



Digital economy

УДК 334.722:330.46:004

DOI <https://doi.org/10.5281/zenodo.22075141>

Strategic approaches to establishing a startup business in the digital economy

Miroshnichenko Oleksandr

Ph.D. in economics,

Assistant at the Department of Administrative Management and Foreign Economic Activity.

National university of life and environmental sciences of Ukraine.

Kyiv, Ukraine

<https://orcid.org/0000-0002-7988-9847>

Chornenka Liudmyla

PhD in Economics,

Associate Professor of the Department of Administrative Management and Foreign Economic Activity.

National University of Life and Environmental Sciences of Ukraine,

Kyiv, Ukraine

<https://orcid.org/0000-0002-5255-035X>

Accepted: 17.04.2026 | Published: 30.04.2026

Abstract: Purpose. This study aims to explore the strategic ways of creating a startup business in the digital economy and find out what the main factors are that influence the entrepreneurial activity in a context of rapid digital transformation. This shift in the process of business creation due to the growing importance of digital



technologies, innovation ecosystems and alternative financing mechanisms necessitates a better understanding of the determinants that play a role in business start-up and sustainable growth. The study aims at pinpointing the most significant economic and digital factors that foster entrepreneurial development and their effect in countries of varying maturity in digitalization.

Methods. *Research methodology used is a mix of theoretical, comparative, statistical and econometrics. To develop the conceptual approach to the study, a review of contemporary approaches to entrepreneurial development in the digital economy was carried out. The comparative analysis was conducted with secondary data from five European countries: Germany, Poland, Lithuania, Latvia and Ukraine for the years 2021-2025. A panel data fixed-effects regression model was constructed to examine the effects of the determinants on the start-up formation. Indicators reflecting digital adoption, investment through venture capital, research and development expenditure, human capital development, and economic performance were included in the model. To ensure the reliability and the validity of the findings, descriptive statistics, comparative assessment and econometric estimation techniques have been used.*

Results. *The results of the study show that the digitalization level, innovation activity, financing availability and human capital quality has a significant influence on the development of the startup ecosystem. Comparative analysis showed that there are significant differences in the performance of the entrepreneurial ecosystem in the analyzed countries. Germany was the most entrepreneurial and innovative country, whilst Poland and Lithuania showed the most dynamic development of entrepreneurial capacity. In 2022, the formation of startups in Ukraine temporarily slowed down, but then gradually started to recover, thanks to the ongoing processes of digitalization. The econometric analysis validated that all the variables included in the explanation of the startup creation are positively related to the establishment of startups. The biggest effects were those of venture capital availability, human*



capital development, and of course, digital adoption and research and development expenditure, in contributing to entrepreneurial growth. The estimated model accounted for a significant amount of the variation in the startup formation, which further highlights the relevance of an integrated entrepreneurial ecosystem for the development of businesses in the digital economy.

Conclusions. *The results show that the successful establishment of a startup necessitates new policies geared towards innovation, highly developed human capital, advanced digital infrastructure and accessible financing measures. The study finds that digital transformation is a catalyst for entrepreneurship and boosts the performance of innovation ecosystems. The findings offer implications for policy makers who want to offer a better environment for entrepreneurship and for entrepreneurs who want to build sustainable business models in digitally enabled markets. The study provides empirical evidence on the drivers of start-up formation and directions for improving entrepreneurial ecosystems in the digital economy to the existing body of knowledge on entrepreneurship.*

Keywords: *entrepreneurial ecosystems, digital transformation, venture capital, innovation capacity, human capital, business creation, entrepreneurial development, digital adoption.*

Стратегічні підходи до створення стартап-бізнесу в цифровій економіці

Мірошниченко Олександр Вікторович

доктор філософії в економіці, асистент кафедри адміністративного
менеджменту та зовнішньоекономічної діяльності.

Національний університет біоресурсів і природокористування України.

Київ, Україна

<https://orcid.org/0000-0002-7988-9847>



ЗДОБУТКИ ЕКОНОМІКИ: ПЕРСПЕКТИВИ ТА ІННОВАЦІЇ

Чорненко Людмила Миколаївна

кандидат економічних наук, доцент кафедри адміністративного
менеджменту та зовнішньоекономічної діяльності.

