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Andrzej Buszko
Pomeranian University, Slupsk
ORCID: 0000-0003-0600-4646

Shadow economy impacts on start-up vitality in selected European countries

Abstract

The study aims to find the relation between the shadow economy and start-ups performance in selected European countries. The MIMIC approach was employed to indicate the level of the shadow economy. The Pearson correlation index was used to show the dependence between the shadow economy and number of start-ups. It was proved that the shadow economy influences negatively start-ups activity. Additionally, the numerous start-ups in analyzed countries proved to be a supportive factor in unicorn creation.

Keywords: start-up, shadow economy, vitality, economy, impact
JEL Classification: H11, E02, M2, P11

Introduction

The shadow economy plays an important role as a key element of the business environment. Firstly, it should be noted that overall the shadow economy creates two markets. Principally, one is legal and the other one it is in fact the shadow economy. Whenever the shadow economy occupies a sound place in any economy, it affects general development. According to the study carried by Medina and Schneider [2018], it was highlighted that in developed countries the increase in the shadow economy by 1% of GDP generated the growth of official GDP by

7%, contrary to developing countries. In such economies the upsurge of the shadow economy minimizes GDP even by nearly 5%. Such a relation makes a difference in the business environment. Business cycles create opportunities. If there is a decline, lawfully operating companies will face more difficulties and the shadow economy receives an impact for its enlargement. Those operating illegitimately have better conditions for survivability. In France, Germany, and Scandinavia nearly 65% can survive after 3 years of activity. Such a result seems to be very positive since in the USA the rate is just 50% [World Bank, 2025]. Alea [1996] highlighted a remarkable pheonmenon. Economic growth is supported by the shadow economy. This is mainly due to the greater competition (among legally and illegally operating companies), pressure on innovation and efficiency. Innovation and efficiency supposed to be "radar orientation" for fledgeling companies, especially start-ups. It should be remembered that companies from the shadow economy do not pay taxes and in this way gain higher profits, contrary to those functioning officially. Such market entities are under higher pressure going into bankruptcy. In a way they have a choice: to stay legal and try to be more innovative or switch into the shadow economy sphere. Some stay *hybrid*. Selected operations are kept as legal, but some transactions are not registered and finally the shadow economy proved to be on the uprising curve. A few industries are very favourable for such a behaviour, for example: construction, agriculture, tourism and entertainment, services, etc. Additionally, the shadow economy can be evaluated as an incubator for new companies, since quite often both entry and all other business costs are not so high. Entrepreneurs can verify the idea of business without the need to obey formalities and spend time on bureaucratic procedures. If he/she succeeds, he/she will transfer the business into the legal part of economy. So, the shadow economy can be coined as a temptation for those who do not want to spend relatively high amounts of money on new companies. This attitude may be applied to start-ups, too. Start-ups can be influenced by the shortage of assets and competitions by well-grounded market entities. On the other hand, the shadow economy can be viewed as the barrier for start-ups, since companies from the shadow economy are frequently very flexible and can offer similar products and services at lower prices. In this way start-ups face unexpected, banned competitors. Therefore, the shadow economy may shape company performance as well.

Literature review

Start-ups play a vital role in any economy. New, fledgeling companies shape innovativeness and economic growth. Based on that entrepreneurship is demonstrated. The more companies are created, the more vigorous economy is formed [Ganaway, 2025]. It should be noted that start-ups are newly recognized firms in the phase of increasing and searching for new scalable businesses. But even the general business environment has improved, 11 out of 12 start-ups are still failing [Startup Genome, 2019]. Even though the average cost of start-up creation is ca. 3,000 USD, still many young entrepreneurs hesitate to set up a new company. The main

