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The impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth

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THE IMPACT OF ENTREPRENEURSHIP FINANCIAL OPPORTUNITIES AND BUSINESS ENVIRONMENT ON THE COUNTRY'S INNOVATION DEVELOPMENT AND NATIONAL WEALTH

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Abstract: *The Covid-19 pandemic caused negative consequences for the economic growth and national wealth of countries worldwide. In 2020 the GDP per capita growth was -4,3% worldwide and -5% in Azerbaijan. However, in 2021, it was 4,8% and 5,1% in accordance, indicating Azerbaijan's economic potential. At the same time, Azerbaijan takes only 80th place from 132 countries in the Global Innovation Index Rank, which is not sufficient and requires further innovation development of the country. Also, Azerbaijan is the 34th of 190 countries in the Ease of Doing Business rank. Still, according to the Enterprise Surveys made by the World Bank, 23,7% of firms in Azerbaijan choose access to finance as their biggest obstacle. At the same time, the average world indicator is 14,2%, and the average one in Europe and Central Asia is 9,4%. Therefore, this research aims to prove the hypothesis about the positive impact of entrepreneurship financial opportunities and the business environment on the country's innovation development and national wealth. In the first stage, a bibliometric and analytical analysis was carried out using the tools of the Scopus database, the VOSviewer, and Google Trends. In the second stage, a sample of 20 countries was formed. It includes the top 10 leaders in the Global Innovation Index Rank with high-income economies (as benchmark countries for innovation development, according to which Azerbaijan should increase its position) and the top 10 leaders with upper-middle-income economies (similar to Azerbaijan). The informational base consists of data from the World Bank, the World Intellectual Property Organization, and the World Economic Forum for the last 10 available years. In the third stage, the correlation analysis was made to identify the relationship between the indicators of entrepreneurship financial opportunities and business environment (financing of SMEs, venture capital availability, domestic credit to the private sector, ease of doing business, ease of starting a business, ease of getting credit, ease of resolving insolvency, protecting minority investors, number of new limited liability companies, new business density) and the indicators of the country's innovation development (Global Innovation Index) and national wealth (total wealth per capita). And at the fourth stage, the impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth was determined based on regression modeling results. The obtained results could be useful for scientists in further research on this issue and for government officials in improving the state's economic policy.*

Keywords: business, credit, entrepreneurship, financing, innovation, investors, venture capital, wealth

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Introduction. The COVID-19 pandemic caused negative consequences for the economic growth and national wealth of countries around the world. The indicator of national wealth, including natural, human, and produced capital, and net foreign assets based on market exchange rates and a country-specific GDP deflator (World Bank, 2021), in particular, wealth per capita, is 36315,40 US\$ in Azerbaijan when its average level in upper-middle-income economies (which includes Azerbaijan) is 84193,67 US\$ (World Bank, n.d.j). In 2020 the GDP per capita growth was -4,3% in the world and -5% in Azerbaijan, however, in 2021 it was 4,8% and 5,1% in accordance (World Bank, n.d.g), which indicates an economic potential of Azerbaijan.

At the same time, Azerbaijan takes only 80th place from 132 countries in the Global Innovation Index Rank (WIPO, 2021), which is insufficient and requires further innovation development of the country. Also, Azerbaijan is the 34th of 190 countries in the Ease of doing business rank (World Bank, 2020; World Bank, n.d.d). However, according to the Enterprise Surveys made by the World Bank, 23,7% of firms in Azerbaijan chose access to finance as their biggest obstacle, while the average world indicator is 14,2%, and the average one in Europe and Central Asia is 9,4% (World Bank, n.d.e).

Besides it, in Azerbaijan, the MSME Finance gap (Micro, Small and Medium Enterprises Finance gap) is 6805414229,47 US dollars (MSME Finance gap / GDP is 13%). However, MSMEs are the drivers of economic and innovation development and growth, and access to finance is determined as a significant barrier (IFC, 2017; SME Finance Forum, n.d.).

Thus, relatively low indicators of innovation development and national wealth, the emphasis on access to finance as the biggest obstacle for Azerbaijan business and a significant MSME financial gap, and the existing potential for improvement of these indicators in Azerbaijan due to entrepreneurship financial opportunities and business environment determine the choice and confirm the relevance and timeliness of research topic.

This research aims to prove the hypothesis about the positive impact of entrepreneurship financial opportunities and the business environment on the country's innovation development and national wealth.

The structure of the article involves four stages of research. In the first stage, a bibliometric and analytical analysis was carried out using the tools of the Scopus database, the VOSviewer, and Google Trends. In the second stage, a sample of 20 countries was formed, including the top 10 leaders in the Global Innovation Index Rank with high-income economies (as benchmark countries for the level of innovation development, according to which Azerbaijan should increase its position) and top 10 leaders with upper-middle-income economies (as Azerbaijan) using the data of the World Bank, the WIPO and the WEF for the last 10 available years. In the third stage, the correlation analysis was made to identify the relationship between the indicators of entrepreneurship financial opportunities and business environment (financing of SMEs, venture capital availability, domestic credit to the private sector, ease of doing business, ease of starting a business, ease of getting credit, ease of resolving insolvency, protecting minority investors, number of new limited liability companies, new business density) and the indicators of the country's innovation development (Global Innovation Index) and national wealth (total wealth per capita). And at the fourth stage, the impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth was determined based on regression modeling results.

Literature Review. In the first stage of bibliometric analysis, the Scopus database tools were used. Search results in the Scopus database publications, in particular in titles, abstracts, and keywords, according to the request 'entrepreneurship and innovation development' include 5970 documents for 1969-2021. The dynamic analysis shows a positive trend of publication activity on this issue (Figure 1).

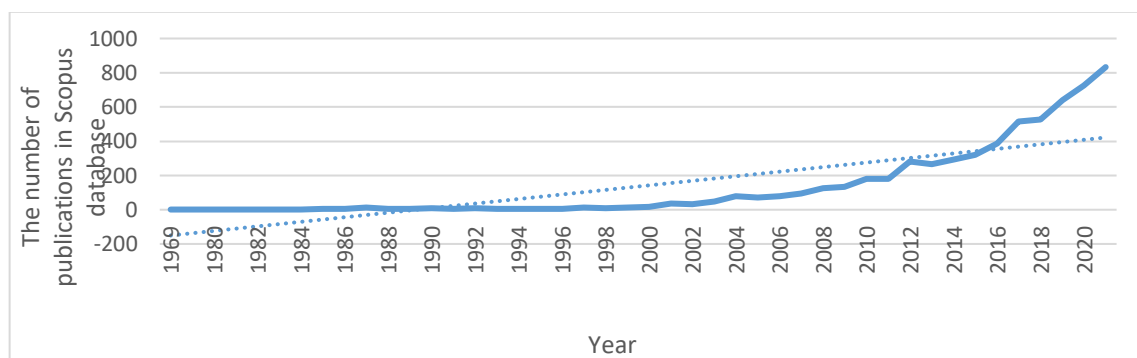


Figure 1. Dynamic analysis of publication activity on entrepreneurship and innovation development
Sources: developed by the authors.

