR policies, and providing financial incentives. Additionally, it is crucial to engage with other countries to facilitate the exchange of information and technology through international research conferences, joint projects, hackathons, and similar events, while overcoming regulatory and integration barriers to fully participate in the global research space. It is important to note that the government should act as an enabler of such cooperation and other incentive programmes, bringing together private and intellectual capital to facilitate R&D investment, rather than being the primary investor and monopolising the implementation process.

Also, the study shed light on intellectual property rights protection in Ukraine which currently has an insufficient mechanism of implementation, hampers the spread of innovation and limits growth opportunities of local IT companies. Issues related to the protection of intellectual property rights have long been socially sensitive and are of scientific interest to many domestic jurists and academia.

Further scientific research is necessary to enhance the legal framework regarding the protection of property rights, particularly within the Ukrainian IT market. Close cooperation between lawmakers, government and researchers can comprehensively address all aspects of these relations, preventing oversights that may hinder the protection of intellectual property rights.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

All authors have contributed equally.

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The Authors declare that there is no conflict of interest.

REFERENCES

1. Bryzhko, V. (2009). Pro suchasnu informatsiinu polityku. *Pravova informatyka*, 2(22), 31-44. <https://ippi.org.ua/sites/default/files/09bvmsip.pdf>
2. Cetin, M., & Erkisi, K. (2023). An innovative perspective on the impact of innovation on global competitiveness: Comparative analysis of EU13 and EU15 countries. *Journal of Competitiveness*, 15(4), 19-35. <https://www.cjournal.cz/files/504.pdf>
3. Civelek, M., Ključnikov, A., Fialova, V., Folvarčná, A., & Stoch, M. (2021). How innovativeness of family-owned SMEs differ depending on their characteristics? *Equilibrium*, 16(2), 413–428. <https://journals.economic-research.pl/eq/article/view/1887>
4. Dedrick, J., & Kraemer, K. (2000). Liberalization and the Computer Industry: A Comparison of Four Developing Countries. CRITO (UC Irvine). https://escholarship.org/content/qt5mn5f085/qt5mn5f085_noSplash_028435bd806aa7df8eccee3649766e7b.pdf
5. European Commission. (2024). Open data in Europe. <https://data.europa.eu/en/publications/open-data-maturity/2023>
6. Eurostat. (2024). R&D expenditure. <https://ec.europa.eu/eurostat/statistics-explained>
7. Erh, J. (2023). Singapore’s digital transformation journey. *Journal of Southeast Asian Economies*, 40(1), 4-31. <https://www.jstor.org/stable/27211223>
8. Everlegal. (2021). Regulation of the digital market in Europe: how the EU changes the legislation? *Everlegal*. <https://everlegal.ua/regulyvannya-tyfrovogo-rynku-v-evropi-yak-es-reformue-zakonodavstvo>
9. Harding, T., & Javorcik, B. S. (2011). Roll out the red carpet and they will come: investment promotion and FDI inflows. *The Economic Journal*, 121(557), 1445-1476. <https://doi.org/10.1111/j.1468-0297.2011.02454.x>
10. Hryhorchuk, M., Shevchenko, A., Melnyk, M., Nalyvaiko, L., & Dolhoruchenko, K. (2023). Protection of property rights during the Russian-Ukrainian war: theoretical and legal analysis. *Justice in Eastern Europe*, 2(19), 1-19. https://ajee-journal.com/upload/attaches/att_1683190082.pdf
11. IT Ukraine Association. (2022). Do it Like Ukraine – annual report.