reasons for set-up failure are connected with the market environment and inefficient funding [Wardini, 2023]. Start-ups usually face the problem with market demand uncertainty, limited own assets and creation of profitable business models [Osawa, 2006; Tomaszewski, 2019]. Different economies provide dissimilar business conditions. That is why the survivability of start-ups significantly varies among countries. Switzerland is believed to be a good place for business, but the rate of start-ups is changeable. In October 2021, 3,694 companies were founded in Switzerland. While the number of start-ups increased by 1.74% compared to September 2021, it decreased by 6.62% in comparison with October 2020 [Startups.ch, n.d.]. Their performance can be viewed from many perspectives, but one of the most crucial is related to their survivability. Start-ups face many problems not only including the business environment as such, but also the shortage of financing, especially during the early days of operating [Baytelman, Voropayeva, 2025]. New companies quite often think of relocating. The most favourable business environment is believed to be in the USA (24% of founders indicate this country as the best option), Germany (18%), and the Netherlands (11%) [European Startup Monitor 2019/2020]. Start-ups usually employ an interesting strategy based on innovation [Lusoi, 2025]. Arcuri et al. [2025] pointed out that the survivability of start-ups depends on their innovativeness. The more innovative a start-up is, the more chances for longer activity and final success. Székely [2024] highlighted three important factors fostering start-ups functioning. The first one is related to employees, the second to the market demand for a start-up's offer, and the third one – innovation solutions provided by the new company. Dixit et al. [2025] remarked that on the one hand start-ups rely on their ecosystem, but on the other hand they create it. If the ecosystem is friendly, start-ups receive better support to survive. Máté et al. [2024] mentioned that start-ups could collect backing from market entities, so finally the chances for their success became higher. This feature is very important, since start-ups generally do not have substantial initial capital and profits are very insignificant [Miglo, 2025]. Whenever start-ups do not operate in an approachable environment, they do not have much chances for survivability. Greco [2023] referred to the Italian ecosystem. It is different from other Mediterranean ecosystems. It is more favourable for start-ups due to the internationalization. Foreign companies operating in Italy seek innovative partners, start-ups can be a good solution in this respect. Open economies are more constructive for cooperation among diverse companies. Fair collaboration is a crucial success factor of any company. The shadow economy rejects fair cooperation. Ameer et al. [2025] tried to investigate the role of financial development and institutional quality in shadow economy reduction. The team of researches employed the CS-ARDL estimation method; the results disclosed that financial development and institutional quality decreased meaningfully the shadow economy in developing countries, albeit these two economic categories support the growth of the illegal economy in developed nations. Bustamante et al. [2021] added one important factor – internationalization. Researchers discovered that transnational existence of a start-up is designed by whether it internationalizes to an economy with robust or feebler institutions than those in its home country. Finally, international start-ups perform better in another country if the

circumstances in their home country are worse. Entrepreneurs are very creative and more than others seek better opportunities for their new fledgeling companies [Agarwal et al., 2002]. Deloof and Vanacker [2018] underlined that start-ups performed differently during crisis time. Incumbent companies rely on close cooperation with banks since they need financing, especially during first months of their activity. If banks start to be more careful and limit the amount of loans, a start-up feels at a loss and goes into bankruptcy more quickly. Estrin and Mickiewicz [2012] raised a very important issue related to the shadow economy and entrepreneurship. They revealed that there was a positive correlation between the size of the shadow economy and entrepreneurial entry. Furthermore, the researchers discovered that the entrepreneurial entry was relatively very limited when the illegal economy constituted ca. 15% of gross domestic product (GDP). The shadow economy offers low costs of activity. Companies operating in the framework of the underhand economy may be more competitive. Goel and Saunoris [2022] examined companies functioning illegally from the USA, whether they were interested to exit and started to be legal companies. They found out that no matter what kind of firm was evaluated, none of them was so much interested to leave the shadow economy. The illegal sphere quite often offers better business opportunities than the legal economy. Some economies are overregulated, companies feel pressure and must follow strict rules. If they are not interested in such an environment, they move to the shadow economy. Berdiev et al. [2018] revealed that economic sovereignty affected the spread of the shadow economy.

The roots of the shadow economy are generally recognized, but its effects are still under intensive research [Pham, 2017]. The main factors fostering shadow economy enlargement include:

1. A high level of taxes and a complicated tax system [Eilat, Zinnes, 2000]. This feature is discussable, since Scandinavian countries have a high level of taxes and a low level of the shadow economy, contrary to Georgia and Central Asian countries, where there is a substantial level of the shadow economy associated with minor taxation obligations.
2. Joblessness. People without a chance to find legal employment seek their opportunity in the shadow economy [Hassan, Schneider, 2016].
3. Corruption and organized crime. Countries with a high level of criminality, especially associated with corruption, are very vulnerable in shadow economy development [Hendricks, 2002].
4. National culture and history [Alarcon, Buendía, Sánchez, 2020]. In some countries shadow economy activity is traditionally accepted and even supported by societies. For example, in Balkan countries illegal activity is viewed both as a form of entrepreneurship and resistance to foreign regime rules.
5. Globalization [Ajide, Dada, 2024]. The forms of business operations are transferred from one country to another one. Not only legal operations are welcomed and accepted. In many cases the shadow economy "modus operandi" is believed as the best solution.

