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Development of startup ecosystems in Ukraine and the European Union: Challenges and opportunities

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Abstract. The relevance of the researched problem is determined by the role of startup ecosystems as key drivers of innovation and economic development, fostering technological progress and addressing global challenges through sustainable practices and entrepreneurial activity. The article aimed to analyse the challenges and opportunities for the development of startup ecosystems in Ukraine and the European Union, with emphasis on their comparative strengths, barriers, and growth strategies. To achieve this aim, comparative analysis, a systems approach, and the synthesis of data from official reports, academic sources, and industry surveys were applied. It was found that the EU has a mature, diverse, and well-funded ecosystem with leading hubs in Berlin, Paris, and Amsterdam, supported by institutional programmes such as Horizon Europe. The EU ecosystem was shown to grow from around 60,000 startups and 50 unicorns in 2020 to 75,000 startups and 110 unicorns in 2023, with investments amounting to approximately $20 billion. In contrast, the Ukrainian ecosystem was characterised by dynamism and significant IT expertise, with 30% of startups concentrated in Software/SaaS and 15% in FinTech, but its development was constrained by political instability, limited access to capital, and challenges in scaling to global markets. It was established that the agility and innovative capacity of Ukraine's technology sector can complement the EU's structured markets and regulatory framework. Mutual benefits were highlighted through the combination of institutional support and market access with Ukraine's resourceful and cost-effective talent pool. Emerging sectors such as GreenTech, AI, and FinTech were identified as promising areas for collaboration, while cross-border cooperation, coherent policies, and targeted investments were emphasised as crucial strategies for sustainable growth and resilience. The practical significance of the research lies in its applicability for policymakers, investors, and entrepreneurs in designing strategies to foster collaboration, enhance startup ecosystem development, and unlock the economic potential of partnerships between Ukraine and the EU

Keywords: economic development; innovation; technology; venture capital; entrepreneurship; collaboration

Introduction

The development of startup ecosystems is a key factor in ensuring innovation-driven growth, enhancing economic competitiveness, and integrating national markets into the global space. For Ukraine, this topic is of particular importance in the context of post-war reconstruction, attracting investment, and accelerating the processes of European integration. For the European Union, the relevance of studying startup ecosystems is driven by the need to overcome internal barriers, strengthen regional cohesion, and create conditions for sustainable development under global competition. The rapid expansion of sectors such as GreenTech, FinTech, and artificial intelligence (AI) underscores the transformative role of startups in shaping future economic trajectories. At the same time, the resilience of startup ecosystems has become a decisive factor in responding to global crises, fostering adaptability, and sustaining long-term growth.

Academic literature demonstrates growing interest in the study of startup ecosystems in Ukraine and the EU. V. Tropina & N. Yevtushenko (2023) analysed the current

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state of innovation cooperation between Ukraine and the EU, emphasising the importance of creating favourable organisational and institutional conditions for integrating Ukraine's innovation system into the European space. The authors outlined promising directions for such cooperation but did not address the practical mechanisms of adapting Ukrainian startups to European standards. A. Kuzior *et al.* (2022) examined the specifics of EU innovation policy and assess the national innovation ecosystems of member states and Ukraine, drawing on data from the European Innovation Scoreboard (2025). The authors provided several policy recommendations for Ukraine; however, their findings required further elaboration in terms of practical tools for post-war recovery and strengthening startup competitiveness.

C. Ziakis *et al.* (2022) introduced the StUpEco conceptual model, which explained the structure and functioning of EU startup ecosystems. Their research identified institutional and network factors that determined ecosystem success and provided a valuable theoretical framework for analysing startup development. However, the question of how this model could be adapted to the Ukrainian context, particularly in the framework of European integration and candidate country aspirations, remained open and required further applied research. T. Kharchuk *et al.* (2025) examined the reproduction of Ukraine's business potential under wartime conditions and in the context of European integration. Their research highlighted strategies of business adaptation to crises but paid limited attention to long-term approaches for sustainable startup sector development and underestimated the role of startups as key drivers of innovation in these processes. Researchers O. Kolodiziev *et al.* (2024) investigated the phenomenon of "refugee startups" and their economic adaptation in host countries. Their analysis demonstrated how displaced entrepreneurs designed business models to integrate into new markets and support host economies, but it did not explore the potential of reintegrating such ventures into Ukraine's post-war economy. M. Diha *et al.* (2024) described the dynamic growth of Ukrainian startups in IT, blockchain, agritech, and medicine. They emphasised multimillion-dollar investments, the importance of strong teams, and effective risk management, but left unresolved the issue of how Ukrainian startups could meet the requirements of European investors under infrastructural and regulatory constraints. A.M. Tkachenko *et al.* (2020) emphasised the economic significance of energy saving as a strategic component in the development of Ukrainian enterprises. Their work demonstrated how energy efficiency contributes not only to cost reduction but also to long-term competitiveness. However, the study did not explicitly address how such strategic approaches can be linked to the start-up ecosystem or to broader innovation-driven growth.

V. Menshikov *et al.* (2024) analysed the development of startup ecosystems across selected countries, with a particular focus on case-based comparisons. They underlined the importance of institutional support, access to finance, and entrepreneurial culture as decisive factors in ecosystem performance. Yet, their analysis did not fully consider the specific challenges faced by emerging ecosystems, such as Ukraine's, in aligning with European models. E. Skawińska & R. Zalewski (2020) investigated the success factors of startups within the European Union, offering a comparative perspective on what drives their growth and resilience. The authors highlighted factors such as innovation capacity, managerial flexibility, and adaptability to regulatory environments. While valuable, their findings remain primarily at the EU level, leaving open the question of how these insights can be applied to transition economies undergoing structural transformation. Z. Zavarská *et al.* (2024) focused on innovation systems and policies in Central and Eastern European EU member states, analysing their capacity for innovation-driven growth. The report stressed the role of policy coherence, research and development investment, and cross-border collaboration in fostering innovative capacity. Nevertheless, the study concentrated on EU members and provides limited attention to non-member states like Ukraine, which face unique integration and resilience challenges. A summary of the results of these studies indicates a number of unresolved issues: insufficient development of practical mechanisms for integrating Ukrainian start-ups into the European innovation space, lack of comprehensive approaches to forming cross-border cooperation networks, and the need for strategic decisions for long-term development in the context of post-conflict reconstruction.

Startup ecosystems have become an essential driver of economic growth, innovative solutions, and integration into global markets. For Ukraine and the European Union (EU), this topic is particularly relevant, as the development of entrepreneurial initiatives determines economic competitiveness, stimulates technological breakthroughs, and creates new opportunities for cooperation. At the same time, both regions are affected by common and specific challenges, which highlights the need for a comprehensive analysis of their ecosystems, identification of intersections, and pathways for further integration. The purpose of this article was to identify common and specific problems of the startup ecosystems of Ukraine and the European Union, outline prospects for development, and formulate proposals for organisational and political mechanisms that can ensure their sustainable functioning and mutual integration.