Moreover, 4783 of the above publications (80,12%) were indexed in the last 10 years. It grounds the relevance and novelty of this problem in modern science.

The next search request is 'business environment and innovation development', bringing 4789 document results for 1966-2021. The dynamic analysis also shows a positive trend of publication activity on this issue (Figure 2).

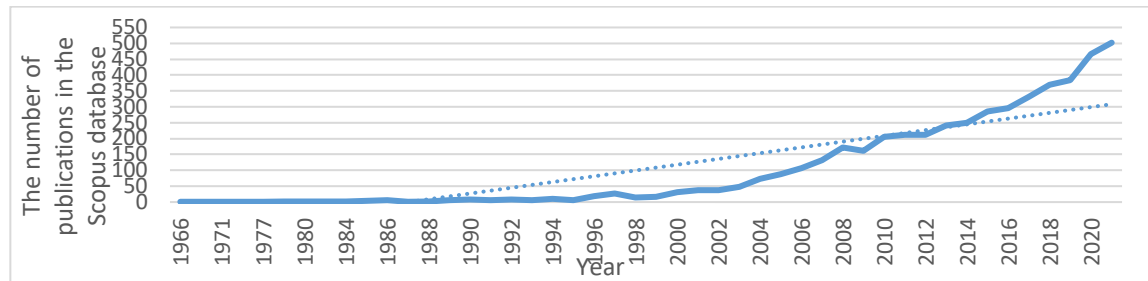


Figure 2. Dynamic analysis of publication activity on the issue of the business environment and innovation development

Sources: developed by the authors.

3336 from 4789 articles (69,66%) were published in the last 10 years. That means the actuality of investigated topic as in the previous case.

The search request of 'entrepreneurship and wealth' shows 939 document results for 1966-2021. This research question connected with 'wealth' is less widespread than the theme of 'innovation development'. Figure 3 presents the dynamics of scholars' interest.

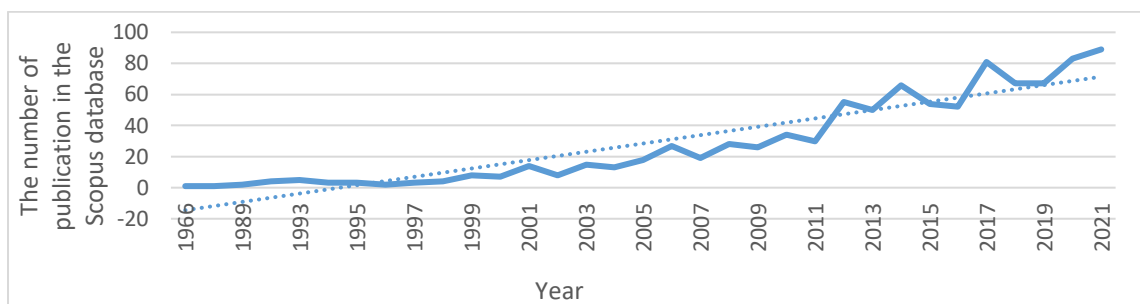


Figure 3. Dynamics of scholars' interest in the issue of entrepreneurship and wealth

Sources: developed by the authors.

The trend of publication activity is positive. 664 of 939 articles (70,71%) were published in the last 10 years. It explains by the increasing scholars' interest in entrepreneurship and wealth. Similar tendencies of publication activity take place in the case of such requests as 'business and national wealth' (616 document results for 1925-2021) and 'business environment and wealth' (721 document results for 1956-2021).

In turn, the dynamics of publication activity on the issue of entrepreneurship and financial opportunities (search requests: 'entrepreneurship and finance' – 1777 document results for 1975-2021, 'entrepreneurship and financial opportunities' – 814 document results for 1985-2021) (Figure 4).

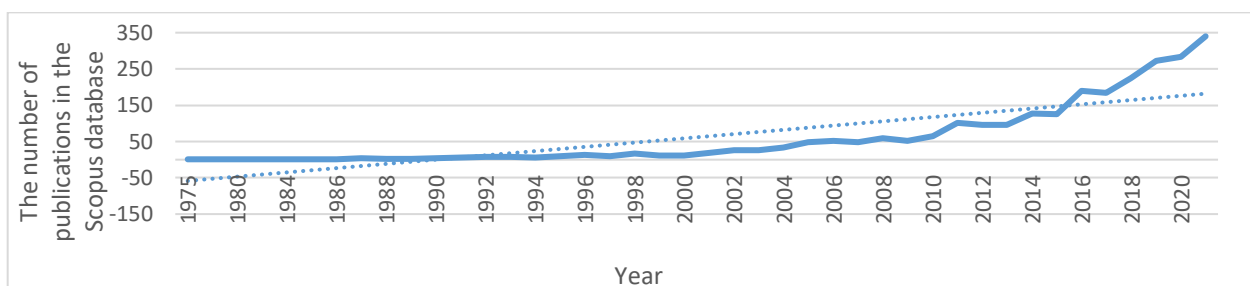


Figure 4. Dynamics of scholars' interest in entrepreneurship and financial opportunities

Sources: developed by the authors.

1938 from 2591 publications found generally by two above search requests (74,8%) were published in the last 10 years. It reflects the increasing scholars' interest in this issue too.

And only 252 document results there are in the case of 'entrepreneurship and finance and innovation development' request (1987-2021), and 58 results – in the case of 'entrepreneurship and finance and wealth' request (1994-2021) (Figure 5).