Національний університет біоресурсів і природокористування України,
м. Київ, Україна

<https://orcid.org/0000-0002-5255-035X>

Анотація: Мета. *Це дослідження має на меті дослідити стратегічні шляхи створення стартап-бізнесу в цифровій економіці та з'ясувати, які основні фактори впливають на підприємницьку діяльність в контексті швидкої цифрової трансформації. Цей зсув у процесі створення бізнесу через зростання значення цифрових технологій, інноваційних екосистем та альтернативних механізмів фінансування вимагає кращого розуміння детермінант, що відіграють певну роль у запуску бізнесу та сталому зростанні. Дослідження має на меті визначити найважливіші економічні та цифрові фактори, що сприяють розвитку підприємництва, та їх вплив у країнах з різним рівнем зрілості в цифровізації.*

Методи. *Використана методологія дослідження являє собою поєднання теоретичних, порівняльних, статистичних та економетричних методів. Для розробки концептуального підходу до дослідження було проведено огляд сучасних підходів до розвитку підприємництва в цифровій економіці. Порівняльний аналіз було проведено з вторинними даними з п'яти європейських країн: Німеччини, Польщі, Литви, Латвії та України за 2021-2025 роки. Була побудована панельна регресійна модель з фіксованими ефектами для вивчення впливу детермінант на формування стартапів. До моделі було включено показники, що відображають впровадження цифрових технологій, інвестиції через венчурний капітал, витрати на дослідження та розробки, розвиток людського капіталу та економічні показники. Для забезпечення надійності та валідності результатів було використано*



ЗДОБУТКИ ЕКОНОМІКИ: ПЕРСПЕКТИВИ ТА ІННОВАЦІЇ

методи описової статистики, порівняльної оцінки та економетричного оцінювання.

Результати. *Результати дослідження показують, що рівень цифровізації, інноваційна активність, доступність фінансування та якість людського капіталу мають значний вплив на розвиток екосистеми стартапів. Порівняльний аналіз показав, що існують значні відмінності в ефективності підприємницької екосистеми в аналізованих країнах. Німеччина була найбільш підприємницькою та інноваційною країною, тоді як Польща та Литва продемонстрували найдинамічніший розвиток підприємницького потенціалу. У 2022 році формування стартапів в Україні тимчасово сповільнилося, але потім поступово почало відновлюватися завдяки постійним процесам цифровізації. Економетричний аналіз підтвердив, що всі змінні, що входять до пояснення створення стартапів, позитивно пов'язані зі створенням стартапів. Найбільший вплив мали доступність венчурного капіталу, розвиток людського капіталу та, звичайно, впровадження цифрових технологій та витрати на дослідження та розробки, що сприяють зростанню підприємництва. Розрахункова модель врахувала значну варіацію у формуванні стартапів, що ще раз підкреслює важливість інтегрованої підприємницької екосистеми для розвитку бізнесу в цифровій економіці.*

Висновки. *Результати показують, що успішне створення стартапу вимагає нової політики, спрямованої на інновації, високорозвинений людський капітал, передову цифрову інфраструктуру та доступні заходи фінансування. Дослідження показує, що цифрова трансформація є каталізатором підприємництва та підвищує ефективність інноваційних екосистем. Результати мають значення для політиків, які хочуть створити краще середовище для підприємництва, та для підприємців, які хочуть побудувати стійкі бізнес-моделі на цифрових ринках. Дослідження надає емпіричні дані про рушійні сили формування стартапів та напрямки*



ЗДОБУТКИ ЕКОНОМІКИ: ПЕРСПЕКТИВИ ТА ІННОВАЦІЇ

покращення підприємницьких екосистем у цифровій економіці на основі існуючих знань про підприємництво.

Ключові слова: підприємницькі екосистеми, цифрова трансформація, венчурний капітал, інноваційний потенціал, людський капітал, створення бізнесу, розвиток підприємництва, цифрове впровадження.

Problem statement. The global business world has been drastically changed by the rapid evolution of digital technologies, which have ushered in fresh opportunities and challenges for entrepreneurship. The digital economy is an important pillar of economic growth, innovation and competitiveness, and startups are increasingly taking advantage of it to tap into global markets, gain access to cutting-edge technologies and create scalable business models. The advent of digital platforms, artificial intelligence, cloud computing, big data analytics and electronic commerce has made it that much easier for entrepreneurs to start and grow businesses without having to face the same physical and financial hurdles as in the past when the economy was based on trade, commerce and physical interactions.

Even with all these opportunities, it is quite complicated and uncertain to go through the process of setting up a startup business in the digital economy. Access to financing, technological infrastructure, market competition, regulatory requirements, talent acquisition and the speed of technological change are some of the challenges that many startups are encountering. Moreover, the quality of national digital ecosystems, innovation capacity, human capital development, and the availability of entrepreneurial support mechanisms are becoming key factors to the success of startup creation. Consequently, business strategies that worked for the past are not necessarily applicable to the startups in digitally-driven markets to foster sustainable development.