The shadow economy can be explained as the reply to weak institutional order [Dreher, Schneider, 2009]. Legally operating companies face so many difficulties and those in the shadow

economy feel quite comfortable, since they are not prosecuted and banned. Such a situation is extremely problematic for incumbent entities. They do have a limited access to financial markets and cooperation with other firms [Dimaggio, 1991]. Additionally to that, new companies feel harsh, unfair competition from shadow economy animators [Buszko, 2022]. Schneider [2000] noted that there were difficulties in estimating the effects of the shadow economy, due to the changes in its performance [Schneider, 2000]. The shadow economy can adopt itself to any business environment and find the possibilities for enlargement. For a quite long time it cannot be even noticed [Marković, Domagoj, 2014]. The huge size of the shadow economy leads not only to a substantial reduction in tax revenues, but also to poorer public goods facilities and as a result, it hammers economic growth as well [Gërxhani, 1999]. The shadow economy has a negative impact on new technologies and innovation. Ajide and Dada [2022] focused on West African countries. Those economies face ca. 50% of the shadow economy level and eager entrepreneurs are interested in illegal operations mostly, since they are more profitable and RONA can be achieved in a short time. It is believed that the shadow economy negatively impacts foreign direct investments. It has been confirmed by most researches [Cicea, Marinescu, 2021; Millia et al., 2022; Vasa, Angeloska, 2020]. On the other hand, some countries with a relatively high level of the shadow economy do not face the problem with foreign direct investments decrease. According to the study headed by Tiutiunyk [2022], the upsurge in the inflow and outflow of foreign direct investments makes the enlargement of the shadow economy, especially in the transition countries (the case of Central and Easter European economies), contrary to worldwide operating corporations protecting their image. They hesitate to invest in the countries with a high level of the shadow economy. In this way new companies, especially start-ups, lose the chance to cooperate with potential supporters and promoters of creative business ideas [Uponor Oyj Company Profile, 2025]. Ghaffar et al. [2022] found a negative relation between the shadow economy and violation of the interest rate, especially in developing countries. This makes a barrier for fledgeling companies, because the cost of capital is not only hard to predict but it is relatively very high. Rādulescu, Popescu, and Matei [2010] are sure that the shadow economy is the most effective option for small and medium-sized companies' investment, especially in developing and transition countries. Such companies do not need any special, costly requirements, and they focus just on their business activity.

Methodology

The aim of the study is to find out the dependence between the level of the shadow economy and vitality of start-ups in selected European countries. The number of start-ups was calculated per 1 million citizens. Such a ratio is believed to be more precise in presenting vigorous business activity in the analyzed economies. Both the shadow economy and the number of start-ups were calculated for 2022. Since there are many different definitions of

the shadow economy, in this research the shadow economy is understood as all, not permitted economic activity that influences budget revenues negatively. The non-random sampling technique was employed to choose the group of European countries. It is assumed that the structure of the sample is consistent with the structure of the general population. The chosen countries represent Central and West Europe, the Nordic and Mediterranean area. The following economies were taken into account: Poland, Estonia, Sweden, Finland, Denmark, Norway, Great Britain, Ireland, France, Germany, Czechia, Hungary, Slovakia, Bulgaria, Spain, Portugal, Greece, Italy. The number of start-ups calculation was based on the data retrieved from GEM – Global Entrepreneurship Monitor, Startup Poland, State of European Tech 22, OECD Statistics, European Startup Monitor, Eurostat, World Bank Open Data, Statista. The level of the shadow economy was set up employing the MIMIC (Multiple Indicators Multiple Causes) approach. The idea is based on Linearly Structural Equation Models (LSEM). Thanks to this approach, the shadow economy is understood as a latent variable and it is identified by the following equation:

$$\eta = y_1 x_1 + y_2 x_2 + \ldots + y_n x_n + \zeta$$

Where: η is a latent variable, it means the shadow economy; y denotes scalar structural coefficients, x embodies vectors of explanatory (causal) variables, and ζ represents the residual vector (i.e., the structural model error term). To assess the stationarity of the time series in the collected dataset, the Dickey-Fuller test with generalized least squares (DF-GLS) was applied. Based on this approach, it was determined that at a significance level of $p < 0.05$, the time series represent the analyzed variables in each country. Subsequent explanatory (casual) variables were taken into account: the unemployment rate, criminality level, level of investment, consumption, medium salary, price of goods and services, share of construction and agriculture in a country's GDP, number of small and medium-sized companies. The level of the shadow economy was calculated as % GDP. The following hypothesis was assumed:

There is a negative correlation between the number of start-ups in the selected European countries and the level of their shadow economy.