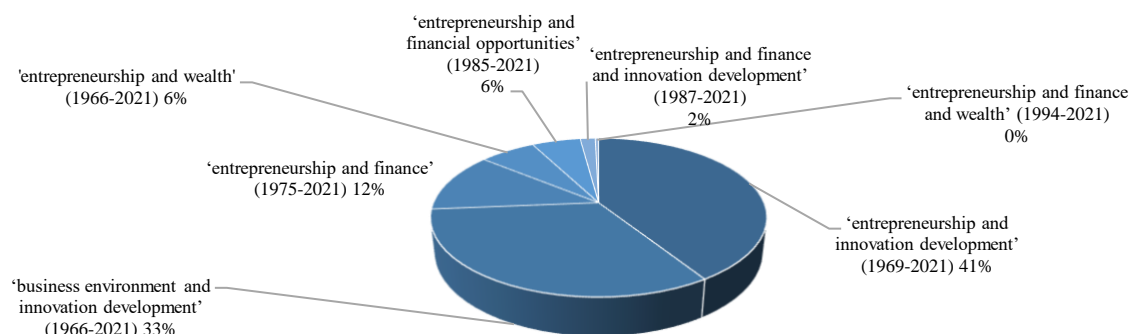


Figure 5. Share of document results from search in the Scopus database by certain requests
Sources: developed by the authors.

It grounds that the issue of the impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth is not investigated enough. And chosen article topic and research purpose are relevant.

At the second stage of bibliometric analysis, the multidisciplinary research map on the impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth was built due to the VOSviewer instrument based on the above Scopus data (Figure 6).

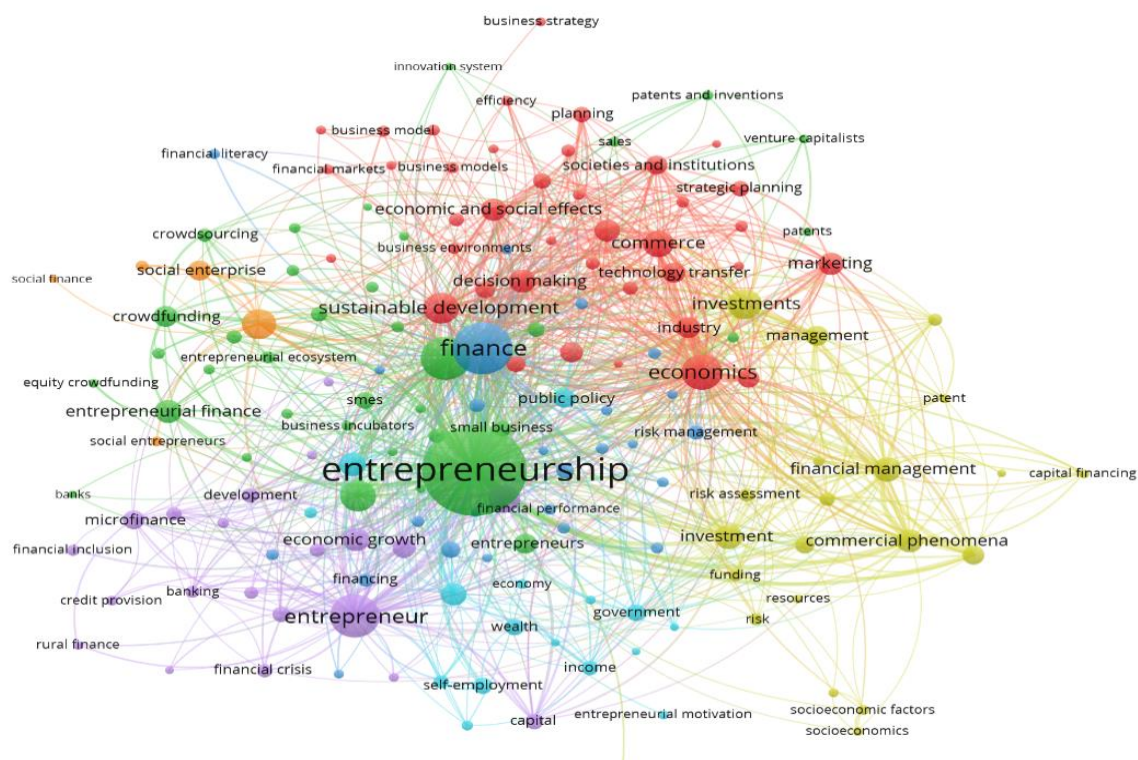


Figure 6. Map of multidisciplinary research on the issue of the impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth
Sources: developed by the authors.

During bibliometric analysis by VosViewer soft, the minimum number of occurrences of using a certain keyword was 10. And only 413 from 13468 keywords (according to the requests «entrepreneurship and

finance and innovation development», «entrepreneurship and finance and wealth», «entrepreneurship and finance», «entrepreneurship and financial opportunities», «entrepreneurship and wealth», «business environment and wealth») met this threshold.

The following 7 clusters of multidisciplinary research on the issue of the impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth were found:

- «green» cluster – entrepreneurship, entrepreneurial finance, entrepreneurial ecosystem, entrepreneurship policy, small business, SMEs, access to finance, financial resources, venture capital, start-ups, business incubators, banks, crowdfunding, crowdsourcing, fintech, innovation, economic development, technology entrepreneurship, sustainable entrepreneurship;
- «red» cluster – economics, economic and social effects, decision making, business environment, business opportunities, business modeling, commerce, financial markets, technology transfer, new ventures, strategic planning, wealth creation, economic growth, sustainable development;
- «blue» cluster – wealth, income, profit, public policy, government, public sector, business, private sector, regulation, tax, environmental economics;
- «purple» cluster – financial services, financial inclusion, banking, credit provision, capital, financial crisis, financial support, financial system, microfinance, rural finance, economic growth, business development, national economy;
- «dark blue» cluster – finance, corporate finance, financial literacy, financial capital, financial performance, firm performance, risk management, project management, competitiveness, corporate governance;
- «yellow» cluster – financial management, investments, capital financing, commercial phenomena, funding, forecasting, risk assessment, organization, intellectual property, leadership;
- «orange» cluster – social entrepreneurship, social entrepreneurs, social enterprise, social finance, social innovation.