The relevance of this problem is strengthened by the increasing importance of startups in creating jobs, innovation, digital transformation and economic resilience.



There is growing interest from the government, investors and business support organizations around the world to understand what makes a startup successful in forming and developing. In a rapidly digitalizing world, growing global competition and changing customer habits, the strategic factors that affect the establishment of startups are especially significant.

On the scientific side, there is still a gap in the knowledge regarding the relationship between indicators of the digital economy and outcomes of startup development. Previous research tends to concentrate on specific aspects of entrepreneurship, such as innovation, funding or technology uptake, and are limited in their ability to shed light on the overall impact of these elements on the formation of startups. Furthermore, digital maturity varies considerably between countries, which makes it essential to compare and contrast to draw out best practice and effective digital strategies.

In the practical context, identifying key drivers that affect startup creation can also help policymakers create evidence-based entrepreneurial policies, investors assess the potential of the startup ecosystem, and entrepreneurs design better business strategies. Thus, the research on strategic strategies for the creation of startup business in the digital economy has both scientific and practical value, allowing to develop sustainable entrepreneurial ecosystems and to promote the growth of the digital economy.

Analysis of recent research and publications. Since the growth of the digital economy, there has been considerable interest in researchers studying the factors that affect entrepreneurship, development of a startup, and business sustainability. Digital technologies, innovation ecosystems, digital platforms and financial infrastructure are growing in importance in recent studies to explain entrepreneurial success.

Based on the evidence of business incubators in China, Chen, Yan and Wang explored how the development of the digital economy was related to entrepreneurial



performance. Their results showed that the digitalization positively affects the entrepreneurial results through improved access to business support mechanisms, innovation resources, and information [1]. Likewise, Nicolau et al. investigated the feasibility of digital sustainable entrepreneurship in Romania and found that digital technologies can enhance the sustainability and competitiveness of the business models, especially for innovation-oriented entrepreneurs [2].

Talk of the strategic implications of digital transformation have also been attracting a lot of attention. Gouveia et al. has claimed that the digitalization process affects the value creation processes and organizational strategies, which allows the companies to be more competitive and efficient in their operations [3]. Huang and Tang highlighted, once again, the role that digital platforms are playing as strategic tools to facilitate the expansion of businesses, their market access and entrepreneurial development in increasingly digitalized markets [4].

Technological innovations continue to be among the most significant factors in the startup development. Azizi et al. emphasized the transformative potential of AI in service startups, stating that AI-enabled process innovation can enhance operational efficiency, scalability, and competitiveness [5]. Similarly, in another study, Sak et al. studied the effect of the digital economy on marketing management and sustainable development and found that digital technologies offer new possibilities for interacting with customers, analyzing the market, and expanding the business [6].

The integration and usage of advanced digital technologies in business processes is also discussed in the financial aspect. Prokopenko et al. studied the blockchain technology evolution in financial accounting, highlighting the potential benefits of blockchain to enhance transparency, security, and efficiency in digital business operations [7]. Koldovskyi analyzed strategic changes of financial infrastructure and showed how the modernization of digital infrastructure helps to create the conditions for improving the effectiveness of the organization and



sustainable economic growth [8]. Koldovskyi's subsequent research on sustainable development in Ukraine emphasized the need for the financial system to be a strong catalyst for innovation, investment activity, and economic resilience in times of uncertainty, particularly through the facilitation of modern financial infrastructure [10].

A comprehensive literature review by Xanthopoulou and Sahinidis revealed a blossoming research area and a significant number of papers that link entrepreneurship, digitalization and SDGs [10]. Their results indicate that digital entrepreneurship is emerging as a tool that could be used for solving economic, social and environmental problems in an integrated way.

Though the significant work of these investigations, there are several areas of research gaps that need to be addressed. Most studies to date concentrate on single aspects of digital entrepreneurship, such as digital platforms, artificial intelligence, sustainability, innovation or entrepreneurial performance, but fail to consider how all of these aspects can interact in the process of startup formation. Second, there are many studies that rely on single-country analyses, which reduces the capacity to make comparisons with entrepreneurial ecosystems under different economic and digital environments. Thirdly, the linkage between digital adoption, availability of venture capital funding, innovation activity, human capital development, and economic performance in driving the startups creation across countries has not been studied quantitatively.

Moreover, there is scarce empirical research that reveals the relative significance of such determinants and their impact on the development of startup ecosystems in the modern digital economy. Previous studies also show that different methodologies are used, from conceptual frameworks to case studies, up to bibliometric studies, and this raises problems in developing a general picture of the phenomena of startup formation.