Materials and Methods

The study uses a wide range of sources that provide comprehensive coverage of the development of start-up ecosystems in Ukraine and the European Union. The main sources were analytical reports from consulting companies and industry associations (Consortium of Ukraine's leading..., 2020; Civitta, 2025; Digital Tiger 2024, 2025), which provided up-to-date statistics on the number of start-ups, venture capital investment volumes and sector

dynamics. In addition, several official EU and Ukrainian documents were used, including the European Commission (n.d.a), European Commission (n.d.b) and Digital Europe Programme (n.d.), as well as legislative initiatives such as the Startup Law in Spain (2022, December). Statistical data were also derived from international organisations and open databases, including the European Innovation Scoreboard (2025) and the Global Innovation Index (2025). Other sources were scientific articles in peer-reviewed publications, which helped identify key concepts, success factors and barriers to the development of innovative ecosystems. The study employed a corpus of scholarly publications devoted to the development of innovation and start-up ecosystems. In particular, works by M. Schrijvers *et al.* (2024), S. Primario *et al.* (2024), and R. Kumari *et al.* (2025) were utilised to construct the theoretical framework of the research. These studies provided conceptual approaches for assessing the performance of entrepreneurial ecosystems, understanding modes of interaction among ecosystem participants, and evaluating the contribution of entrepreneurial ecosystems to regional economic development. They served as the basis for identifying key success factors, structural characteristics, and parameters for the subsequent comparative analysis. They were selected based on three main criteria: relevance of the topic (works directly related to startups, innovation ecosystems, and economic integration between Ukraine and the EU); scientific novelty and relevance (sources from 2020-2024 reflecting the latest trends); reliability and representativeness of data (use of official statistics and internationally recognised sources).

The methodological basis of the study relied on a review, analytical, and comparative approach, which made it possible to compare the indicators of startup ecosystem development in different EU countries such as Germany, France, Netherlands, Sweden, Spain, Portugal, Ukraine and UK. Elements of resource-based theory of strategic management were used to interpret competitive advantages, which made it possible to identify key intangible resources (intellectual capital, innovation potential, entrepreneurial competencies). The structure of the study was built around three blocks: 1) barriers to development (access to financing, talent drain, regulatory complexity, market fragmentation); 2) transformation trends (GreenTech, digitalisation, DeFi, development of regional hubs); 3) opportunities and prospects (joint investment programs, integration into European clusters, creation of joint innovation projects). The limitations of the analysis lied in its dependence on available statistical data, which sometimes has a time lag (for example, investment statistics for 2022-2023 may not fully reflect the situation in 2024-2025), as well as the lack of access to micro-level data on individual startups due to commercial confidentiality. In order to include an empirical component, the study used statistical indicators illustrating the dynamics of the number of startups in the EU, the sectoral structure of Ukrainian startups, examples of successful companies such as Grammarly (n.d.) and GitLab (n.d.), Revolut (n.d.) and Klarna (n.d.), which illustrate the potential of ecosystems to create globally competitive players. Thus, the combination of theoretical analysis, a comparative approach, and the use of empirical data made it possible to form a comprehensive picture of the state and prospects of the development of startup ecosystems in Ukraine and the European Union.

Results

A comprehensive study and in-depth understanding of startup ecosystems played a key role in making countries more attractive to international investors. This, in turn, facilitates capital inflows that spur economic growth and accelerate technological innovation. Thriving startup ecosystems foster job creation, entrepreneurship, and economic development. The impact of the ecosystem on the growth and sustainability of startups allowed us to evaluate different strategies for strengthening innovation hubs, creating an environment that supported long-term economic sustainability and social progress. In order to determine the level of development of the competitive potential of startups, it was necessary to identify not only the characteristic features of startup businesses, but also, first of all, their key success factors. The resource-based approach of strategic management theories assumes that this advantage was the result of key tangible and intangible resources. Based on the analysis of literature A.V. Karpenko & R.V. Sevastyanov (2022) and Z. Zavarská *et al.* (2024), eight types of competitive advantages as success factors were systematised, namely: innovation, entrepreneurial, resource, competence, intellectual capital, sustainable development, content management, and information advantages. It was also suggested that there are differences in the situation in catching-up countries and more developed EU member states.

By addressing these interconnected challenges and leveraging emerging opportunities, Ukraine and the EU can enhance their ecosystems, driving innovation and fostering economic resilience (Table 1). The startup ecosystems of Ukraine and the European Union (EU) were undergoing significant transformations, driven by global trends and regional dynamics that create new opportunities for growth. Among these, the development of green technologies has attracted particular attention as a key area of innovation. The increasing demand for sustainable solutions presented vast potential for startups focused on renewable energy, the circular economy, and ESG-driven innovations. Ukraine, with its rich natural resources and skilled workforce, had the capacity to become a key player in renewable energy, particularly in wind and solar power. Meanwhile, the EU continued to lead the way in green technology thanks to ambitious initiatives such as the European Commission (n.d.b.) and funding programs such as Horizon Europe, which prioritised sustainable innovation. Joint investments by Ukraine and the EU, tax incentives, and knowledge-sharing platforms could further accelerate progress in this sector.

Table 1. Key challenges for start-ups in the EU and Ukraine

Barrier	EU startups	Ukrainian startups
Access to funding	Most money goes to rich regions; smaller areas don't get much	Very little investment; war and risks make it worse
Talent shortages	Big companies hire most skilled workers; rules make moving workers across countries hard	Many skilled workers leave the country
Regulatory complexity	Different laws in each country make it hard to grow	Rules are unclear and not flexible
Market fragmentation	Different languages and cultures make cross-border growth hard	Same problem – hard to grow across regions

Source: developed by the author based on M. Greenacre (2025), A. Zaikin (n.d.)

Access to funding remained a critical barrier for start-ups, impacting their ability to scale and compete in global markets. In Ukraine, early-stage funding was particularly limited due to a nascent venture capital ecosystem and an over-reliance on external investors. This dependency often led to challenges in retaining intellectual property and skilled talent within the country, creating vulnerabilities in long-term innovation and economic growth. Conversely, while the EU benefits from substantial investment volumes, disparities in funding distribution were a persistent issue. Established hubs such as Berlin and Paris attracted a disproportionate share of capital, leaving startups in peripheral regions underserved. This imbalance restricted opportunities for less-developed areas to fully participate in the global startup landscape, undermining regional equity and cohesion. Talent shortages further exacerbate these challenges, as human capital was fundamental to the success of any startup ecosystem. Ukraine faced significant brain drain, with skilled professionals emigrating to pursue better opportunities abroad. This migration diminished the local talent pool, limiting the capacity of startups to grow and innovate. In the EU, while the region boasts a highly educated workforce, startups often struggled to compete with multinational corporations offering higher salaries and superior benefits. Additionally, bureaucratic obstacles to hiring international talent constrain efforted to build diverse, competitive teams, further limiting the dynamism of the ecosystem. Regulatory and market fragmentation posed additional hurdles for startups. In Ukraine, inconsistent enforcement of regulations and bureaucratic inefficiencies delayed business operations and inflated operational costs, deterring both domestic and foreign entrepreneurs. In the EU, despite efforts at harmonisation, the regulatory landscape remained fragmented, with each member state maintaining distinct legal frameworks and compliance requirements. This lack of uniformity created barriers for startups seeking to scale across borders, imposing significant financial and administrative burdens that stifle innovation and growth.