Thus, the issues of entrepreneurship financial opportunities and business environment are closely connected with research in the entrepreneurial ecosystem, financial system, resources and instruments, innovation and technology transfer, wealth creation, economic growth, and sustainable development. Some aspects of entrepreneurship, economic development, and the impact of innovation were overviewed by Szirmai et al. (2011). The effects of entrepreneurship, in particular in developing countries were studied by Fagerberg and Srholec (2008) and Sedeh et al. (2021). Kaya (2021) explained trends in entrepreneurial activity and its current problems in the context of economic crises and paid attention to changes in costs, credit coverage, taxes, legal aspects, etc. Acs (2006), Kritikos (2014) and Bosma et al. (2018) investigated the impact of entrepreneurs on economic growth. Janssen and Bacq (2017) studied the connection between entrepreneurship and wealth creation, etc. Khovrak (2013) paid attention to the problem of financing innovation development on the level of the national economy. Szkuta et al. (2017) focused on the need to improve access to financing for innovative enterprises, however, justifying the impact on the enterprises' results and not on the state economy as a whole.

Financial resources for funding entrepreneurship and innovation on the basis of cross-country analysis were also summarised and analyzed by Cornelius (2020). Davydenko et al. (2019) described the innovation activity of enterprises according to the sources of their financing to substantiate the impact on innovation efficiency, taking into account the aspect of financial security under the conditions of a shortage of own financial resources and the need to attract investments. Bircan et al. (2014) characterized finance only for innovation and suggested that banks dominated due to few private or public resources available. Cetorelli and Gambera (2001) also studied banks as a financial resource, the issue of financial dependence, and the connection with growth. Samoilikova (2020) studied the interconnections between general financial policy indicators and the level of innovation development on the basis of correlation and regression analysis. Rzaev and Samoilikova (2020) proved the impact of financing R&D expenditures by different economic sectors (on GDP growth per capita using economic-mathematical modeling. They investigated financing innovations by business, but without emphasis on the entrepreneurship sector and its financing. Azizov (2021) investigated the aspects of entrepreneurship management and innovation development in certain spheres – in tourism of Azerbaijan. Adeyinka et al. (2019) put the problem of founding a sustainable resource for financing MSMEs and studied the influence of bank financing on the growth and MSMEs development in Nigeria. Kasemi and Gadi (2022) studied the role of small and medium-sized enterprises in ensuring the continuity and sustainability of economic development, summarizing the theoretical foundations and conducting a survey of

such enterprises in Algeria. However, during assessment and impact grounding, the previous research did not focus on special indicators of entrepreneurship financial opportunities, considering mostly indicators of state financial policy or business development in general. The impact of especially entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth is not investigated enough. There is the necessity of grounding, formalization, and assessment.

Methodology and research methods. A bibliometric analysis was carried out using the tools of the Scopus database, VOSviewer, and Excel software. Analytical analysis was made with the help of Google Trends instrument and Excel software. A sample of 20 countries was formed to prove the hypothesis about the positive impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth. It includes the top 10 leaders in the Global Innovation Index Rank with high-income economies (Switzerland, Sweden, United States, United Kingdom, Republic of Korea, Netherlands, Finland, Singapore, Denmark, and Germany) and the top 10 leaders with upper-middle-income economies and Azerbaijan (China, Bulgaria, Malaysia, Turkey, Thailand, Mexico, Costa Rica, North Macedonia, Georgia, and Azerbaijan) (WIPO, 2021).

The informational base consists of data from the World Bank, the WIPO, and the WEF for the last 10 available years (2009-2018). Using STATA software, the correlation analysis was made to identify the relationship between the indicators of the country's innovation development (Global Innovation Index) and national wealth (total wealth per capita) and the following indicators of entrepreneurship financial opportunities and business environment:

- financing of SMEs – the indicator of the Global Competitiveness Index (a country's score is based on the survey's questions and answers and the Index calculation methodology), formed by the World Economic Forum (WEF) (WEF, 2018-2019);
- venture capital availability – the indicator of the Global Competitiveness Index (a country's score is based on the survey's questions and answers and the Index calculation methodology), formed by the World Economic Forum (WEF) (WEF, 2009-2018);
- the cost of business start-up procedures – a percent of GNI per capita, the official statistics of the World Bank (World Bank, n.d.a);
- domestic credit to the private sector – a percent of GDP, the official statistics of the World Bank (World Bank, n.d.c);
- ease of doing business – a score of Indicator of Doing Business Rank by the World Bank. It is the simple average of the scores for each of the Doing Business topics: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts, and resolving insolvency (World Bank, n.d.b);
- ease of starting a business – a score of Indicator of Doing Business Rank by the World Bank. It is the simple average of the scores for each of the component indicators: the procedures, time, and cost for an entrepreneur to start and formally operate a business, as well as the paid-in minimum capital requirement (World Bank, n.d.b);
- ease of getting credit – a score of Indicator of Doing Business Rank by the World Bank. It benchmarks economies concerning the regulatory best practice on the indicator set (World Bank, n.d.b);
- ease of resolving insolvency – a score of Indicator of Doing Business Rank by the World Bank. It is the simple average of the scores for each of the component indicators: the recovery rate of insolvency proceedings involving domestic entities, as well as the strength of the legal framework applicable to judicial liquidation and reorganization proceedings (World Bank, n.d.b);
- protecting minority investors – a score of Indicator of Doing Business Rank by the World Bank. It benchmarks economies concerning the regulatory best practice on the indicator set (World Bank, n.d.b);
- number of new limited liability companies – the Indicator in the Entrepreneurship database by the World Bank. It means the number of newly registered companies with limited liability (or its equivalent), per calendar year (World Bank, n.d.f);
- new business density – the Indicator in the Entrepreneurship database by the World Bank. It is calculated as the number of newly registered corporations per 1,000 working-age people (15–64 ages) in private, formal sector companies with limited liability (World Bank, n.d.f).

Before correlation analysis, the Shapiro-Wilk test for the normal distribution of data was performed, depending on the result of which the appropriate method of calculating the correlation coefficient was chosen (Pearson or Spearman). The impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth was determined based on regression modeling

results in STATA software. Linear regression models for panel data were built with fixed effects and random effects. Then, the Hausman specification test was performed to choose one or other model specifications for each investigated interconnection.

Results. In the first stage of proving the hypothesis about the positive impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth, the analytical analysis was conducted using tools of Google Trends.

Figure 7 shows the results of the search requests «entrepreneurship financial resources» and «innovation development» for 2004-2021 (time limits of the beginning due to Google Trends) and their comparison.