The Spearmen correlation index was used to verify this hypothesis. It was calculated based upon the following formula:

$$\sigma = \frac{6\sum d^2}{n(n^2 - 1)}$$

H0: $r(X, Y) = 0$; lack of correlation
H0: $r(X, Y) \neq 0$; there is a correlation between the analysed data.

Findings

Based upon the methodological approach, Table 1 presents the number of start-ups and the level of the shadow economy in the selected European countries. Both the level of the shadow economy and the number of start-ups varies significantly.

Table 1. Number of start-ups and level of the shadow economy in the selected European countries as of 2022

Country	No. of start-ups / 1 million citizens	Level of Shadow Economy/ %GDP
Poland	143	16.6
Estonia	1,034	16
Sweden	680	9
Finland	180	7.9
Denmark	72	8.4
Norway	44	8.5
Great Britain	541	12
Ireland	766	11.4
France	340	13
Germany	298	11.8
Czechia	321	13.7
Hungary	201	18.9
Slovakia	122	17
Bulgaria	117	22.1
Spain	150	17.2
Portugal	460	16.9
Greece	51	24.3
Italy	92	17.9

Source: own calculation.

Estonia is the leader among European countries in start-up creation. In 2022, 1,034 start-ups were identified. The second place is occupied by Ireland, with 766 entities and the third place was taken by Great Britain, with 541 start-ups. Newly established companies found a good place in Germany and France. A relatively small number per 1 million citizens was observed in the Mediterranean region. Poland is ranked in the middle of the analyzed countries with 143 start-ups. The highest level of the shadow economy was observed in Greece (24.3% of GDP). A high level was noticed in Bulgaria (22.1%) and the Mediterranean area, such as Spain and Portugal. Using the Spearman coefficient index, the correlation between the shadow economy levels and the number of start-ups in the selected European countries constituted -0.228 ($p < 0.05$). This indicates a negative correlation between the analyzed

categories. It means the higher level of the shadow economy, the lower number start-ups in the country. The assumed hypothesis was confirmed. Entrepreneurs find the shadow economy as the barrier to innovation and creativity.

Discussion

Even though Estonia is the undisputed leader in Europe in start-up creation, this country faces difficulties with a relatively high level of the shadow economy. This problem seems to be well grounded in former Soviet Republics and developing countries. the shadow economy occupies a sound place in Mediterranean economies as well. The low level of the shadow economy is observed in Nordic and well-developed European countries. As it is known, this economic category may play a positive role as a stimulator for GDP expansion in such economies, contrary in less-developed ones. In such economies the shadow economy is recognized as a barrier to progress. Start-up founders may consider three main strategies of activity:

1. Transform the incumbent company into a unicorn.
2. Develop and sell it.
3. Convert a start-up into a traditionally operating firm [Knudsen,von Zedtwitz, Griffin, Barczak, 2023; Yanadori, Marler, 2006].

There are at least several definitions of unicorns. Some academics coin this entity as the company (private, publicly listed, supported by venture capital or business angels) with market valuation exceeding 1 billion USD. In this article a unicorn is understood as a firm originated from a private start-up and after some time with its market valuation at one billion USD or more. Estonia could arrange a good creative business environment for unicorns. The most recognized unicorns originated in this country are: Bolt, 2 Playtech – the world's largest online gaming software supplier, or Skype. Estonian entrepreneurs are very flexible and due to the global political changes, now they are very active in the military sector. By the end of 2024 the country had housed 165 deep tech start-ups, which are defined as "companies built on advanced scientific research and breakthrough technologies" (Start-up Estonia, 2024). By that time Germany had created 31 unicorns and this country is recognized as a good place for such business performance. What should be highlighted is their well-developed financial market, business friendly environment, support, education system. The most recognized unicorns in Germany are: Celonis (software company), N26 (banking applications solutions), Personio (cloud-based HR management and recruiting platform), Trade (business and investment platform), or Flink (an online start-up that offers grocery deliveries in ten minutes). Albeit Norway does not present a significant number of start-ups per 1 million citizens, over there a relatively high number of unicorns is noticed. In 2022 in Norway 2.1 unicorns per 1 million citizens were identified. Sweden set up 680 start-ups and 2.4 unicorns per 1 million citizens. It means that in Scandinavia entrepreneurs craft carefully new companies. They were quite quickly accepted by the market and noticed a quick rate of growth. A good example of Norwegian

unicorns is Duna Analitics. The unicorn is focused on big data analyses and analytics solutions for crypto- currencies. It allows investors to explore and share data from Ethereum Mainnet, Matic, Optimism, and xDai. Crypto-currencies have become very popular, especially among young investors all over the world. In other countries the number of unicorns is not so high. Poland (taking a worldwide attitude) is number 61 in terms of the total number of unicorns created, since there is one unicorn DocPlanner [Statista, 2025].