Digital transformation was another pivotal trend, with AI, fintech, and health tech driving innovation globally. Ukraine's robust IT industry aligned well with these trends, positioning the country as a hub for AI development, software outsourcing, and fintech solutions. The skilled and cost-effective workforce was a significant advantage. In parallel, the EU benefited from well-structured regulatory frameworks and digital initiatives, such as the Digital Europe Programme (n.d.), which supported the adoption of advanced technologies. Enhanced market access for Ukrainian startups, targeted upskilling programs, and public-private partnerships in health tech could deepen the impact of digital transformation in both ecosystems. Decentralised Finance (DeFi) and blockchain were also gaining traction in Ukraine and the EU, offering innovative solutions in financial inclusion, digital identities, and payment systems (Blockchain Observatory & Forum: Conclusion report, 2024). Ukraine's proactive approach to cryptocurrency and blockchain adoption positions was as a regional leader, while the EU provided a secure regulatory environment for blockchain startups. Collaborative frameworks and pilot projects for blockchain applications, particularly in public services, could strengthen these advancements.

Emerging regional hubs were reshaping the innovation landscape. In Ukraine, cities like Lviv and Kyiv were becoming vibrant tech ecosystems, driven by concentrated talent and growing international interest, though infrastructure and funding access remain challenges. Similarly, non-traditional hubs in the EU, such as Barcelona, Stockholm, and Lisbon, were diversifying the region's startup environment with competitive tax regimes and dynamic entrepreneurial networks (How European tech hubs..., 2025). Strengthening infrastructure in Ukrainian hubs and fostering collaborations between EU and Ukrainian cities could further enhance these ecosystems. Cross-border collaboration between Ukraine and the EU offered immense potential for mutual growth. Ukraine's technical expertise and cost-effective workforce complement the EU's structured markets, regulatory support, and funding opportunities. By co-financing joint projects, creating innovation clusters, and streamlining mobility for startup founders and talent, the two regions could leverage their strengths to foster a more integrated and resilient startup ecosystem (EIIT, 2023). This collaborative approach promised not only to drive innovation but also to contribute to sustainable economic development and global competitiveness.

Infrastructure deficiencies also hinder the development of robust startup ecosystems. In Ukraine, the shortage of incubators, accelerators, and coworking spaces outside major cities like Kyiv and Lviv restricted access to critical resources such as mentorship, funding, and collaboration networks. While the EU generally offered more developed infrastructure, significant disparities persist between core

and peripheral regions. Startups located outside established centres faced a lack of resources, which limited their competitive potential and exacerbated existing inequalities in the ecosystem. Addressing these gaps in infrastructure was essential to fostering a more inclusive and dynamic startup environment (Horban & Bilenko, 2025).

Several promising sectors were driving growth opportunities for startups in Ukraine and the EU, despite the challenges faced by these ecosystems. A. Kuzior *et al.* (2022) noted that sustainable innovation has become a strategic priority for both regions, with GreenTech emerging as a critical area of innovation, fuelled by global sustainability goals of the European Commission (n.d.b) and a rising demand for eco-friendly solutions from consumers and industries alike. In Ukraine, a similar emphasis on energy efficiency and environmentally responsible production is reflected in research on the economic significance of energy saving for enterprise competitiveness (Tkachenko *et al.*, 2020). Startups in this sector were advancing renewable energy technologies, circular economy innovations, and environmentally sustainable practices. Similarly, AI and financial technology (FinTech) were dominating the innovation landscape, with significant progress in automation, data analytics, and decentralised finance. HealthTech was also a rapidly growing field, propelled by increased demand for telemedicine services, wearable health devices, and personalised healthcare solutions, particularly in the wake of global health crises. These sectors presented significant opportunities for both regions to drive technological progress and address critical societal needs.

Cross-border collaborations between Ukrainian and EU startups offered substantial benefits for both parties. According to I.G. Lukianenko & Y.S. Sova (2024), Ukraine's tech ecosystem demonstrated strong adaptability and competitiveness even under wartime conditions, which made it an attractive partner for European companies. A. Kuzior *et al.* (2022) also emphasised that the growing complementarity between the Ukrainian and EU innovation ecosystems supports sustainable development and deepens economic integration. As a result, Ukrainian startups gained access to larger, structured markets in the EU, enabling them to scale their operations and attract international investors. In turn, EU companies benefited from Ukraine's highly skilled workforce and cost-effective technical expertise, which enhanced their ability to develop innovative solutions. Joint ventures, shared innovation projects, and strategic partnerships were facilitating greater economic integration, fostering mutual growth, and strengthening ties between the two regions.

Policy reforms were playing a pivotal role in shaping a more favourable environment for startups. In Ukraine, the government had prioritised digital transformation, streamlining administrative processes to make it easier for entrepreneurs to establish and operate businesses, as highlighted by M. Diha *et al.* (2024). Reforms in areas such as taxation and intellectual property rights were further enhancing the startup climate, supporting the reproduction of business potential even amidst wartime challenges (Kharchuk *et al.*, 2025). The EU was similarly advancing regulatory harmonisation, with initiatives like the Digital Single Market aiming to eliminate cross-border barriers and created a unified space for innovation. These policy advancements were fostering conditions conducive to entrepreneurial activity and enabling startups to thrive in an increasingly interconnected global economy.

Spain's startup ecosystem has experienced considerable growth but continues to face structural challenges in securing early-stage funding. Venture capital activity, while on the rise, was characterised by comparatively smaller ticket sizes than those found in more mature ecosystems across Northern and Central Europe. This limitation restricted the scaling potential of high-growth ventures. Nevertheless, policy interventions from the Spanish government, in collaboration with the European Investment Fund, were increasingly improving access to capital and supporting the development of the innovation economy. Across the European Union, disparities in investment levels remained evident. Countries such as Germany, the Netherlands, and the Nordic states continued to dominate venture capital inflows, while Southern and Eastern European countries struggled to attract comparable levels of investment. This imbalance undermined cohesion across the EU's innovation landscape. Accelerators were strategically aimed at narrowing these gaps by incentivising cross-border investments and supporting startups in less capitalised regions. Talent availability in Spain was shaped by a combination of strengths and limitations. The country benefited from a well-educated workforce, but faced a shortfall in experienced professionals in high-demand fields such as AI, deep technology, and advanced software engineering. Moreover, Spain's tax treatment of stock options discouraged equity-based compensation strategies, thereby hindering talent retention. Despite these challenges, the country's relatively low cost of living and high quality of life continued to attract foreign professionals, partially offsetting domestic talent shortages. Within the EU, labour mobility has improved through initiatives such as the EU Blue Card system, yet it was still hindered by bureaucratic and legal fragmentation. Differences in national taxation, employment regulation, and residency procedures complicated the movement of skilled labour, particularly in innovation-intensive sectors. In addition, many Eastern European countries faced a constant outflow of skilled workers, as specialists moved to more economically developed regions, exacerbating the imbalance in human capital within the Union (Font-Cot *et al.*, 2023).