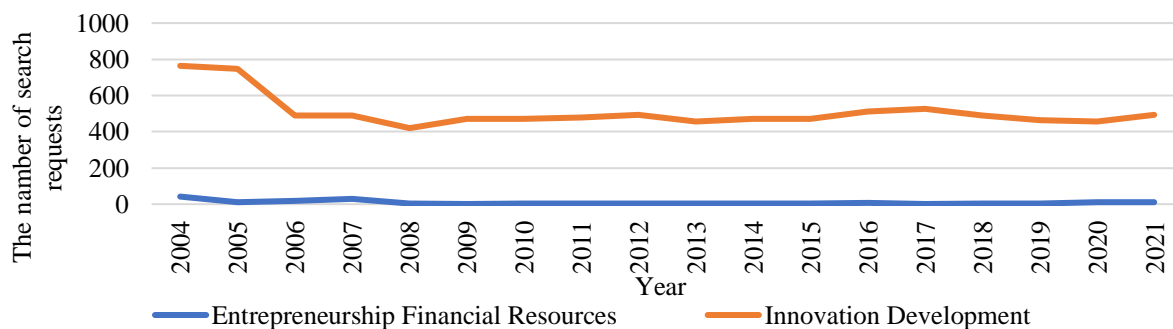


Figure 7. Dynamics of the popularity of search requests «entrepreneurship financial resources» and «innovation development» in the Internet

Sources: developed by the authors.

Figure 8 demonstrates the results of the search requests 'entrepreneurship financial resources' and 'national wealth' for 2004-2021 and their comparison.

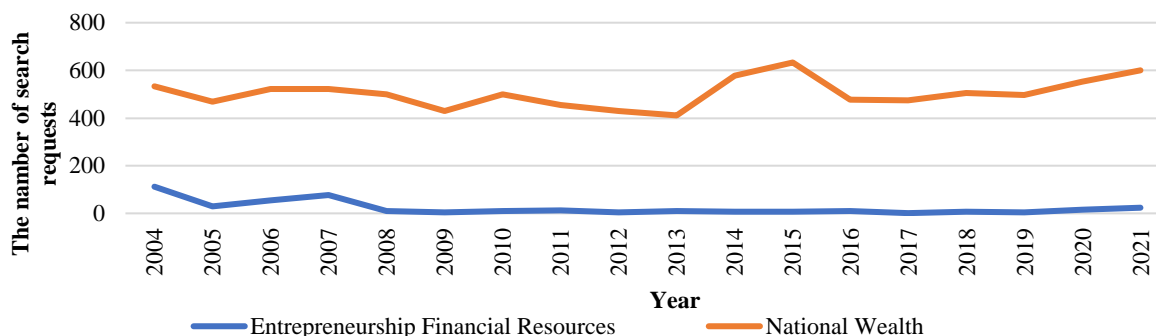


Figure 8. Dynamics of the popularity of search requests «entrepreneurship financial resources» and «national wealth» in the Internet

Sources: developed by the authors.

The dynamics of queries compared by popularity are mostly similar. In both cases (Fig. 7-8), the dynamics of the popularity of search requests were sensitive to the impact of the financial crisis (decreasing in 2007). There was also interest in entrepreneurship financial resources, national wealth, and innovation development (Fig. 7-8) after 2020 (COVID-19 impact). In 2014-2015 there were peak changes in the popularity of the «national wealth» request (Figure 8), which related to economic crises due to changes in Russia's economy and Brazil's economy.

In the second stage of proving the hypothesis about the positive impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth, the correlation analysis was made to identify the relationship between the indicators of entrepreneurship financial opportunities and business environment and the indicators of the country's innovation development and national wealth.

The indicators of entrepreneurship financial opportunities and business environment in this research are the following: financing of SMEs as an index of Global Competitiveness Index (is available only for 2018-2019, that is why there is countries' panel value for 2018 for research purpose) (WEF, 2018-2019), cost of business start-up procedures (World Bank, n.d.a), venture capital availability as an index of Global Competitiveness Index (WEF, 2009-2018), domestic credit to private sector (World Bank, n.d.c), ease of

doing business as an index of Ease of doing business rank (World Bank, n.d.b), ease of starting a business as an index of Ease of doing business rank (World Bank, n.d.b), ease of getting credit as an index of Ease of doing business rank (World Bank, n.d.a), ease of resolving insolvency as an index of Ease of doing business rank (World Bank, n.d.b), protecting minority investors as an index of Ease of doing business rank (World Bank, n.d.f), number of new limited liability companies (World Bank, n.d.f), new business density (World Bank, n.d.f). The country's innovation development indicator is the country's place in the Global Innovation Index (INSEAD, 2010, 2011; INSEAD & WIPO, 2012, GII, n.d.). The indicator of national wealth is the value of total wealth per capita (World Bank, n.d.j).

Before correlation analysis, performing the Shapiro-Wilk test for normal data distribution is necessary. The appropriate method of calculating the correlation coefficient will be chosen depending on that result: Pearson (test result is more than 0.05, and there is the normal distribution of data) or Spearman (test result is less than 0.05, and there is no normal distribution of data) (Shapiro & Wilk, 1965; Pearson, 1896; Spearman, 1987). Table 1 presents the fragment of correlation analysis results on the example of Azerbaijan (the representative of upper-middle-income economies).

Table 1. Fragment of correlation analysis results on the example of Azerbaijan

Indicator	Shapiro-Wilk test	Global Innovation Index		Total wealth per capita	
		Correlation coefficient	Time lag	Correlation coefficient	Time lag
financing of SMEs	0.96360	-0.74	–	0.71	–
Cost of business start-up procedures	0.85825	-0.47	–	-0.24**	–
Venture capital availability	0.46306	0.41	1	0.67	–
Domestic credit to the private sector	0.98668	0.13**	1	0.27**	–
Ease of doing business	0.99014	0.26**	1	0.43	2
Ease of starting a business	0.00937*	-0.77	3	-0.54	–
Ease of getting credit	0.91238	0.73	1	0.87	2
Ease of resolving insolvency	0.00000*	-0.96	2	-0.95	3
Protecting minority investors	0.99989	0.72	2	0.86	2
Number of new limited liability companies	0.09336	-0.81	3	-0.82	3
New business density	0.09334	-0.80	3	-0.79	3

Note: * - do not correspond to the normal distribution of the data; ** - the effect is not statistically significant.

Sources: developed by the authors on the basis of (WEF, 2009-2018; World Bank, n.d.b; World Bank, n.d.a; World Bank, n.d.e; INSEAD, 2010, 2011; INSEAD & WIPO, 2012; GII, n.d.; World Bank, n.d.g) using STATA software.