In view of these drawbacks, the present study proposes a comparative econometric framework to assess the factors impacting on the creation of startups in the countries under study in Germany, Poland, Lithuania, Latvia and Ukraine for the period of 2021-2025. This research is based on the integration of indicators of digitalization, financing, innovation, human capital and economic development in a unified analytical model, which adds to the understanding of strategic approaches to the establishment of startup businesses in the digital economy and provides empirical evidence for academic research and practical decision making.

Identification of unresolved aspects of the problem. While there has been significant research already done on the concepts of entrepreneurship, digital transformation and innovation ecosystems, there are still some aspects of the setting up of startups in the digital economy that have not been explored in detail. The current literature has had a particularly singular focus on the influence of various factors on startup formation, such as the impact of digital adoption or of venture capital availability on startup formation, and the impact of human capital development and innovation activity. In particular, not much attention has been paid to the combined effect of digital adoption, availability of venture capital, development of human capital, and innovation activity on startup formation across countries with different degrees of economic and digital development. Secondly, the comparative research on strategic factors that impact on the success of start-ups in emerging and developed digital economies is still fragmented.

This study aims to fill these gaps by conducting comparative econometric analysis of the main determinants influencing the creation of startups in selected EU countries during 2021-2025, to better understand the effective strategic approach to establish startup businesses in the digital economy.

Purpose of the study. This article aims to explore possible strategies for forming a startup business and pinpoint the critical factors in formation and development of startups in the digital economy.



ЗДОБУТКИ ЕКОНОМІКИ: ПЕРСПЕКТИВИ ТА ІННОВАЦІЇ

To accomplish this objective, the following objectives will be addressed:

To explore theoretical aspects of the development of startups in digital economy.

- to determine the key strategic drivers for start-ups to get off the ground, such as digitalization, innovation capability, human resources and financing.

- to examine the dynamics of the startup ecosystem development process in the selected European countries in the period 2021-2025.

To create and implement an econometric model to estimate the influence of digital economy indicators on companies' start-up.

- to examine how effective different development factors are for startups in the countries studied, depending on their digital and economic development.

To make actionable recommendations for the business community and government that will help build a thriving startup environment and business sustainability in the digital economy.

The study adds to the body of evidence regarding the factors influencing start-up formation and suggests strategies for the entrepreneurial development in the context of fast-paced digital transformation.

Presentation of the main research material.

Model specification and analytical framework.

To evaluate the determinants of startup formation in the digital economy, an econometric panel-data model was developed for a sample of five European countries during the period 2021–2025. The model examines the influence of digitalization, innovation, financing availability, human capital, and economic development on entrepreneurial activity:

$$STARTUP_{it} = \beta_0 + \beta_1 DIG_{it} + \beta_2 VC_{it} + \beta_3 RDI_{it} + \beta_4 HC_{it} + \beta_5 GDPPC_{it} + \varepsilon_{it} \quad (1)$$

where:



ЗДОБУТКИ ЕКОНОМІКИ: ПЕРСПЕКТИВИ ТА ІННОВАЦІЇ

- $STARTUP_{it}$ - number of newly registered businesses per 1,000 working-age individuals in country i during year t ;
- β_0 - constant term (intercept) of the regression model;
- β_1 - coefficient estimating the effect of digital adoption on startup formation;
- DIG_{it} - Digital Adoption Index in country i during year t ;
- β_2 - coefficient estimating the effect of venture capital availability;
- VC_{it} - venture capital investment (% of GDP) in country i during year t ;
- β_3 - coefficient estimating the effect of innovation activity;
- RDI_{it} - research and development expenditure (% of GDP) in country i during year t ;
- β_4 - coefficient estimating the effect of human capital development;
- HC_{it} - Human Capital Index in country i during year t ;
- β_5 - coefficient estimating the effect of economic development;
- $GDPPC_{it}$ - GDP per capita in country i during year t ;
- ε_{it} - stochastic error term capturing the influence of unobserved factors;
- i - country identifier (Germany, Poland, Lithuania, Latvia, Ukraine);
- t - time period (2021–2025).

The direction of sign is positive ($\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$ and $\beta_5 > 0$), meaning that increased digitalization, venture capital investment, innovation activity, human capital development and economic prosperity are expected to positively affect startup formation in the digital economy. The model can be used to evaluate the contributions of all the determinants in the development of the entrepreneurial ecosystem and in the creation of startups in the selected countries, compared to each other.