Spain's regulatory framework remained a significant obstacle to entrepreneurial activity. Cumbersome administrative procedures, including delays in company registration and complex tax compliance requirements, contributed to inefficiencies that slow startup formation and scaling. In response, the Law of Spain No. 28 (2022) has introduced targeted reforms to reduce bureaucratic burdens, incentivise innovation, and attract international

entrepreneurs through favourable visa regimes. These policy developments suggested a move toward a more supportive business environment, though implementation challenges remain. At the EU level, regulatory heterogeneity continued to present barriers to the creation of a unified digital economy. Startups faced difficulties navigating the varied legal environments, particularly with respect to data protection (GDPR), labour laws, and taxation. In an effort to address these challenges, the European Commission has introduced the Digital Markets Act and is actively pursuing regulatory harmonisation through the Single Digital Market strategy, aimed at streamlining cross-border operations and enhancing legal coherence. Spain offered a sizable domestic market, yet startups were frequently dependent on international expansion to achieve scalable growth. However, limited English proficiency among the population and business leaders may constrain global outreach. Conversely, Spain's strong cultural and linguistic connections with Latin America provided a distinct comparative advantage for internationalisation, offering access to high-growth emerging markets that share institutional and linguistic affinities.

Throughout the EU, startups encountered a fragmented market environment shaped by divergent consumer preferences, legal systems, and linguistic diversity. These factors can obstruct the realisation of pan-European business strategies. Nevertheless, the Single European Market offered substantial opportunities for cross-border growth by reducing trade and regulatory barriers among member states, positioning the EU as one of the most accessible and integrated economic blocs globally. Spain continued to underperform in research and development investment relative to other major EU economies. Both public and private sector contributions to R&D remained low, and collaboration between academic institutions and industry actors was often limited. However, the country increasingly benefited from EU-level funding instruments, particularly Horizon Europe (European Commission, n.d.a), which promote knowledge transfer and transnational research initiatives. Innovation performance across the EU was similarly uneven. Although countries such as Germany, Sweden and Finland led the way in terms of research and development intensity and number of patents, other Member States sought to catch up with them in terms of investment levels, reflecting broader trends in regional competitiveness (Lukianenko & Sova, 2024). In order to promote a more balanced innovation ecosystem, the European Union has identified the development of joint research mechanisms and cross-border innovation clusters designed to promote knowledge sharing and technological convergence as a priority. Cultural and social norms continued to influence the entrepreneurial climate in Spain. A risk-averse business culture and limited social tolerance for failure tended to discourage entrepreneurial initiatives. In addition, business networks remained predominantly regional, reducing opportunities for contact with global investors and innovative ecosystems (Tropina & Yevtushenko, 2023). However, growing participation in events such as South Summit (n.d.) and Startup Grind (n.d.) signalled a cultural shift towards greater openness and entrepreneurial activity.

Within the broader EU context, cultural diversity among member states presented both challenges and opportunities. Variations in entrepreneurial attitudes, collaboration styles, and market behaviours impacted the cohesion and scalability of startups operating across borders. Nevertheless, pan-European initiatives and events such as Slush (n.d.) and Web Summit (n.d.) were playing a critical role in fostering connectivity, enabling startups to build transnational networks, and supporting the formation of a more integrated European startup community. The presented Figure 1. illustrates the comparative trends in Venture Funding for Europe and Ukraine from 2018 to 2024, measured in USD billions.

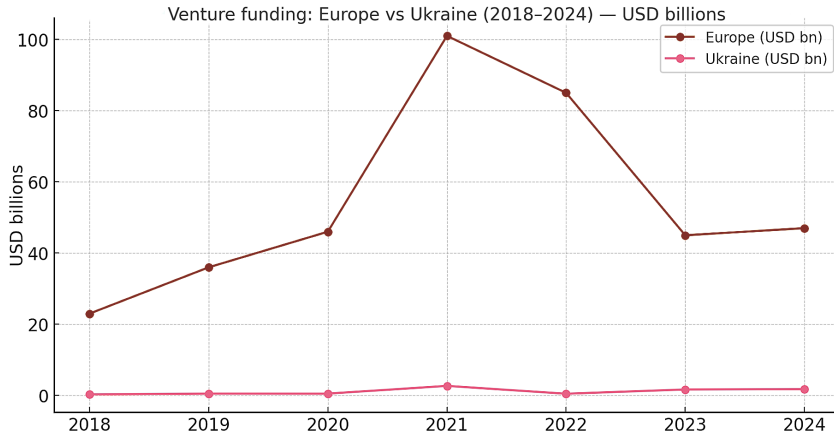

Figure 1. Venture funding: Europe vs Ukraine (2018-2024), USD billions

Source: developed by the author based on Consortium of Ukraine's leading ecosystem players team up to launch startup database (2020), Civitta (2025), Digital Tiger 2024 (2025)

The graph clearly depicts a substantial and persistent disparity in the absolute volume of venture funding between the two regions, with Europe consistently securing significantly higher capital compared to Ukraine.

The European venture funding market shows a pronounced growth and subsequent correction cycle:

- Initial Growth (2018-2021): funding in Europe experienced strong, rapid growth, soaring from approximately $23 billion in 2018 to a peak of over $100 billion in 2021. This peak year highlights a period of significant investor optimism and liquidity, potentially fuelled by favourable macroeconomic conditions and maturation of the European startup ecosystem.
- Post-Peak Correction (2022-2023): following the 2021 peak, European funding saw a sharp decline in 2022, falling to around $85 billion, and continued to drop significantly in 2023 to approximately $45 billion. This decline aligns with the global trend of tightening monetary policy, economic uncertainty, and, notably, the geopolitical shock from the full-scale invasion of Ukraine, which negatively impacted the broader European startup scene.
- Stabilisation (2023-2024): preliminary data for 2024 suggests a potential slight recovery or stabilisation, with funding slightly increasing to just under $50 billion.

Venture funding in Ukraine remains at a considerably lower scale, with its trajectory heavily influenced by internal and external factors:

- Low Base and Modest Growth (2018-2020): Ukrainian funding consistently hovered at or slightly above $0 billion from 2018 to 2020, demonstrating the small, nascent size of its early-stage VC market relative to Europe.
- Pre-War Peak (2021): Ukraine experienced its highest funding level in 2021, mirroring the European boom, though its peak value remains near $2 billion – a fraction of the European total. This year represents the high watermark of foreign and domestic investment confidence prior to the full-scale war.
- Post-Invasion Resilience (2022-2024): critically, despite the immense challenges posed by the full-scale invasion starting in February 2022, the graph shows remarkable resilience in the Ukrainian VC market. While funding slightly decreased in 2022, it stabilised and showed a marginal increase in 2023 and 2024, staying at approximately the $1-2 billion range. This stability, in the face of conflict, underscores the tenacity and continued operation of the Ukrainian tech sector, often driven by the adaptation of startups and continued support from international programs and specific funds focused on Ukraine.

Ukraine and the European Union (EU) have demonstrated different but equally influential examples of successful startup ecosystems, each of which shows the role of a favourable environment in promoting innovation and growth (Table 2). The Table 2 provides quantitative evidence of the Ukrainian ecosystem's resilience, pivot, and alignment with global and strategic European trends over a period marked by significant geopolitical and economic disruption.

Table 2. Comparative analysis of startup ecosystem challenges

Challenge	Ukraine	EU
Funding access	Limited venture capital	Uneven distribution of investments
Talent retention	Brain drain	Competition with large corporations
Regulatory environment	Bureaucratic hurdles	Fragmented frameworks
Infrastructure	Few innovation hubs	Underdeveloped regions

Source: developed by the author based on Digital Tiger 2024 (2025), Digital Europe Programme (n.d.)