Table 2. Number of unicorns and the time transformation from a start-up into a unicorn in selected European countries as of 2022

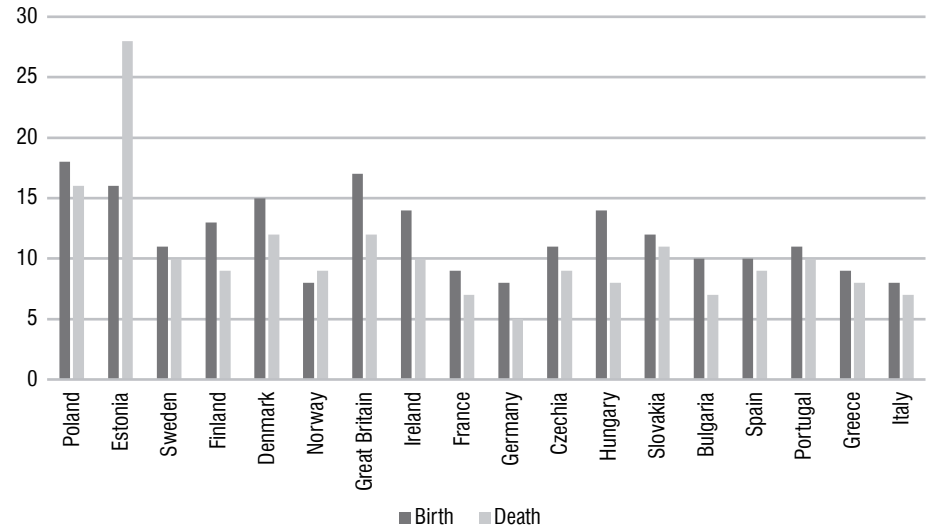
Country	No. of unicorns	Medium time needed to transform a start up into a unicorn (in years)
Poland	1	9
Estonia	4	6
Sweden	7	4
Finland	5	5
Denmark	10	4
Norway	5	5
Great Britain	10	5
Ireland	9	5
France	25	5
Germany	31	4
Czechia	2	7
Hungary	1	9
Slovakia	1	9
Bulgaria	1	10
Spain	7	7
Portugal	3	8
Greece	1	8
Italy	4	7

Source: Statista (accessed: 15.08.2025).

In Europe, Germany proved to be the undisputed leader of the unicorns number. 31 unicorns had been created there by 2022. The second position is occupied by France, with 25 unicorns. Scandinavian countries as well as Great Britain with Ireland provide good opportunities for unicorn development. In those countries relatively less time is needed to transform a start-up into unicorn. It takes approximately 5 years, contrary to Central and East European countries. They produced roughly 1 unicorn and it took nearly 9 years. It should be remembered that in Scandinavia and Germany there is a moderately low level of the shadow economy, contrary to other economies. Such a situation is in a way connected with a general business environment. The World Bank presents the report titled *Business Ready* (it replaced *Doing Business*), which evaluates not only the monitoring burden that firms face in the course of entering the

market, innovating, and expanding their operations, but also the overall business environment [*Business Ready*, 2024]. Taking into consideration Business Entry, Business Location, Utility, Services Labour, Financial Services, International Trade Taxation, Dispute Resolution, Market Competition, Business Insolvency: Estonia, Scandinavian countries as well as Germany, France, and Great Britain are the leaders in such rankings. It means that in these countries the private sector can play a vibrant role in economic development. Start-ups, especially based on innovation solutions, feel better and recognize those areas as a friendly zone for development [Arteaga, Hyland, 2013]. Appropriate economic order may be assessed by enterprise birth and death rates as well. This is due to the easy process not only of setting up a company but closing it down. Starting a company cannot be a trap, managers should be supposed to face no special difficulties in running their business.

Figure 1. Enterprise birth and death rates in the selected European companies in 2022 (%)



Source: Eurostat (online data code bd_size), World Bank Data (accessed: 20.08.2025).