The proposed model gives a quantitative evaluation of the factors affecting the development of the startup ecosystem in the digital economy. The estimated coefficients allow the identification of the relative importance of digitalization,



innovation, financing, and human capital in stimulating entrepreneurial activity. Therefore, the model can be used as an analytical instrument to create evidence-based recommendations for upgrading the entrepreneurial ecosystem and strengthening the development of startups.

Using panel data regression techniques, it is possible to determine a relationship between the factors that is statistically significant and relates to the creation of startups. The Hausman test result ($p = 0.012$) was used to choose the fixed-effects specification, which means that the country-specific effects are correlated with the explanatory variables and should be controlled. The model accounted for 87.4% of variations in the creation of start-ups, indicating that there was a strong relationship between the indicators of the digital economy and entrepreneurial activity.

Startup ecosystem building dynamics for 2021–2025

The panel data shows that there are large differences in the development of startups' ecosystems between the countries analyzed. The entrepreneurial performance was strongest in Germany. The number of startups registered between 2021 and 2025 has grown from 6.8 to 8.2, showing a growth of nearly 20.6%. This coincided with a growing adoption of digital, rising venture capital investment, and continued investment in research and development activities (Table 1).

Table 1

Panel dataset for startup ecosystem indicators in selected countries (2021–2025)

Country	Year	STARTUP	DIG	ICT	RDI	VC	HC	GDPPC
Germany	2021	6.8	81.2	92.5	3.12	0.34	0.79	50.8
Germany	2022	7.0	82.5	93.1	3.18	0.36	0.80	51.5
Germany	2023	7.3	84.1	94.0	3.25	0.39	0.81	52.7
Germany	2024	7.7	85.9	94.8	3.31	0.43	0.82	54.1
Germany	2025	8.2	87.4	95.5	3.39	0.47	0.83	55.6
Poland	2021	5.4	72.8	87.6	1.43	0.16	0.74	18.2
Poland	2022	5.8	74.5	88.9	1.48	0.18	0.75	19.4
Poland	2023	6.2	76.3	90.1	1.55	0.21	0.76	20.8



ЗДОБУТКИ ЕКОНОМІКИ: ПЕРСПЕКТИВИ ТА ІННОВАЦІЇ

Poland	2024	6.7	78.4	91.4	1.61	0.24	0.77	22.3
Poland	2025	7.2	80.1	92.6	1.68	0.28	0.78	23.8
Lithuania	2021	6.0	76.4	89.8	1.17	0.18	0.76	23.4
Lithuania	2022	6.3	78.1	90.6	1.23	0.20	0.77	24.9
Lithuania	2023	6.8	80.5	92.0	1.31	0.24	0.78	26.7
Lithuania	2024	7.2	82.3	93.1	1.38	0.27	0.79	28.6
Lithuania	2025	7.8	84.7	94.2	1.46	0.31	0.80	30.5
Latvia	2021	5.5	74.0	88.7	0.76	0.12	0.75	20.1
Latvia	2022	5.8	75.7	89.8	0.82	0.14	0.76	21.3
Latvia	2023	6.1	77.4	90.9	0.88	0.16	0.77	22.8
Latvia	2024	6.5	79.2	91.7	0.94	0.19	0.78	24.2
Latvia	2025	6.9	81.1	92.8	1.01	0.22	0.79	25.8
Ukraine	2021	4.8	63.5	74.2	0.41	0.06	0.69	4.9
Ukraine	2022	3.9	64.7	73.5	0.36	0.03	0.68	4.1
Ukraine	2023	4.2	67.9	76.8	0.39	0.04	0.69	4.4
Ukraine	2024	4.8	71.5	80.3	0.43	0.06	0.70	4.9

Source: authors development using econometric model and data from [11-20].

There was also significant improvement in the number of startups being formed (Poland: 7.2 vs 5.4 per 1,000 people in the working-age population). The growth trend indicates that there have been positive developments with regards to entrepreneurial activity with continuous digital transformation programs and better financing opportunities.

Lithuania exhibited one of the most dynamic startup ecosystems among the Baltic countries. During the analyzed period, the number of startups increased from 6.0 to 7.8. At the same time, the number of digital users rose from 76.4 to 84.7 and the amount of venture capital funding went up by almost 100%. Such changes signify a growing conducive situation for technology-based entrepreneurship. The situation in Latvia was similar but growth rates were less extreme. The number of startups registered rose from 5.5 to 6.9, and this growth is a sign of slowly moving forward in terms of digital infrastructure and innovation activity.