Thus, in Azerbaijan, the following indicators have a very high (correlation coefficient is more than 0.7) or high (correlation coefficient is more than 0.5) positive impact on the country's position in the Global Innovation Index: ease of getting credit (time lag – 3 years), protecting minority investors (time lag – 2 years). Venture capital availability influences average strength. If the cost of business start-up procedures decreases, Global Innovation Index will increase with average strength too. Other indicators have a negative influence, or the effect is not statistically significant. In turn, in Azerbaijan, the following indicators have a very high or high positive impact on the value of the indicator of total wealth per capita: financing of SMEs (without lag), venture capital availability (without lag), ease of getting credit (time lag – 2 years), protecting minority investors (time lag – 2 years). Ease of doing business influences with average strength. Other indicators have a negative influence, or the effect is not statistically significant. Table 2 presents the fragment of correlation analysis results on the example of Germany (the representative of high-income economies).

In Germany venture capital availability (time lag – 3 years), domestic credit to the private sector (time lag – 1 year), ease of getting credit (time lag – 2 years), number of new limited liability companies (time lag – 3 years) and new business density (time lag – 3 years) have a very high positive impact on the country's position in Global Innovation Index. Ease of doing business influences with average strength. If the cost of business start-up procedures decreases, Global Innovation Index will increase with very high strength (time lag – 2 years). Other indicators have a negative influence.

As for the impact on the value of the indicator of total wealth per capita in Germany, financing of SMEs (without lag), ease of starting a business (without lag), ease of resolving insolvency (time lag – 1 year), and protecting minority investors (time lag – 3 years) have a very high or high positive impact. Other indicators have a negative influence.

Table 2. Fragment of correlation analysis results on the example of Germany

Indicator	Shapiro-Wilk test	Global Innovation Index		Total wealth per capita	
		Correlation coefficient	Time lag	Correlation coefficient	Time lag
financing of SMEs	0.96360	-0.74	–	0.71	–
Cost of business start-up procedures	0.04642*	-0.80	2	0.77	3
Venture capital availability	0.60569	0.95	3	-0.96	–
Domestic credit to the private sector	0.01760*	0.98	1	-0.96	1
Ease of doing business	0.08078	0.44	3	-0.62	3
Ease of starting a business	0.16722	-0.81	3	0.87	–
Ease of getting credit	0.99999	0.87	2	-0.90	3
Ease of resolving insolvency	0.45321	-0.55	1	0.62	1
Protecting minority investors	0.99999	-0.87	2	0.90	3
Number of new limited liability companies	0.70622	0.94	3	-0.86	3
New business density	0.70120	0.96	3	-0.85	3

Note: * - does not correspond to the normal distribution of the data.

Sources: developed by the authors on the basis of (WEF, 2009-2018; World Bank, n.d.b; World Bank, n.d.a; World Bank, n.d.e; INSEAD, 2010, 2011; INSEAD & WIPO, 2012; GII, n.d.; World Bank, n.d.g) using STATA software.

Of course, there are differences in dependencies between research indicators in Azerbaijan and Germany, as between other countries and economies. But some tendencies are similar. That is why it is necessary to formalize and estimate these effects by building a regression model to estimate panel data on a sample of countries. Using the given earlier data, the natural logarithms of the variables were used to improve the quality of the simulation.

Table 3 presents the results for building linear regression models for panel data (with fixed effects and random effects) to estimate the impact of venture capital availability on national wealth (total wealth per capita).

Table 3. Results of linear regression modeling for panel data (with fixed effects and random effects) to estimate the impact of venture capital availability on national wealth

Estimate the Impact of Venture Capital Availability on National Wealth						
lnW	Coef.	Std. Err.	t / z	P> t / z	[95% Conf. Interval]	
Fixed-effects (within) regression						
lnVCA	-.0476365	.0140096	-3.40	0.001	-.0752816	-.0199914
_cons	12.4341	.0460856	269.80	0.000	12.34316	12.52504
sigma_u 1.1962295 sigma_e .08387364 rho .99510794						
F test that all u_i=0: F(19, 179) = 1320.18 Prob > F = 0.0000						
Random-effects GLS regression						
lnVCA	-.0510926	.0143661	-3.56	0.000	-.0792497	-.0229356
_cons	12.44537	.2227057	55.88	0.000	12.00888	12.88187
sigma_u .94676835 sigma_e .08387364 rho .99221303						
Wald chi2(1) = 12.65 Prob > chi2 = 0.0004						
Hausman specification test						
chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 11.59						
Prob>chi2 = 0.0007						

Sources: developed by the authors on the basis of (WEF, 2009-2018; World Bank, n.d.b; World Bank, n.d.a; World Bank, n.d.e; INSEAD, 2010, 2011; INSEAD & WIPO, 2012; GII, n.d.; World Bank, n.d.g) using STATA software.

Hausman specification test (p-value is less than 0.5) shows that the initial hypothesis that a random-effects model adequately models individual-level effects is strongly rejected. That is why in this case, a fixed-effects model is appropriate. The value of R-squared is 0.3848 – it is not very high, which can be explained by the necessity to consider the individual effects because of the peculiarities of the selected model. Wald test shows the p-level < 0.01, the value of Prob > F= 0.0000 is less than 0.05, and the level of significance of the t-criterion P>|t| = 0.001 (it is less than 0.05) means that model is adequate.

Table 4 presents the regression modeling results to estimate the impact of venture capital availability on innovation development (Global Innovation Index). Hausman specification test shows that the initial hypothesis that a random-effects model adequately models individual-level effects is strongly rejected. That is why in this case, a fixed-effects model is appropriate.

Table 4. Results of linear regression modeling for panel data (with fixed effects and random effects) to estimate the impact of venture capital availability on innovation development

estimate the impact of venture capital availability on innovation development						
LNG	Coef.		Std. Err.	t / z	P> t / z	[95% Conf. Interval]
Fixed-effects (within) regression						
lnVCA	.1190668		.0619595	1.92	0.050	-.0031982 .2413317
_cons	2.405196		.2038207	11.80	0.000	2.002996 2.807397
sigma_u	1.2109206	sigma_e	.3709444	rho	.91421079	
F test that all u_i=0: F(19, 179) = 74.05				Prob > F = 0.0000		
Random-effects GLS regression						
lnVCA	.1718817		.0606072	2.84	0.005	.0530939 .2906695
_cons	2.232902		.3019832	7.39	0.000	1.641026 2.824778
sigma_u	.99382296	sigma_e	.3709444	rho	.87771996	
Wald chi2(1) =		8.04	Prob > chi2 =		0.0046	
Hausman specification test						
chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B) =		8.68				
Prob>chi2 =		0.0032				

Sources: developed by the authors on the basis of (WEF, 2009-2018; World Bank, n.d.b; World Bank, n.d.a; World Bank, n.d.e; INSEAD, 2010, 2011; INSEAD & WIPO, 2012; GII, n.d.; World Bank, n.d.g) using STATA software.