Comparing to other European countries, Estonia in 2022 faced the highest rate of companies' death – 28% of firms were closed down, but 17% new ones were established. It means that Estonian entrepreneurs make the decision of shutting down their business quite quickly, but simultaneously they are eager to start a new activity. It may be assumed that their ideas are verified by the market mainly. Germany noticed a comparatively small rate of companies' death – ca. 5% of all companies stopped their business activity, but nearly 10% new appeared. German managers are supposed to spend more time on idea creation than going to the market immediately. Each phase of new company creation, including a start-up, should be planned carefully. Such a way of movement can be recognized in Scandinavia as well as France. Great Britain and Ireland seem to be vulnerable in their business design. A relatively high levels of companies' birth and death were observed in these counties in 2022.

Summary

The shadow economy shapes the business environment and influences start-ups performance. The higher level of the shadow economy, the lower number of start-ups is identified. Whenever decision-makers want to support business development and innovation, they should focus on the shadow economy and minimize its size. It is difficult to exclude illegal activity, but following Scandinavian countries, its downsizing is realistic. Although the shadow economy offer some opportunities for start-ups, like low costs of entry and operations, in general terms it is a barrier to development. Entrepreneurs prefer a fair and legal business environment. Founding a start-up cannot be a trap, managers should feel free in setting up and closing down their company. In a friendly environment a start-up can be transformed more easily to a unicorn. Such a transformation is a good example of business activity and hopefully more followers can be noticed. Success should be highlighted.

References

1. Agarwal, R., Sarkar, M.B., Echambadi, R. (2002). The conditioning effect of time on firm survival: An industry life cycle approach. *Academy of Management Journal*, 45(5), pp. 971–994.
2. Ajide, F.M., Dada, J.T. (2022). The impact of ICT on shadow economy in West Africa. *International Social Science Journal*, 72, pp. 749–767, https://doi.org/10.1111/issj.12337
3. Ajide, F.M., Dada.J.T. (2024). Globalization and shadow economy: a panel analysis for Africa. *Review of Economics and Political Science*, 49(2), pp. 166–189, https://doi.org/10.1108/REPS-10-2022-0075
4. Alarcon, G., Buendía, J., Sánchez, M. (2020). Shadow economy and national culture: A spatial approach. *Revista Hacienda Pública Española*, 232, pp. 53–74. DOI:10.7866/HPE-RPE.20.1.3
5. Ameer, W., Sohag, K., Zhan, Q. (2025). Do financial development and institutional quality impede or stimulate the shadow economy? A comparative analysis of developed and developing countries. *Humanities and Social Sciences Communication*, 12, https://doi.org/10.1057/s41599-024-04347-w
6. Arcuri, M.C., Russo, I., Gandolfi, G. (2025).Productivity of innovation: the effect of innovativeness on start-up survival. *The Journal of Technology Transfer*, 50, pp. 1111–1169, https://doi.org/10.1007/s10961-024-10069-7
7. Arteaga, R., Hyland, J. (2013). *Pivot: How Top Entrepreneurs Adapt and Change Course to Find Ultimate Success*. Wiley. DOI:10.1002/9781118778852
8. Asea, P.K. (1996). The informal sector: Baby or bath water? *Carnegie-Rochester Conference Series on Public Policy*, 45, pp. 163–171.
9. Baytelman, Y., Voropayeva, V. (2025). A Start-Up for Business Development of Start-Ups. In: M.E. Auer, T. Rüütmann (Eds.), *Futureproofing Engineering Education for Global Responsibility* (pp. 195–202). ICL 2024. Lecture Notes in Networks and Systems, Vol. 1280. Cham: Springer, https://doi.org/10.1007/978-3-031-83523-0_18