- https://itukraine.org.ua/files/reports/2022/DoITLikeUkraine2022_EN.pdf
12. IT Ukraine Association. (2023). Digital Tiger – annual report. https://itukraine.org.ua/files/ITU_GT.pdf
 13. IT Ukraine Association. (2023). Incredible tech – investor’s guide to Ukrainian IT. Online Report. <https://itukraine.org.ua/files/ITIGUIT.pdf>
 14. Japanese Cabinet Office. (2024). Moonshot Research and Development Program. <https://www8.cao.go.jp/cstp/english/moonshot1.pdf>
 15. Jia, H. (2018). What is China’s Thousand Talents Plan? *Nature Jobs Career Guide China*. <https://www.nature.com/articles/d41586-018-00538-z.pdf>
 16. Karyy, O., Halkiv, L., & Tsapulych, A. (2021). Development of the IT-sphere of Ukraine: factor and directions of activation. *Journal of Lviv Polytechnic National University*, 5(1), 42-55. <http://dx.doi.org/10.23939/semi2021.01.042>
 17. Kholiavko, N., Popelo, O., & Tulchynska, S. (2021). Priority directions of increasing the adaptivity of universities to the conditions of the digital economy. *Revista Tempos e Espaços em Educação*, 14(33). <http://dx.doi.org/10.20952/revtee.v14i33.16383>
 18. Kmecová, I., & Androniceanu, A. (2024). Level of investments in human capital in SMEs as a means of further development and increased competitiveness. *Journal of Competitiveness*, 16(1), 79-95. <https://doi.org/10.7441/joc.2024.01.05>
 19. Kundytskyj, O., & Senyshyn, O. (2020). Characteristics of state regulation in the domestic IT sector. *Bulletin of Lviv Polytechnic National University*, 1, 34-42. https://science.lpnu.ua/sites/default/files/journal-paper/2020/may/21606/maket200296-36-44_0.pdf
 20. Kusairi, S., Wong, Z. Y., Wahyuningtyas, R., & Sukemi, M. N. (2023). Impact of digitalisation and foreign direct investment on economic growth: Learning from developed countries. *Journal of International Studies*, 16(1), 98-111. <http://doi:10.14254/2071-8330.2023/16-1/7>
 21. Kutsyk, P., & Protsykevych, A. (2019). Priorities of the financial and investment state policy of support for IT-services market development in Ukraine. *Herald of Lviv University of Trade and Economics*, 57, 5-12. https://www.irbis-nbu.gov.ua/cgi-bin/irbis_nbu
 22. Kutsyk, P., & Protsykevych, A. (2022). Rozvytok investytsiinykh protsesiv na rynku IT-posluh: metodolohiia ta praktyka derzhavnoho rehuliuвання: Monograph. Lviv: Lviv university of trade and economics, 224. https://www.jute.lviv.ua/fileadmin/www.lac.lviv.ua/data/News/Academy/2023/01/zam-962_web.pdf
 23. Lavrenenko, V., Kyrylenko, V., & Tereshchenko, Y. (2021). Challenges of intellectual property protection in Ukraine. *Stratehiia ekonomichnoho rozvytku Ukrainy*, 48, 23-35. <http://sedu.kneu.edu.ua/article/view/235535/234413>
 24. Liu, N. (2001). Task Attributes and The Employees' Knowledge Capture Behavior - An Empirical Investigation at the High-tech Industrial Park in Taiwan. Proceedings of the R&D Management Conference 2001, February 2001, Wilmington, New Zealand.
 25. Ministry of Economy of Ukraine. (2024). Investment Guide Ukraine. [https://cdn.prod.website-files.com/621f88db25fbf24758792dd8/666b35cf2dc77cc050e252fa_Ukraine%20Investment%20Guide%202024_compressed%20\(1\).pdf](https://cdn.prod.website-files.com/621f88db25fbf24758792dd8/666b35cf2dc77cc050e252fa_Ukraine%20Investment%20Guide%202024_compressed%20(1).pdf)
 26. Mitchell, A. D., & Mishra, N. (2018). Data at the docks: modernizing international trade law for the digital economy. *Vanderbilt Journal of Entertainment & Technology Law*, 20(4), 1073-1134. <https://scholarship.law.vanderbilt.edu/cgi/viewcontent.cgi?article=1104&context=jetlaw>
 27. National Bank of Ukraine statistic data base. (2024). <https://bank.gov.ua/ua/statistic/sector-external>
 28. Nikolaeva, O., Onoprienko, A., Taran, S., Sholomitskyi, Y., & Iavorskyi, P. (2020) Creative industries: impact on the development of Ukraine’s economy. KSE. Ministry of Culture and Information Policy of Ukraine. <https://kse.ua/wp-content/uploads/2021/04/KSE-Trade-Kreativni-industriyi-Zvit.pdf>
 29. OECD. (2022). Building back a better innovation ecosystem in Ukraine. <https://www.oecd.org/ukraine-hub/policy-responses/building-back-a-better-innovation-ecosystem-in-ukraine-85a624f6/>
 30. Official website of State Statistics Service of Ukraine. (2024). <https://www.ukrstat.gov.ua/>
 31. Official website of Portulans Institute. (2024). <https://portulansinstitute.org/reports/>
 32. Ouyang, H. S. (2006). Agency problem, institutions, and technology policy: explaining Taiwan's semiconductor industry development. *Research Policy*, 35(9), 1314-1328. <https://doi.org/10.1016/j.respol.2006.04.013>
 33. Osiyevskyy, O., Shevchenko, L., Marchenko, O., & Umantsiv, Y. (2023). Competition Traps: Unconscious Biases and Conscious Decisions. *Rutgers Business Review*, 8(2), 111-130. <https://rbr.business.rutgers.edu/article/competition-traps-unconscious-biases-and-conscious-decisions>
 34. Osiyevskyy, O., Umantsiv, Y., & Biliavska, Y. (2023). Digital Ecosystem: A Mechanism of Economic Organization of Enterprises of the Future. *Rutgers Business Review*, 8(2), 175-194. <https://ekmair.ukma.edu.ua/server/api/core/bitstreams/d200b6b0-97fd-4083-a75a-ea77c0d4214a/content>
 35. Park, W. G., & Ginarte, J. C. (1997). Intellectual property rights and economic growth. *Contemporary Economic Policy*, 15, 51–61.
 36. Pillai, B. P. J. (2006). Role of government in the growth of India’s software industry. National University of Singapore. <https://core.ac.uk/download/pdf/48629407.pdf>
 37. Ruhlig, T. (2023). The sources of China’s innovativeness. *DGAP Analysis*, 5. <https://dgap.org/en/research/publications/sources-chinas-innovativeness>