The analysis of Ukrainian startup sectoral distribution from 2018 to 2024 reveals a dynamic, resilient ecosystem aligning with global digital transformation. Core sectors like Software/SaaS (33 to 30%) and FinTech (14 to 15%) remained stable anchors of the economy, affirming the country's strong IT foundation. The most dramatic shift was the strategic pivot toward Defense/Security Tech, which nearly doubled its share from 7% to a high of 12% by 2023, reflecting a critical response to geopolitical challenges. Simultaneously, the emergence of MarTech & Media (0 to 10%) and the growth of AI/Data (6 to 8%) show rapid entrepreneurial adaptation toward high-growth, modern technologies. This sectoral evolution demonstrates Ukraine's capacity to redirect capital and talent, positioning it as a key partner for the EU's strategic digital and security initiatives.

In Ukraine, Kyiv has become a dynamic IT hub, characterised by a high concentration of technology start-ups and innovation centres. The city's ecosystem has been bolstered by a skilled workforce, competitive costs, and an entrepreneurial culture that encourages technological progress. Lviv has complemented this success with its strong academic institutions, which contribute to the formation of a talent pool and the creation of a collaborative environment for startups. Notable Ukrainian successes include Grammarly, an AI writing assistant used by millions of people around the world, and GitLab, a leading DevOps platform used by businesses worldwide. These success stories have highlighted Ukraine's potential to create globally recognised companies, even within a relatively young ecosystem (Kokhan & Mazur, 2019).

Ukraine had significant potential for entrepreneurship and startups in the energy sector, particularly in transporting natural gas and hydrogen mixtures through its main and distribution pipelines, a strength highlighted by I.G. Lukianenko & Y.S. Sova (2024) in their assessment of the Ukrainian tech ecosystem. As an associate member of the European Union since 2014, Ukraine was well-positioned to leverage international collaboration opportunities, with the EU's hydrogen strategy emphasising partnerships with neighbouring countries and creating avenues for startups to contribute to green hydrogen production and clean energy solutions (Diha & Honta, 2024). The EU's hydrogen strategy emphasised partnerships with neighbouring countries, opening doors for innovative startups to

contribute to green hydrogen production and clean energy solutions. Entrepreneurs in Ukraine could play a pivotal role in developing technologies and infrastructure to facilitate this transition (Loi, 2023). By fostering such collaboration, the EU aimed to support sustainable development and energy innovation in partner regions, while Ukraine's existing infrastructure offered a unique opportunity for startups to scale solutions aligned with the EU's green hydrogen goals (Digital Tiger 2024, 2025). This focus on hydrogen also created a fertile ground for investment in clean energy ventures. By strengthening partnerships with countries like Ukraine, the EU encouraged entrepreneurship that drives environmental sustainability and energy transformation. These initiatives set the stage for startups to contribute meaningfully to building a cleaner, more sustainable energy future while driving economic growth and innovation.

Ukraine had an Association Agreement with the EU and was a party to the Energy Community Treaty. In 2019, the European Commission presented a programme to transform the European Union into a carbon-neutral continent - the European Green Deal. This project was supposed to reduce CO_2 emissions by 50-55% in 2030. The overall goal of the European Green Deal programme was to completely decarbonise the energy sector by abandoning the use of fossil fuels (coal, oil and natural gas) and replacing them with renewable energy sources. Ukraine was an energy partner of the EU. In the future, Ukraine may become a partner of the EU in the production, transportation and storage of greener gases on the basis of the existing infrastructure. International cooperation was an important part of the EU's hydrogen strategy. The EU intended to develop cooperation on green hydrogen production with neighbouring countries and regions to facilitate their transition to clean energy and their sustainable development. Ukraine had an Association Agreement with the EU and was a party to the Energy Community Treaty. In 2019, the European Commission presented a programme to transform the European Union into a carbon-neutral continent – the European Green Deal. The project aimed to reduce CO2 emissions by 50-55% by 2030 (Zavarská *et al.*, 2024). The Kherson, Odesa, Mykolaiv and Zaporizhzhia regions of Ukraine were capable of meeting half of the EU's electricity needs.

The development of clusters in Ukraine helped the development of Ukrainian business. This development was ensured by integration into global production and distribution networks with a reduction in the processing of raw materials with low added value. The Ukrainian economy had certain advantages over the EU countries. Such advantages included low labour costs, quantity of labour resources and logistics. The economic relations between Ukraine and the EU can be characterised as gradually growing. More than 70% of Ukrainian IT exports were outsourced software development services. Ukrainian developers were integrated into more developed ecosystems and chains of other countries. Large companies such as Luxoft, Softserve, Eleks, Global Logic, Infopulse and others created software products for major global brands. The basis for the successful integration of industry into global value chains was innovation ecosystems. Developed sectoral and regional clusters can be based on such ecosystems. The integration of Ukrainian clusters into value chains was fundamentally important for the development of Ukrainian industry. Participation in such chains allowed participants to join forces to improve competitiveness. There were international value chains on the basis of Ukrainian companies. Thus, SCM's metallurgical group of companies used the full cycle of production of metallurgical products and assets abroad. SCM was part of global value chains. Kernel was the world's leading and Ukraine's largest producer and exporter of sunflower oil, and a major supplier of agricultural products from the Black Sea region to international markets (Karpenko & Sevastyanov, 2022). Ukrainian company Luxoft developed car control technologies, including unmanned ones, for German car manufacturers.

Table 3 demonstrated that throughout 2018-2024 the Ukrainian startup ecosystem was consistently dominated by Software/SaaS and FinTech projects, while AI/Data, Defense/Security Tech, and EdTech showed gradual growth, reflecting a structural shift toward knowledge-intensive and security-oriented sectors.

Table 3. Sectoral distribution of startups in Ukraine in 2018-2024

Sector	2018	2019	2020	2021	2022	2023	2024
Software / SaaS	33%	32%	31%	30%	30%	30%	30%
FinTech	14%	14%	15%	15%	15%	15%	15%
E-commerce / Marketplaces	12%	12%	11%	10%	9%	8%	6%
HealthTech / MedTech	6%	6%	6%	6%	6%	6%	5%
EdTech	5%	6%	6%	7%	7%	7%	7%
AgriTech	4%	4%	4%	4%	4%	4%	-
GreenTech / CleanTech	4%	4%	4%	4%	4%	4%	4%
AI / Data	6%	7%	8%	9%	9%	9%	8%
Defense / Security Tech	7%	8%	9%	10%	11%	12%	8%
MarTech & Media	-	-	-	-	3%	5%	10%
Other	9%	7%	6%	5%	2%	-	7%
Total	100%	100%	100%	100%	100%	100%	100%

Source: developed by the author on the base of researches Consortium of Ukraine's leading ecosystem players team up to launch startup database (2020), Civitta (2025), Digital Tiger 2024 (2025)

E-commerce and AgriTech, by contrast, declined or even disappeared from the sectoral structure by 2024, whereas new segments such as MarTech & Media emerged and rapidly gained weight, indicating diversification and responsiveness to changing market demands. Overall, the dynamics of sectoral distribution suggested a gradual convergence with priority areas of the EU innovation agenda – digitalisation, deep tech, and green/clean technologies – while preserving distinctive national features linked to wartime needs and security challenges.