10. Berdiev, A., Saunoris, J., Schneider, F. (2018, Oct). Give Me Liberty, or I Will Produce Underground: Effects of Economic Freedom on the Shadow Economy. *Scottish Economic Journal*, 85(2), pp. 537–562, https://doi.org/10.1002/soej.12303
11. *Business Ready* (2024). World Bank Group. Washington.
12. Bustamante, C., Matusik, S., Benavente, J. (2021, Nov). Location capabilities, institutional distance, and start-up survival. *Global Strategy Journal*, 11(4), Special Issue: Institutions and Entrepreneurship,, pp. 548–577.
13. Buszko, A. (2022). Factors Fostering Shadow Economy Performance in Poland and Lithuania during 2000–2019. *Inzinerine Ekonomika-Engineering Economics*, 33(1), pp. 4–12.
14. Cicea, C., Marinescu, C. (2021). Bibliometric analysis of foreign direct investment and economic growth relationship. A research agenda. *Journal of Business Economics and Management*, 22(2), pp. 445–466, https://doi.org/10.3846/jbem.2020.14018
15. Dimaggio, P. (1991). *New Institutionalism in Organizational Analysis*. Chicago: The University of Chicago Press.
16. Dixit, K., Varshney, N., Manna, R. (2025). Start-Up Ecosystem Through the Lens of Action Research. In: A. Chakrabarti, S. Suwas, M. Arora (Eds), *Industry 4.0 and Advanced Manufacturing* (pp. 345–356). Vol. 2. I-4AM 2024. Lecture Notes in Mechanical Engineering. Singapore: Springer, https://doi.org/10.1007/978-981-97-6176-0_29
17. Eilat, Y., Zinnes, C. (2000). *The evolution of the shadow economy in transition countries: consequences for economic growth and donor assistance*. Harvard Institute for International Development, CAER II Discussion Paper No. 83.
18. European Startup Monitor 2019/2020, https://ketmarket.eu/knowledgebase/the-european-startup-monitor-2020-2021/
19. Eurostat (2025). European business statistics methodological manual for business demography statistics. 2025 edition. Luxembourg: Publications Office of the European Union, https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/w/ks-01-25-016
20. Estrin, S., Mickiewicz, T. (2012, Nov). Shadow Economy and Entrepreneurial Entry. *Review of Development Economics*, 16(4), Special Issue: Informality, Illegality and Enforcement. Guest Editors: Ravi Kanbur, Sajal Lahiri, and Jan Svejnar, pp. 559–578.
21. Deloof, M., Vanacker, T. (2018, July/Aug). The recent financial crisis, start-up financing and survival. *Journal of Business Finance and Accounting*, 45(7-8), pp. 928–951.
22. Dreher, A., Schneider, F. (2009). Corruption and the shadow economy: An empirical analysis. *Public Choice*, 144, pp. 215–277.
23. Ganaway, A. (2025). *Mastering the Construction Startup: A Business Infrastructure Guide*. John Wiley & Sons Ltd. DOI:10.1002/9781394292356
24. GEM (Global Entrepreneurship Monitor) (2025). *Global Entrepreneurship Monitor 2024/2025 Global Report: Entrepreneurship Reality Check*. London: GEM.
25. Gërxhani, K. (1999). *Informal sector in developed and less developed countries: a literature survey*. Tinbergen Institute Discussion Paper No. 99–083/2.
26. Ghaffar, S, Chughtai, S, Seerat, A. (2022). NARDL Model of Shadow Economy, Interest Rate Volatility, Economic Growth and Financial Inclusion: Comparative Study of Western Europe and Developing Asia. *RADS Journal of Business Management*, 4(1), pp. 55–75.

27. Goel, R., Saunoris, J. (2022, Oct). Push from the shadows: Does the shadow economy facilitate market exit of firms? *Managerial and Decisions Economics*, 7, pp. 2955–2966.

28. Greco, F. (2023). International Benchmark for Italian Start-Up Ecosystems. *Startup Ecosystems. Studies on Entrepreneurship, Structural Change and Industrial Dynamics*. Cham: Springer, https://doi.org/10.1007/978-3-031-34414-5_6

29. Hassan, M., Schneider, F.G. (2016). *Size and Development of them Shadow Economies of 157 Countries Worldwide. Updated and New Measures from 1999 to 2013*. IZA Discussion Paper No. 10281.

30. Hendricks, L. (2002). How important is human capital for development? Evidence from immigrant earnings. *American Economic Review*, 92(1), pp. 198–219.

31. Knudsen, M.P., von Zedtwitz, M., Griffin, A., Barczak, G. (2023). Best practices in new product development and innovation: Results from PDMA's 2021 global survey. *Journal of Product Innovation Management*, 40(3), pp. 257–275, https://doi.org/10.1111/jpim.12663

32. Marković, B, Domagoj, P. (2014). The Effects of Fiscalization in Suppressing the Underground Economy in the Catering Industry. *Interdisciplinary Management Research*, 10, pp. 575–84.