38. Shestack, Y., Biliavska, Y., Osetskyi, V., Mykytenko, N., & Umantsiv, Y. (2023). Devising a Comprehensive Method to Manage Digital Competencies. *Eastern-European Journal of Enterprise Technologies*, 3(13)(123), 86-97. <http://doi.org/10.15587/1729-4061.2023.281933>
39. Shymayeva, M. (2015). Strategy features of informatization society in the countries of the world. *Global and National Problems of Economics*, 6, 976-981. <http://global-national.in.ua/archive/6-2015/199.pdf>
40. Tareck, A. (2023). Legal mechanisms for the stimulation of the digital economy in developing countries. *Access to Justice in Eastern Europe*, 1-13. <https://doi.org/10.33327/AJEE-18-6S002>
41. The Economist Group. (2022). Ukraine Reform Tracker https://cdn.vev.design/private/BCwBc9ZFZyVz8yQOKr9VexSnjf1/QsEtzJC50A_EC0065-SDC-UkraineReport-ALL.pdf.pdf
42. Tirole, J. (2023). Competition and the industrial challenge for the digital age. *Annual Review of Economics*, 15, 573-605. <https://doi.org/10.1146/annurev-economics-090622-024222>
43. Ukraine Facility Plan. (2023). <https://www.ukrainefacility.me.gov.ua/en/>
44. United Nations. (2024). UN e-government knowledgebase. <https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/180-Ukraine/dataYear/2018>
45. Voloshyn, V., & Shekhlovych, A. (2017). Finansovo-ekonomichni instrumenty stymulivannia rozvytku IT-sfery Ukrainy. Analytychna zapyska. National Institute for Strategic Studies. <https://niss.gov.ua/en/node/2434>
46. Wallsten, S. (2001). The Role of Government in Regional Technology Development: The Effects of Public Venture Capital and Science Parks. *SIEPR Policy paper*, 00-39, March 2001. https://drive.google.com/file/d/1gQxnQxuWCPLYw37Op6g1Oak_k2UpyG9b/view
47. World Bank Database. (2024). Research and development expenditure. <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS>
48. World Intellectual Property Organization. (2019). Global Innovation Index 2019. The geography of innovation: local hotspots, global networks. https://www.wipo.int/edocs/pubdocs/en/wipo_pub_944_2019.pdf
49. World Intellectual Property Organization. (2021). Global Innovation Index 2021. Tracking innovation through the COVID-19 crisis. https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2021.pdf
50. World Intellectual Property Organization. (2023). Global Innovation Index 2023. Innovation in the face of uncertainty. <https://www.wipo.int/edocs/pubdocs/en/wipo-pub-2000-2023-en-main-report-global-innovation-index-2023-16th-edition.pdf>
51. Yasko, Y. (2020). Institutional providing of state competition policy. *Investytsiyi: praktyka ta dosvid*, 19-20, 74-79. http://www.investplan.com.ua/pdf/19-20_2020/14.pdf