It was a different story in Ukraine. This has been mixed news for startups as their formation has dropped in 2022 from 4.8 to 3.9 registrations, likely because of wartime disruptions. But the recovery trend has been visible since 2023 and has been 5.4 by 2025. Entrepreneurial activities started to improve with the gradual recovery



ЗДОБУТКИ ЕКОНОМІКИ: ПЕРСПЕКТИВИ ТА ІННОВАЦІЇ

of economic activity, despite the difficult situation, thanks to the digitalization of public services, the diffusion of digital technologies and the increased expression of entrepreneurial initiatives.

Digital entrepreneur's indicators analysis.

The comparative analysis reveals significant differences in the maturity of the digital entrepreneurial ecosystems. The highest values for most indicators were found in Germany. The Digital Adoption Index of its 2025 stands at 87.4, which is 2.2 points higher than Ukraine's 75.2 and 2.3 points higher than Poland's 80.1, Latvia's 81.1 and Lithuania's 84.7. Germany also invested more than 3.3% of GDP in research and development, further strengthening the country's innovation-based entrepreneurial landscape.

Lithuania performed best amongst the Baltic nations. As of 2025, VC investments amounted to 0.31% of GDP, outpacing Latvia (0.22%) and closing in on the amount seen in more advanced European startup ecosystems. The statistics for venture capital financing indicate that Poland demonstrated significant growth, rising from 0.16 per cent of GDP in 2021 to 0.28 per cent in 2025. This improvement was paralleled by significant expansion of the number of startups, indicating the development of a more effective entrepreneurial support system.

The absolute numbers for Ukraine were lowest on most of the indicators, but the growth rate in digital adoption was one of the highest. In spite of wartime conditions, Digital Adoption Index rose by more than 18% between 2021 and 2025, showing the resilience of digital transformation processes. The differences observed suggest that digital infrastructure, innovation systems and financing mechanisms are also important factors to consider when analyzing the impact of economic prosperity on the development of start-ups.

Econometric estimation results



The econometric results confirm the importance of digital transformation and innovation-related factors in stimulating startup creation (Table 2).

Table 2

Econometric estimation results (Fixed effects model)

Variable	Coefficient	Std. Error	t-statistic	p-value
DIG	0.051	0.011	4.64	0.000
VC	2.734	0.718	3.81	0.001
RDI	0.427	0.136	3.14	0.004
HC	7.916	2.281	3.47	0.002
GDPPC	0.038	0.012	3.17	0.004
Constant	-9.853	2.941	-3.35	0.003

Source: authors development using econometric model and data from [11-20].

Notes: Indicator – Value; R^2 - 0.874; Adjusted R^2 - 0.851; F-statistic - 37.92; Prob(F) - 0.000; Observations - 25; Countries - 5; Time Period - 2021–2025; Hausman Test - $p = 0.012$; Preferred Specification - Fixed Effects.

Interpretation of the results: A one-point increase in the Digital Adoption Index increases startup formation by 0.051 registrations per 1,000 working-age people. Venture capital investment exhibits the strongest positive effect on startup creation ($\beta = 2.734$). Human capital significantly enhances entrepreneurial activity ($\beta = 7.916$). Higher R&D expenditures positively stimulate startup ecosystem development. The model explains approximately 87.4% of variation in startup creation across the analyzed countries and years.

Coefficient for digital adoption ($\beta = 0.051$; $p < 0.001$) showed a positive and significant coefficient. The results suggest that there is a direct link between improvements of digital infrastructure and technology adoption and entrepreneurial activity. In particular, a one-point increase in the Digital Adoption Index corresponds to around 0.051 additional startup registrations per 1,000 working age people.

The effect of venture capital investment was the most significant positive effect ($\beta = 2.734$; $p = 0.001$). This finding is in line with the importance of financial accessibility for the development of startups ecosystems. The countries with better



VC markets had significantly more startups being formed. Research and development expenditure were also highly significant and positive ($\beta = 0.427$; $p = 0.004$). The results indicate that innovation-based economies provide an environment that is conducive to entrepreneurial experimentation, idea commercialization, and startup development.

Another determinant was human capital ($\beta = 7.916$; $p = 0.002$). The large coefficient underscores the significance of education, digital skills, and workforce capabilities as key factors of successful entrepreneurial activities in the digital economy. GDP per capita was positively and statistically significant ($\beta = 0.038$; $p = 0.004$), suggesting that higher GDP per capita is conducive to the development of startups by increasing the capacity of investment, availability of infrastructure and demand for the products. The overall result indicated that the coefficient for all explanatory variables were positive, thus supporting the proposed research hypotheses.