The value of R-squared is 0.3631 – it is not very high, which can be explained by the necessity to consider the individual effects because of the peculiarities of the selected model. Wald test shows the p-level < 0.01, the value of Prob > F= 0.0000 is less than 0.05, and the level of significance of the t-criterion P>|t| = 0.05 (it is not more than 0.05) means that model is adequate.

Similar regression modeling for panel data with fixed effects and random effects and checking the Hausman specification test were made for other investigated indicators (Table 5).

Table 5. Results of linear regression modeling for panel data (with fixed effects and random effects) to estimate the impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth

Indicator	Regression model	Impact direction	Impact explanation	Hypothesis proving
Venture capital availability	lnW = -0,48lnVCA + 13,71	Reverse	The value of total wealth per capita will decrease by an average of 0,48% with the increase of venture capital availability of 1%	No
	lnGII = 0,12lnVCA + 3,99	Direct	The value of the Global Innovation Index will increase by an average of 0,12% with the increase of venture capital availability of 1%	Yes
Cost of business start-up procedures	lnW = -0,05lnCBS + 13,4	Reverse	The value of total wealth per capita will increase by an average of 0,05% with the decrease of cost of business start-up procedures of 1%	Yes
	lnGII = 0,22lnCBS + 4,11	Direct	The value of the Global Innovation Index will increase by an average of 0,22% with the increase of cost of business start-up procedures of 1%	No
Domestic credit to the private sector	lnW = 0,3lnDC + 12,58	Direct	The value of total wealth per capita will increase by an average of 0,3% with the increase of domestic credit to the private sector of 1%	Yes
Ease of doing business	lnW = 1,52lnEDB + 6,91	Direct	The value of total wealth per capita will increase by an average of 1,52% with an increase of ease of doing business of 1%	Yes
Ease of starting a business	lnW = 0,95lnESB + 9,98	Direct	The value of total wealth per capita will increase by an average of 0,95% with the increase of ease of starting a business of 1%	Yes
Protecting minority investors	lnW = 0,29lnPMI + 12,43	Direct	The value of total wealth per capita will increase by an average of 0,29% with the increase of protecting minority investors of 1%	Yes
	lnGII = -0,73lnPMI + 7,48	Reverse	The value of the Global Innovation Index will decrease by an average of 0,73%, with the increase of protecting minority investors of 1%	No

Continued Table5

Indicator	Regression model	Impact direction	Impact explanation	Hypothesis proving
Resolving insolvency	$\ln W = 0,39 \ln RI + 11,88$	Direct	The value of total wealth per capita will increase by an average of 0,39% with the increase of ease of resolving insolvency of 1%	Yes
The number of new limited liability companies	$\ln W = 0,22 \ln LCC + 11,17$	Direct	The value of total wealth per capita will increase by an average of 0,22% with the increase of the number of new limited liability companies of 1%	Yes
	$\ln GII = -0,26 \ln LCC + 7,19$	Reverse	The value of the Global Innovation Index will decrease by an average of 0,26% with the increase of the number of new limited liability companies of 1%	No
New business density	$\ln W = 0,23 \ln BD + 13,13$	Direct	The value of total wealth per capita will increase by an average of 0,23% with the increase of new business density of 1%	Yes

Note: $\ln W$ – the natural logarithm of the indicator of total wealth per capita, $\ln GII$ – the natural logarithm of the value of the Global Innovation Index, $\ln VCA$ – the natural logarithm of the indicator of venture capital availability, $\ln CBS$ – the natural logarithm of indicator of the cost of business start-up procedures, $\ln DC$ – the natural logarithm of indicator of domestic credit to the private sector, $\ln EDB$ – natural logarithm of indicator of ease of doing business, $\ln ESB$ – natural logarithm of indicator of ease of starting a business, $\ln PMI$ – the natural logarithm of indicator of protecting minority investors, $\ln RI$ – natural logarithm of indicator of ease of resolving insolvency, $\ln LCC$ – the natural logarithm of indicator of the number of new limited liability companies, $\ln BD$ – the natural logarithm of indicator of new business density.

Sources: developed by the authors.

The impact of certain other indicators from the above list was not confirmed due to the revealed inadequacy of the constructed models. And some hypotheses were not confirmed. It can be explained by the fact that in this research, there were such limits as the sample size (only 20 countries), time (only 10 years), and abstraction from the influence of the other external and internal factors, which also influences on the country's innovation development and national wealth, except investigated indicators of entrepreneurship financial opportunities and business environment. The obtained results can be a basis for future research. Despite this, most hypotheses were confirmed, so the research purpose was archived. Under comparison of the obtained results with the previous ones of some scholars, the following should be noted. Samoilikova (2020) grounded that increasing the volume of domestic credit to the private sector has a positive impact on innovation development. But a similar hypothesis was not proved in this research that can be explained by the different samples and time of the investigation. The author also proved the positive effect of the solution of insolvency. The results of this research are positive only in case of impact on wealth but not for innovation development. However, in compared research, there was a partial confirmation of the hypothesis about the impact of venture capital, and our result is similar – the value of the Global Innovation Index will increase for an average of 0,12% with the increase of venture capital availability for 1%. Rzaev & Samoilikova (2020) proved that the increase of financing innovation (especially GERD financed by business) by 1% can lead to increasing GDP per capita by 0.13% with a lag of 2 years. And results of this research focus on financing by venture capital or credit based on the increasing indicators of venture capital availability. Domestic credit for business can significantly affect national wealth – 0,48% and 0,3%, accordingly. It shows the necessity to investigate the structure of financing sources in detail and pay attention to venture capital and getting credit for business.