In the EU, several cities emerged as leading examples of startup success. According to the European Innovation Scoreboard (2025), cities such as Barcelona and Stockholm have become models of innovative ecosystems, effectively combining sustainability-driven policies with digital transformation. Barcelona has positioned itself as a hub for GreenTech innovation, leveraging its commitment to renewable energy and sustainability to attract startups focused on environmentally conscious solutions. Stockholm, on the other hand, has established itself as a FinTech powerhouse, with companies like Klarna revolutionising digital payments and driving the sector's growth (Booster Labs, 2024; European Innovation Scoreboard, 2025). These ecosystems benefited from access to finance, robust infrastructure and a culture of collaboration that fosters entrepreneurship. The EU's focus on harmonised regulations and targeted investments further supported the development of these hubs, enabling start-ups to scale up and innovate effectively. Notable startups from both regions underscored the transformative potential of well-supported ecosystems. Ukrainian firms like Grammarly and GitLab have achieved global impact through innovative approaches and scalable business models. In the EU, companies such as Revolut and Klarna demonstrated the region's capacity to nurture startups that redefine industries and compete on the global stage. Such examples demonstrate what A. Kuzior *et al.* (2022) describe as the synergy between regional policy support, cross-border collaboration, and investment in infrastructure – a key factor in sustaining long-term growth and creating environments where startups can thrive and lead in technological innovation.

Early-stage startups in the European Union (EU) continued to face significant challenges in securing adequate capital, despite overall growth in venture investments. However, these investments were unevenly distributed across the region. Germany, France, and the UK attract the largest shares of funding, with Germany receiving 25%, France 20%, and the UK 18%. These countries mainly drew investments in sectors such as FinTech, AI, GreenTech, HealthTech, and EdTech. On the other hand, peripheral regions, which encompass a range of diverse sectors, received only 8% of the total venture capital. This disparity underscored a critical issue: the lack of "patient capital" in less central regions, which impedes the growth of high-potential, innovative startups that often require long-term investment. Consequently, this uneven distribution of funding hindered the broader development of the EU's entrepreneurial ecosystem. The startup ecosystem in the European Union has shown steady growth from 2020 to 2024. In 2020, there were around 60,000 startups, with 50 achieving "unicorn" status (startups valued at over $1 billion) (Kuzior *et al.*, 2022). The key sectors included FinTech, MedTech, and E-commerce, with investment volume reaching approximately $8.9 billion (Menshikov *et al.*, 2024). By 2021, the number of startups grew to 65,000, and the number of unicorns rose to 75. The leading sectors shifted to FinTech, MedTech, and Travel Tech, with investments totalling $14.5 billion (Balodis, 2024). In 2022, the EU startup ecosystem expanded further, with approximately 70,000 startups and 90 unicorns. The top sectors included FinTech, GreenTech, and EdTech, while investments reached $18. In 2023, the number of startups increased to 75,000, and the number of unicorns surged to 110. The prominent sectors were AI, Cybersecurity, and GreenTech, with investments amounting to $20 billion. Looking ahead to 2026, the number of startups was projected to reach 80,000, with 130 unicorns. The most promising sectors remain AI, FinTech, and GreenTech, and investments were expected to total $22 billion (Kuzior *et al.*, 2022; Menshikov *et al.*, 2024).

In 2021, the United Kingdom emerged as a leader in the European startup ecosystem, with 13 new unicorns. The country attracted significant investment, totalling $14.5 billion in the first half of the year. In terms of overall unicorn distribution, the UK had 100 unicorns, followed by Germany with 42, France with 22, and the Netherlands with 18. The UK's unicorns were primarily concentrated in the FinTech sector, which accounted for 34% of the total, followed by MedTech at 14% and Travel Tech at 8%. These figures highlighted the UK's strong performance in the startup landscape, particularly in innovative industries like FinTech and MedTech, while also showcasing the growing importance of travel technologies. In 2021, the UK saw significant growth in its startup ecosystem, with 13 new unicorns, nearly double the number of new billion-dollar companies in 2020. British startups raised a total of $14.5 billion in investments during the first half of 2021, compared to $8.9 billion in the second half of 2020. The UK became the first European country to reach 100 unicorns, followed by Germany with 42, France with 22, and the Netherlands with 18. According to "How European tech hubs are shaping the global economy" (2025), majority of UK unicorns are concentrated in the FinTech sector (34%), followed by MedTech (14%) and Travel Tech (8%).

In Spain, the startup ecosystem has grown significantly, with over 7,000 tech companies as of 2024, including 3,640 startups and 1,185 scaleups. The average age of Spanish startups increased from 2.2 years in 2019 to 3.19 years in 2024, signalling the maturity of the sector. The economic impact of Spain's startup ecosystem was valued at €100 billion, generating an annual economic effect of €11.5 billion and providing 100,000 direct jobs. Despite this growth, only 18% of Spanish startups report positive EBITDA, and revenues for medium and large companies remain stable with no significant changes (Alonso, 2024). In terms of

investment, Spanish startups accounted for 20% of total investments in European startups in 2015, indicating strong investor interest in the Spanish market. Additionally, in December 2022, the Spanish Parliament approved the "Startup Law", aimed at improving conditions for entrepreneurs and attracting more investment to the tech sector. The startup ecosystem in the European Union has seen significant growth years, with a marked increase in venture investments, despite a slight slowdown in 2022 following the record-breaking year of 2021 (Alonso, 2024). Key startup hubs in Europe remained London, Berlin, and Paris, but other ecosystems, such as those in Amsterdam, Stockholm, and Barcelona, are also experiencing rapid development. The most attractive sectors for investment included FinTech, HealthTech, AI, and GreenTech (Larosa *et al.*, 2023).

Spain, in particular, has shown positive trends in its startup ecosystem. Investment volumes and the number of new startups continued to grow, with government support playing a crucial role through various programs and initiatives. Barcelona, as the leading startup hub in Spain, has experienced significant growth. In 2023, the city was home to 2,102 startups, marking a 4% increase from the previous year and nearly double the number from 2016. The dynamic nature of Barcelona's ecosystem was further evidenced by the fact that 48% of these startups were founded in the last five years. Catalonia's startup ecosystem reached a record combined turnover of €2.1 billion in 2023, representing a 14% increase from the previous year. Over the last five years, Catalan startups attracted €5.3 billion in investment, a 231% increase compared to the previous five years. Among the well-known early-stage startups from Barcelona, Cafler (founded in 2021) stood out. It provided a platform for regular car maintenance and has attracted €13.6 million in funding. Deale was a platform connecting entrepreneurs with investors, securing €3 million in funding. Emotional, a startup focusing on mental health, has raised €900k (Emocional.com). Feeder utilised AI for customer behaviour analysis in the video content sector, securing €637k in funding (getfeeder.com). MiMARK offered accessible diagnostic solutions for gynaecological oncology, with €7 million in funding. Origine Bio (n.d.), a biotechnology firm, raised €5.5 million in 2022. Other growing startups included Piper, which used AI to automate tasks for sales teams (€3 million in funding), and REVER, a SaaS platform in B2B e-commerce, which secured €8.4 million. Barcelona's startup scene also focused on sustainability, AI, big data, and blockchain technology. The city continued to attract talent and investments, solidifying its position as a major European startup hub.