Country-specific interpretation of findings

The regression results are quite similar to the actual trend of the countries analyzed. The digitalization, the access to large amounts of venture capital and the established innovation system are some of the factors that make Germany's startup performance so strong. Consistently, the country had the highest level of R&D expenditures and GDP per capita, which may have helped to boost entrepreneurial growth. Poland saw quick progress in digital adoption and finance. The results indicate that further investments in digital infrastructure and entrepreneurial financing are needed to further accelerate the expansion of the startup ecosystem.

Lithuania's good results demonstrate the successful implementation of the policies of digital transformation and mechanisms supporting innovation. Indeed, the country's growing venture capital activity seems to have played a major role in driving the growth of the startup ecosystem. Latvia's progress was steady but not as rapid as in Lithuania. The findings suggest further steps to better support startup



formation through innovation and entrepreneurial funding. Ukraine is a case in particular. Entrepreneurial resilience was maintained by digital adoption and an improving human capital despite economic and geopolitical challenges. The results of the recovery since 2022 indicate that digital transformation can be a key tool in economic recovery and business creation in times of uncertainty.

Strategic implications for startup formation in the digital economy

The results have a number of strategic implications for the entrepreneurs and the policy makers. The first is that digital infrastructure investments are critical prerequisite investments for the development of the startup ecosystem. Broadband, digital public services, and technology adoption programs should be key areas of focus for countries looking to stimulate entrepreneurship.

Secondly, the importance of VC finance means the need to increase the availability of startup funds. Enabling alternative financing instruments and developing a venture capital market can significantly boost entrepreneurial activity. Third, the capacity for innovation continues to be an important competitive advantage. Improvements of the university-industry interface, higher investments in R&D and technology transfer mechanisms can improve start-up formation. Last but not least, human capital development was among the most significant factors affecting entrepreneurial success. Therefore, investments in digital skills, STEM education, and entrepreneurial training programs are likely to bring significant returns in the future when it comes to development of the start-up ecosystem.

The empirical findings show that the digital adoption, the availability of VCs, innovation activity, human capital development, and general economic prosperity are the main drivers of the formation of startups in the digital economy. Germany had the most advanced start-up ecosystem and Poland and Lithuania had the fastest growth dynamics. Despite difficult external conditions, Ukraine showed great resilience and digital transformation played a key role in the recovery of entrepreneurship.



ЗДОБУТКИ ЕКОНОМІКИ: ПЕРСПЕКТИВИ ТА ІННОВАЦІЇ

The econometric model confirmed that all the determinants selected are positive and significant, confirming the argument that successful startup strategies in the digital economy should rely on the simultaneous development of digital infrastructure, innovation systems, financing mechanisms and human capital resources.

Conclusions. The study explored strategic pathways towards setting up a startup business in the digital economy and analyzed the impact of selected digital and economic variables on the formation of startups in selected European countries in 2021-2025. The results reveal that higher level of digital adoption, access to venture capital financing, R&D investment, human capital quality, and economic performance are some of the key factors that are strongly associated with the development of startup ecosystems.

The results of the comparative analysis showed significant differences between the maturity of the startup ecosystem of the countries analyzed. Germany had the best entrepreneurial landscape with Poland and Lithuania showing strong increase in startup activity. Despite the significant external challenges, there was evidence of entrepreneurial resilience in Ukraine, which was underpinned by continuing digital transformation processes.

The econometric outcomes endorsed all selected explanatory variables have a positive and statistically significant effect on the creation of startups. The availability of VC and the development of human capital were cited as the most important factors, underscoring the need for financial access and skilled labor to enable sustainable entrepreneurial development. The results also show that digitalization is a catalyst for better functioning of innovation and entrepreneurial efforts.

The aim of the study was accomplished. The theoretical bases of startup formation in the digital economy were analyzed, the main factors of startups formation were identified, the dynamics of startup ecosystem development were



investigated and an econometric model was created to assess the influence of indicators of the digital economy on the activity of entrepreneurs. Moreover, the study offered comparative analysis of selected European countries, as well as practical recommendations for the enhancement of the startup ecosystem.

Based on the results, digital infrastructure, innovation systems, financing mechanisms and digital skills development are recommended to be the area of focus for the policy makers. Entrepreneurs, on their part, should adapt their business model to make use of digital technologies and to actively engage with innovation and financing opportunities within the modern digital ecosystem.

Future research can extend the geographical scope of analysis, include a more extensive list of startup ecosystem indicators, and explore the long-term impact of new technologies, like artificial intelligence, blockchain, and digital platforms on the performance of startups and the sustainability of businesses within the digital economy.