Conclusions. The research found the relevance to developing entrepreneurship financial opportunities and the business environment grounded. The hypothesis about the positive impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth was put forward and partially confirmed during the research. A bibliometric analysis was carried out using the tools of the Scopus database and the VosViewer software. It showed a positive trend of publication activity on the investigated issue. Besides it, 80,12% of publications about entrepreneurship and innovation development for 1969-2021, 69,66% – about the business environment and innovation development for 1966-2021, 70,71% – about entrepreneurship and wealth for 1966-2021, 74,8% – about entrepreneurship and finance, and financial opportunities were indexed in the last 10 years. It grounded the relevance and novelty of this problem in modern science. The analytical analysis was conducted using tools of Google Trends. The dynamics of queries compared by popularity were mostly similar and were sensitive to the impact of the financial crisis (decreasing in 2007). There was also an interest increase in entrepreneurship financial resources, national wealth, and innovation development after 2020 (COVID-19 impact). In 2014-2015 there were peak changes in the popularity of the «national wealth» request, which related to the economic crisis due to changes in Russia's

economy and Brazil's economy. The correlation analysis was made to identify the relationship between the indicators of entrepreneurship financial opportunities and business environment (financing of SMEs, venture capital availability, domestic credit to the private sector, ease of doing business, ease of starting a business, ease of getting credit, ease of resolving insolvency, protecting minority investors, number of new limited liability companies, new business density) and the indicators of the country's innovation development (Global Innovation Index) and national wealth (total wealth per capita). Before correlation analysis, the Shapiro-Wilk test was performed, and depending on the result, the appropriate method of calculating the correlation coefficient was chosen (Pearson or Spearman).

In Azerbaijan, the following indicators have very high or high positive impacts on the country's position in the Global Innovation Index: ease of getting credit (time lag – 3 years) and protection of minority investors (time lag – 2 years). Venture capital availability influences average strength. If the cost of business start-up procedures decreases, Global Innovation Index will increase with average strength too. In turn, in Azerbaijan, the following indicators have a very high or high positive impact on the value of the indicator of total wealth per capita: financing of SMEs (without lag), venture capital availability (without lag), ease of getting credit (time lag – 2 years), protecting minority investors (time lag – 2 years). Ease of doing business influences with average strength. The impact of entrepreneurship financial opportunities and business environment on the country's innovation development and national wealth was determined based on regression modeling results in STATA software. Linear regression models for panel data were built with fixed effects and random effects. Then, the Hausman specification test was performed to choose one or a model specification for each investigated interconnection. Obtained results show that total wealth per capita will increase by an average of 0,05% with the decrease in the cost of business start-up procedures of 1%, for an average of 0,3% with the increase of domestic credit to the private sector for 1%, for average 1,52% with the rise in ease of doing business for 1%, for average 0,95% with the increase in ease of starting a business for 1%, for average 0,29% with the increase of protecting minority investors for 1%, for average 0,39% with the rise in ease of resolving insolvency for 1%, for average 0,22% with the increase of the number of new limited liability companies for 1%, for average 0,23% with the increase of new business density for 1%. The Global Innovation Index will increase by an average of 0,12% with an increase of venture capital availability of 1%.

The obtained results can be useful for entrepreneurs and government officials in the process of decision-making and improving the state's economic policy to achieve a better position in innovation development and national wealth. Especially it is grounding the necessity to make reforms aimed at increasing venture capital availability, decreasing the cost of business start-up procedures, expanding opportunities for getting domestic credit to the private sector, simplification of doing business and starting a business, improvement of protecting minority investors and procedures of resolving insolvency, motivation of opening new limited liability companies and increasing new business density.

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Вплив фінансових можливостей підприємництва та бізнес-середовища на інноваційний розвиток країни та національне багатство

Пандемія COVID-19 негативно вплинула на економічне зростання та національне багатство країн світу. У 2020 році спад ВВП на душу населення становив -4,3% у світі та -5% в Азербайджані. Однак, у 2021 році ВВП на душу населення зросло на 4,8% у світі та 5,1% в Азербайджані, що свідчить про економічний потенціал Азербайджану. Автори зазначили, що Азербайджан займає лише 80-е місце зі 132 в рейтингу Глобального інноваційного індексу. Це свідчить про необхідність інтенсифікації інноваційного розвитку країни. У рейтингу легкості ведення бізнесу, Азербайджан посідає 34 місце зі 190. Згідно з результатами опитування підприємств, проведеного Світовим банком, 23.7% підприємств в Азербайджані вважають доступ до фінансування найбільшим бар'єром у веденні бізнесу, разом з тим, середньосвітовий показник становить 14,2%, а в Європі та Центральній Азії – 9,4%. Таким чином, дане дослідження має на меті довести гіпотезу про позитивний вплив фінансових можливостей підприємництва та бізнес-середовища на інноваційний розвиток країни та національне багатство. Дослідження здійснено в наступній логічній послідовності. На першому етапі було застосовано бібліометричний аналіз та аналітичний метод з використанням інструментів бази даних Scopus, VOSviewer та Google Trends. На другому етапі було сформовано вибірку з 20 країн, до якої увійшли топ-10 лідерів Рейтингу глобального індексу інновацій з високим рівнем доходу (як країни-орієнтири інноваційного розвитку, відповідно

до яких Азербайджан повинен підвищувати свої позиції) і топ-10 лідерів з доходом вище середнього (схожих до Азербайджану). Джерелами статистичних даних є Світовий банк, Всесвітня організація інтелектуальної власності та Світовий економічний форум. Періодом дослідження обрано останні 10 доступних років. На третьому етапі дослідження було проведено кореляційний аналіз для виявлення взаємозв'язку між показниками фінансових можливостей підприємництва та бізнес-середовища (фінансування МСП, доступність венчурного капіталу, внутрішнє кредитування приватного сектору, легкість ведення бізнесу, легкість започаткування бізнесу, легкість отримання кредиту, легкість вирішення неплатоспроможності, захист міноритарних інвесторів, кількість нових товариств з обмеженою відповідальністю, щільність нового бізнесу) та показниками інноваційного розвитку країни (Глобальний інноваційний індекс) та національного багатства (загальне багатство на душу населення). Своєю чергою, на четвертому етапі за результатами регресійного моделювання визначено вплив фінансових можливостей підприємництва та бізнес-середовища на інноваційний розвиток країни та національне багатство. Отримані результати мають практичне значення та можуть бути корисними для науковців у подальших дослідженнях даної проблематики та для урядовців при удосконаленні економічної політики держави.

Ключові слова: бізнес, кредит, підприємництво, фінансування, інновації, інвестори, венчурний капітал, багатство.