The European venture capital market has shown a steady upward trend in investment volumes, driven by increased interest in innovation sectors and the proliferation of high-growth startups. However, after record highs in 2021, there was a moderate slowdown in 2022, likely influenced by macroeconomic factors, including rising interest rates and geopolitical uncertainty (Ziakis *et al.*, 2022; Balodis, 2024).

Major startup ecosystems such as London, Berlin and Paris continued to dominate the European innovation landscape, benefiting from established networks, robust talent pools and favourable regulatory frameworks. However, secondary centres such as Amsterdam, Stockholm and Barcelona were gaining importance, reflecting the geographic diversification of innovation activity on the continent. FinTech remained a leading area of investment, supported by Europe's mature financial services industry and growing consumer demand for digital and decentralised financial solutions. AI continued to be a critical area of focus, with applications spanning multiple industries, increasing efficiency and creating significant value propositions for both businesses and consumers. Green technologies were experiencing accelerated funding streams due to increased regulatory pressures and societal demands. The growth of new startup ecosystems highlighted the interplay between local policy support, international cooperation, and availability of skilled labour as critical factors for development. These trends highlighted a nuanced picture in which traditional hubs maintain their leadership while new hubs and technology verticals contribute to the overall dynamics

Discussion

The findings of this study reveal that the Ukrainian and EU startup ecosystems, while distinct in their institutional maturity, exhibit strong complementarity in talent, technological focus, and innovation potential. Both face persistent challenges – funding gaps, talent shortages, and regulatory fragmentation – but also share opportunities for synergy in emerging sectors such as GreenTech, FinTech, and AI. These results align with recent scholarship on innovation-driven growth, yet they also introduce new perspectives on resilience and integration under crisis conditions.

V. Tropina & N. Yevtushenko (2023) emphasised the need for institutional reforms to align Ukraine's innovation landscape with the European model. This study extends their work by identifying operational mechanisms – including joint innovation clusters and co-financed cross-border projects that can translate institutional convergence into tangible entrepreneurial collaboration. Similarly, A. Kuzior *et al.* (2022) highlighted the importance of systemic state support as a foundation for innovation. While their work focused on macro-level indicators, the present study complement this by emphasising micro-level startup dynamics, showing how sectoral growth in FinTech and AI can drive integration from the bottom up.

Comparing the results of this study with broader EU-focused studies, such as Z. Zavarská *et al.* (2024), who examined innovation systems in Central and Eastern Europe, reveals that Ukraine's integration potential depends not only on R&D investment and policy coherence but also on adaptive capacity within its startup community. Unlike EU member states analysed by Z. Zavarská *et al.*, Ukraine operates in a volatile environment, where startup resilience functions as a substitute for institutional stability. This highlights a critical difference in innovation pathways between

stable and crisis-driven economies. The results also align with industry (Civitta, 2025; Digital Tiger 2024, 2025), which document Ukraine's rapid IT sector growth despite wartime disruptions. However, this study moves beyond descriptive data by synthesising these insights into a strategic integration framework – showing how complementary strengths in technology, human capital, and cost efficiency can be harnessed through policy harmonisation and joint investment mechanisms. In particular, M. Schrijvers *et al.* (2024) explored the configurations of high-performing regional entrepreneurial ecosystems in Europe, emphasising the importance of network interconnections and flexible management models. Compared with their findings, the results of this study confirm that Ukrainian startups compensate for limited institutional support through strong social capital and horizontal interaction networks among IT companies.

The study by S. Primario *et al.* (2024) focuses on the concept of peer innovation – an open innovation strategy based on collaboration among technology startups. Compared to the results of this study, which identify significant potential for cross-border clusters between Ukraine and the EU, the peer innovation approach can serve as a practical mechanism for strengthening cooperation between Ukrainian and European companies in joint GreenTech and FinTech projects. R. Kumari *et al.* (2025) emphasised the influence of entrepreneurial ecosystems on regional economic development, showing that the strongest effects occur in ecosystems with high levels of government support for innovation. In this context, the present study indicate that for Ukraine, a key priority should be expanding state-level incentive programs at the regional level to balance the concentration of startups in Kyiv and Lviv. Furthermore, the results of this study align with the conclusions of M. Greenacre (2025), who highlighted the need to translate EU-level startup strategies into actionable implementation mechanisms. The results indicate that joint initiatives between the EU and Ukraine could become a platform for such implementation, particularly through programs like European Commission (n.d.a) and the Digital Europe Programme (n.d.).

Some differences emerge when comparing this study with the research of I. Balodis (2024), who examined cultural attitudes toward entrepreneurship in the European Union. While that study highlights that social norms and risk-oriented behaviour are key to fostering entrepreneurship, evidence from Ukraine indicates that even under high-risk conditions (such as wartime and investment instability), startups continue to grow-riven by internal motivation and international partnerships.

The results of this study also complement the work of A. Zaikin (n.d.), which analyses Ukrainian startup strategies during wartime. Both studies emphasise the phenomenon of "resilience-driven innovation" – innovation emerging as a response to crisis conditions. However, unlike A. Zaikin, who focuses mainly on the IT sector, this article expands the analysis to include GreenTech and DefenseTech, where dynamic growth is also observed.

The comparison between Ukrainian and EU startup ecosystems underscores several implications. First, policy harmonisation is essential to reduce regulatory fragmentation and facilitate smoother cross-border scaling. For Ukraine, gradual alignment with EU standards will unlock new markets and partnerships, particularly in clean energy and digital technologies. Second, talent development must remain a priority: expanding STEM education, entrepreneurship programs, and return incentives can mitigate brain drain and sustain innovation capacity. Third, funding diversification through public-private partnerships and regional venture networks is crucial for reducing concentration of capital in major hubs. Finally, infrastructure and collaboration networks – including accelerators, incubators, and innovation clusters – should be expanded to foster connectivity and shared knowledge between ecosystems.

Overall, this study contributes to the literature by framing Ukrainian startups not merely as vulnerable actors during wartime but as adaptive innovators capable of driving post-war recovery and EU integration. The results suggest that Ukraine's entrepreneurial resilience complements the EU's mature yet fragmented innovation system, offering a model for co-development based on mutual strengths. Future research should explore the longitudinal impact of these cross-border collaborations, particularly in sectors where green transformation and digitalisation intersect. To address the challenges and fully harness the potential of the startup ecosystems in Ukraine and the European Union (EU), a series of strategic recommendations were essential. Policy harmonisation is critical to overcoming regulatory fragmentation. Simplifying and standardising cross-border regulations within the EU would enable startups to enter and scale across markets more efficiently. For Ukraine, aligning its regulatory framework with EU standards would facilitate deeper economic and technological integration, providing greater access to regional markets and collaborative opportunities.