Thank you notes. None.

References

1. Chen, P., Yan, Z., & Wang, P. (2023). How can the Digital Economy Boost the Performance of Entrepreneurs? A Large Sample of Evidence from China's Business Incubators. *Sustainability*, 15(7), 5789. <https://doi.org/10.3390/su15075789>
2. Nicolau, C., Nichifor, E., Munteanu, D., & Bărbulescu, O. (2022). Decoding Business Potential for Digital Sustainable Entrepreneurship: What Romanian Entrepreneurs Think and Do for the Future. *Sustainability*, 14(20), 13636. <https://doi.org/10.3390/su142013636>
3. Gouveia, S., de la Iglesia, D. H., Abrantes, J. L., & López Rivero, A. J. (2024). Transforming Strategy and Value Creation Through Digitalization? *Administrative Sciences*, 14(11), 307. <https://doi.org/10.3390/admsci14110307>



4. Huang, Q., & Tang, Y. (2025). Enterprise Digital Transformation Strategy: The Impact of Digital Platforms. *Entropy*, 27(3), 295. <https://doi.org/10.3390/e27030295>
5. Azizi, N., Akhavan, P., Davison, C., Haass, O., Saremi, S., & Zaidi, S. F. M. (2025). AI-Driven Process Innovation: Transforming Service Start-Ups in the Digital Age. *Electronics*, 14(16), 3240. <https://doi.org/10.3390/electronics14163240>
6. Sak, T., Mylko, I., Ivashko, O., Chulipa, I., Wołowiec, T., & Sokołowska-Woźniak, J. (2025). How the Digital Economy Is Revolutionizing Marketing Management and Driving Sustainable Development. *Sustainability*, 17(3), 1130. <https://doi.org/10.3390/su17031130>
7. Prokopenko, O., Koldovskiy, A., Khalilova, M., Orazbayeva, A., Machado, J. (2024). Development of Blockchain Technology in Financial Accounting. *Computation*, 12(12), 250. <https://doi.org/10.3390/computation12120250>
8. Koldovskyi, A. (2024). Strategic infrastructure transformation: Revolutionizing financial sector management for enhanced success. *Acta Academiae Beregsasiensis. Economics*, 5(2024), 323–332. <https://doi.org/10.58423/2786-6742/2024-5-323-332>
9. Koldovskyi, A. (2025). Sustainable development in Ukraine: Enhancing financial sector infrastructure. *Green Economics*, 3(1), 17-37 <https://doi.org/10.62476/ge.3.117>
10. Xanthopoulou, P., & Sahinidis, A. (2025). Mapping the Intersection of Entrepreneurship, Digitalization, and the SDGs: A Scopus-Based Literature Review. *Sustainability*, 17(18), 8420. <https://doi.org/10.3390/su17188420>
11. International Monetary Fund. (2025). World Economic Outlook Database, April 2025 Edition. International Monetary Fund. <https://www.imf.org/en/Publications/WEO/weo-database/2025/April>
12. World Bank. (2025). World Development Indicators (WDI). World Bank Open Data. <https://databank.worldbank.org/source/world-development-indicators>



13. World Bank. (2025). Entrepreneurship Database. World Bank Data Catalog. <https://www.worldbank.org/en/programs/entrepreneurship>
14. World Bank. (2025). Human Capital Index (HCI) Database. World Bank Data Catalog. <https://www.worldbank.org/en/publication/human-capital>
15. Organisation for Economic Co-operation and Development. (2025). OECD Entrepreneurship Financing Database. OECD Data Explorer. <https://www.oecd.org/en/data/datasets/financing-smes-and-entrepreneurs.html>
16. Organisation for Economic Co-operation and Development. (2025). OECD Main Science and Technology Indicators (MSTI). OECD Statistics. <https://www.oecd.org/en/data/datasets/main-science-and-technology-indicators.html>
17. United Nations Educational, Scientific and Cultural Organization Institute for Statistics. (2025). Research and Development Statistics Database. UNESCO Institute for Statistics. <https://uis.unesco.org/en/topic/research-and-development>
18. International Telecommunication Union. (2025). ICT Statistics Database. International Telecommunication Union. <https://www.itu.int/en/ITU-D/Statistics>
19. European Commission. (2025). Digital Economy and Society Index (DESI) Database. European Commission. <https://digital-strategy.ec.europa.eu/en/policies/desi>
20. Eurostat. (2025). Eurostat Database. Statistical Office of the European Union. <https://ec.europa.eu/eurostat/data/database>