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КОНКУРЕНТОСПРОМОЖНІСТЬ ІТ-БІЗНЕСУ В УКРАЇНІ: СТАН І НАПРЯМИ ПІДВИЩЕННЯ

Український ринок інформаційних технологій зазнав трансформаційних змін, обумовлених стратегічними реформами, спрямованими на посилення його зростання, впровадження інновацій і підвищення ефективності. Ці реформи позиціонували Україну як новий технологічний хаб, що привертає глобальну увагу. Приділяючи значну увагу ринкові інформаційних технологій як засадничій основі економічного розвитку, Уряд України доклав значних зусиль для підвищення конкурентоспроможності національного ІТ-бізнесу, включаючи запровадження нових податкових стимулів для ІТ-компаній. Ці ініціативи підкреслюють прагнення України стати впливовим суб'єктом, зміцнюючи свою репутацію надійного та кваліфікованого партнера на міжнародному ринку інформаційних технологій.

У статті проаналізовано ініціативи стимулювання ринку ІТ Урядом України в рамках програми «Ukraine Facility» на 2024-2027 роки, включаючи оцінку їхнього потенційного впливу на залучення інвестицій для розвитку центрів досліджень і розробок (R&D), технопарків та інших технологічних центрів в Україні. У дослідженні також розглянуто схожі державні ініціативи інших країн для порівняння з Україною, висвітлені можливості та виклики щодо підвищення конкурентоспроможності українського ринку ІТ.

У роботі досліджено потенційні кроки, які може здійснити Уряд України для сприяння розвитку центрів досліджень і розробок в Україні та залучення інвестицій, спрямованих на підвищення конкурентоспроможності національних ІТ-компаній. Запропоновано потрійну модель співпраці між усіма суб'єктами ринку, зокрема урядом, бізнесом та університетами для того, аби комплексно ухвалювати рішення щодо відповідності та необхідності того чи іншого механізму стимулювання розвитку ринку.

Крім того, у дослідженні підкреслено значення інтелектуального капіталу через посилення співпраці з міжнародними ІТ-фахівцями та утримання місцевих талантів на фоні «відтоку мізків», окреслюючи потенційні заходи щодо

утримання кадрів, базуючись на міжнародному досвіді. Стаття зачіпає проблематику захисту прав інтелектуальної власності в Україні, що є необхідною умовою для усунення бар'єрів, які стримують динаміку інноваційних процесів і створення ідей IT-компаніями.

Ключові слова: інформаційні технології, ринок IT, конкурентоспроможність IT-бізнесу, програма Ukraine Facility, інвестиції в дослідження та розробки, інтелектуальний капітал

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