33. Máté, D., Estiyanti, N.M., Novotny, A. (2024). How to support innovative small firms? Bibliometric analysis and visualization of start-up incubation. *Journal of Innovation and Entrepreneurship*, 13, https://doi.org/10.1186/s13731-024-00361-z

34. Medina, L., Schneider, F. (2018). *Shadow Economies Around the World: What Did We Learn Over the Last 20 Years*? International Monetary Fund. Working Paper No. 2018/017

35. Miglo, A. (2025). *Capital Structure of Start-Up Firms and Small Firms. Capital Structure in the Modern World*. Cham: Palgrave Macmillan, https://doi.org/10.1007/978-3-031-85459-0_9

36. Millia, H., Adam, P, Muhatlib, A.A., Tajuddin, Pasrun, Y.P. (2022). The effect of inward foreign direct investment and information and communication technology on economic growth in Indonesia. *AGRIS on-line Papers in Economics and Informatics*, 14(1), pp. 69–79, https://doi.org/10.7160/aol.2022.140106

37. Lusoli, A. (2025). *Unthinking Start-Up. Make, Fail, Repeat: Creative Labor in the Start-Up Age. Creative Working Lives*. Cham: Palgrave Macmillan, https://doi.org/10.1007/978-3-031-95574-7_2

38. Pham, T. (2017). Impacts of globalization on the informal sector: Empirical evidence from developing countries. *Economic Modelling*, 62, pp. 207–218.

39. OECD Statistics, https://www.oecd.org/en/data.html (accessed: 07.08.2025).

40. Osawa, Y., Miyazaki, K., [2006]. An Empirical Analysis of the Valley of Death: Large-scale R&D Project Performance in a Japanese Diversified Company. *Asian Journal of Technology Innovation*, 14, pp. 93–116, https://doi.org/10. 1080/19761597.2006.9668620

41. Rădulescu, I., Popescu, C., Matei, M. (2010). Conceptual Aspects of Shadow Economy. *Transactions on Business and Economics–WSEAS*, 7, pp. 160–169.

42. Schneider, F. (2000). *The increase of the size of the shadow economy of 18 OECD–Countries: Some preliminary explanations*. Paper presented at the Annual Public Choice Meeting, March 10–12, Charleston, S.C.

43. Statista, https://www.statista.com/ (accessed: 15.08.2025).

44. Startups.ch, https://blog.startups.ch/en/report-on-company-foundations-october-2021-startup-figures-remain-at-a-stable-level/ (accessed: 05.08.2025).

45. Start-up Estonia (2024). *EESTI DEEPTECH IDUETTEVÕTLUSE ÖKOSÜSTEE*. Raport 2024.
46. Startup Poland (2019). *Polskie Startupy. Raport 2019*. Warszawa, https://startuppoland.org/wp-content/uploads/2021/11/Startup-Poland-raport-Polskie-startupy-2019-PL-www-1.pdf
47. Startup Genome (2019). *Global Startup Ecosystem Report 2019*, https://startupgenome.com/reports/global-startup-ecosystem-report-2019
48. State of European Tech 22. Report (2022), https://2022.stateofeuropeantech.com/3.companies/3.1-thematic-trends/ (accessed: 07.08.2025).
49. Székely, Z. (2024). Three Critical Elements of Start-Up Success. In: S.S. P. Francese, R. King (Eds), *Driving Forensic Innovation in the 21st Century* (pp. 113–145). Cham: Springer,. https://doi.org/10.1007/978-3-031-56556-4_6
50. Tiutiunyk, I., Cieśliński, W., Zolkover, A., Vasa, L. (2022). Foreign direct investment and shadow economy: One-way effect or multiple-way causality? *Journal of International Studies*, 15(4), pp. 196–212, doi:10.14254/2071-8330.2022/154/12
51. Tomaszewski, A. (2019, Nov). Startupy jako wybór strategiczny przedsiębiorstw. *Studia i Prace Kolegium Zarządzania i Finansów*. DOI: 10.33119/SIP.2019.175.15
52. Vasa, L. (2002). Behaviour patterns of farm managing households after the agricultural restructuring – socio-economic analysis. *Journal of Central European Agriculture*, 3, pp, 312–320.
53. Uponor Oyj Company Profile 2025 (2025). *A Comprehensive SWOT, Financial & Strategic Analysis Report*, https://marketpublishers.com/r/U3415F8434B3EN.htm
54. Wardini, J. (2023). *13 Eye-Opening Startup Failure Rate Statistics in 2024*, https://artsmart.ai/blog/startup-failure-rate-statistics/
55. World Bank Open Data, https://data.worldbank.org/ (accessed: 07.08.2025).
56. Yanadori, Y., Marler, J. (2006). Compensation strategy: does business strategy influence compensation in high-technology firms? *Strategic Management Journal*, 27(6), pp. 559–570, doi.org/10.1002/smj.521