The startup ecosystems in Ukraine and the European Union were distinct yet impactful, demonstrating the role of supportive environments in fostering innovation and growth. Ukraine offered significant entrepreneurial potential in the energy sector, especially in transporting natural gas and hydrogen mixtures through its pipelines. As an EU associate member since 2014, Ukraine could leverage international collaboration opportunities, particularly in green hydrogen production and clean energy. The EU's hydrogen strategy fostered partnerships with neighbouring countries, creating space for startups to develop innovative solutions and infrastructure. This emphasis on hydrogen offered a unique opportunity for investment in clean energy ventures, aligning with the EU's goals for sustainable development and energy transformation. Ukraine's startup ecosystem was characterised by a high concentration of tech startups and innovation centres, bolstered by a skilled workforce, competitive costs, and an entrepreneurial culture. Ukraine's potential to produce globally recognised companies was highlighted by notable successes such as

Grammarly and GitLab. The EU's startup ecosystem was supported by access to funding, robust infrastructure, and a collaborative culture that fosters entrepreneurial activity. Harmonised regulations and targeted investments further support the development of these hubs, enabling startups to scale and innovate effectively. Notable startups from both regions, such as Grammarly and GitLab from Ukraine and Revolut and Klarna from the EU, underscored the transformative potential of well-supported ecosystems. These examples illustrated the critical importance of strategic support, cross-border collaboration, and investment in infrastructure to create environments where startups can thrive and lead in technological innovation. The EU's startup ecosystem has shown steady growth from 2020 to 2024, with key sectors including FinTech, MedTech, and E-commerce. Investment volumes have increased, and the number of unicorns (startups valued at over $1 billion) has risen. The most promising sectors for future growth remained AI, FinTech, and GreenTech. Talent development was another priority for sustaining innovation and competitiveness. Investments in educational initiatives, such as coding bootcamps, entrepreneurship programs, and STEM-focused curricula, were necessary to cultivate a robust talent pipeline. To address brain drain, governments should implement incentives for skilled professionals to remain in or return to their home countries, such as competitive salaries, tax benefits, and professional development opportunities. Expanding funding mechanisms was vital to fostering early-stage innovation and supporting startups in underserved regions. Public-private partnerships can play a pivotal role in increasing the availability of financial resources, particularly in areas lacking venture capital presence. Promoting networks of angel investors and venture capitalists, alongside government-backed funding initiatives, would ensure a broader distribution of resources and empower more startups to thrive (Duma & Zavtura, 2021).

Infrastructure development was equally important for nurturing a vibrant entrepreneurial ecosystem. Increasing the number of incubators, accelerators, and coworking spaces in underserved regions would provide startups with access to essential resources, such as mentorship, funding channels, and collaboration opportunities. Strengthened support networks would also enhance connectivity within and between ecosystems, fostering knowledge exchange and innovation. Cross-border collaboration holds immense potential for mutual growth. Establishing programs to encourage partnerships between Ukrainian and EU startups could leverage the complementary strengths of each region. Ukraine's technical expertise and cost-effective solutions, combined with the EU's structured markets and regulatory frameworks, create opportunities for joint ventures and innovation clusters. Such collaborations would drive economic growth, enhance resilience, and position both regions as leaders in the global startup ecosystem.

In summary, comparing these results with other studies reveals several shared trends: the growing role of regional ecosystems, the need for institutional support, the importance of social capital, and the impact of digital integration. At the same time, the unique contribution of this research lies in identifying the pathways for synergy between Ukraine's adaptability and the EU's innovation potential, creating the foundation for a joint space of sustainable innovation and economic growth. Both Ukraine and the EU present unique yet complementary challenges and opportunities for startup ecosystems. While Ukraine faced significant barriers, the ongoing geopolitical crisis has also spurred interest in energy innovation and digital transformation. Meanwhile, the EU's ecosystem continued to provide a conducive environment for growth, though challenges related to regulatory complexity and capital access remain. Future collaboration between Ukraine and the EU, particularly in the green energy and technology sectors, hold significant promise for fostering sustainable economic growth and technological advancement.

Conclusions

The study demonstrated that the startup ecosystems of Ukraine and the European Union (EU) develop under different conditions but face similar challenges, including limited access to capital, talent shortages, and regulatory fragmentation. In the EU, there are clear positive dynamics. In 2020, there were about 60,000 startups with a total investment volume of approximately $8.9 billion. In 2021, the number of startups increased to 65,000, while investment rose to $14.5 billion. In 2022, there were 70,000 startups with $18 billion in funding, and in 2023 the figure reached 75,000 startups with $20 billion invested. By 2026, it is projected that the EU will host 80,000 startups with total investments of $22 billion. However, funding remains concentrated in leading countries: Germany accounts for 25% of investments, France 20%, and the United Kingdom 18%, while peripheral regions receive only 8%.

In Ukraine, funding volumes remain modest, yet the ecosystem shows the ability to generate globally competitive technological solutions. Kyiv and Lviv have become key hubs where skilled labour, lower operating costs, and a strong entrepreneurial culture foster the emergence of innovative companies. Promising sectors for both regions include GreenTech, FinTech, AI, and HealthTech. In the EU, these are supported by initiatives such as the European Green Deal and the Digital Europe Programme, while Ukraine's resources and technical expertise provide opportunities for integration into the broader innovation market. Thus, the results confirm persistent imbalances in funding and regional disparities in the EU but also highlight Ukraine's considerable potential, as the country demonstrates the ability to build competitive startups and strengthen integration with the European ecosystem despite limited resources.

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Розвиток стартап-екосистем в Україні та Європейському Союзі: виклики та можливості

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Анотація. Актуальність досліджуваної проблеми визначається роллю стартап-екосистем як ключових рушіїв інновацій та економічного розвитку, які сприяють технологічному прогресу та вирішенню глобальних викликів завдяки сталим практикам і підприємницькій активності. Метою статті було проаналізувати виклики та можливості розвитку стартап-екосистем в Україні та Європейському Союзі з акцентом на їхні порівняльні переваги, бар'єри та стратегії зростання. Для досягнення цієї мети було застосовано порівняльний аналіз, системний підхід і синтез даних з офіційних звітів, академічних джерел та галузевих опитувань. Було встановлено, що ЄС має зрілу, різноманітну та добре фінансовану екосистему з провідними хабами у Берліні, Парижі та Амстердамі, підтримувану інституційними програмами, такими як Horizon Europe. Показано, що екосистема ЄС зросла з приблизно 60,000 стартапів і 50 «єдинорогів» у 2020 році до 75,000 стартапів і 110 «єдинорогів» у 2023 році, а обсяг інвестицій становив близько 20 млрд доларів. На відміну від цього, українська екосистема характеризується динамічністю та значною IT-експертизою: 30 % стартапів зосереджені у сфері Software/SaaS, а 15 % – у FinTech. Водночас її розвиток стримується політичною нестабільністю, обмеженим доступом до капіталу та труднощами масштабування на глобальні ринки. Встановлено, що гнучкість і інноваційний потенціал українського технологічного сектору можуть доповнювати структуровані ринки та регуляторну основу ЄС. Переваги взаємодії підсилюються поєднанням інституційної підтримки та доступу до ринку з українським ресурсним і економічно ефективним кадровим потенціалом. Визначено, що перспективними сферами співпраці є GreenTech, штучний інтелект та FinTech, а транскордонна кооперація, узгоджені політики та цільові інвестиції є ключовими стратегіями для сталого зростання та підвищення стійкості. Практична значущість дослідження полягає в тому, що його результати можуть бути корисними для політиків, інвесторів і підприємців у розробленні стратегій сприяння співпраці, розвитку стартап-екосистем і розкриття економічного потенціалу партнерства між Україною та ЄС

Ключові слова: економічний розвиток; інновації; технології; венчурний капітал; підприємництво; співпраця