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Olga A. Guseva

**GRANT AND EQUITY FINANCING OF HIGH-TECH SMALL AND
MEDIUM ENTERPRISES IN RUSSIA**

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Academic supervisor:
Candidate of Sciences (PhD)
Anastasia N. Stepanova

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Entrepreneurship and the entrepreneurial ecosystem are often considered as drivers of national economic growth [Acs, Estrin, Mickiewicz, Szerb, 2018; Van Stel, Carree, Thurik, 2005; Thurik, Wennekers, 2004]. Recent academic research identifies the effects on innovation development, job creation and the impact on big businesses and society as a main contribution of entrepreneurship to the economy [Barringer, Ireland, 2019].

In particular, small innovative enterprises in green technologies industries were found to be 16 times more productive than large innovative enterprises in terms of patents per employee in the company [Breitzman, Thomas, 2011]. In terms of job creation in developing countries, it is small enterprises (less than 20 people) that create the most significant number of jobs [Ayygari, Demirguc-Kunt, Maksimovic, 2014]. At the same time, there is a similar trend in developed countries: in the United States, firms with fewer than 500 employees were involved in creating 2/3 of private-sector jobs in 2014 [Barringer, Ireland, 2019]. Moreover, the business models of many ventures are often built around existing product and service production, thereby providing competition, and helping large firms become more efficient. New products and services provided by small and medium enterprises (SMEs) have also a major impact on the society by improving quality of life, health, productivity.

Meanwhile, among all types of SMEs, technology companies can create products and innovations with significant economic value that impact everyone's lives [Portincaso, de la Tour, Soussan, 2019].

In 2018 Russian state authorities introduced national projects in 12 areas of strategic development of the Russian Federation. The implementation of these projects is expected to contribute to scientific, technological, and socio-economic development of the country by improving living standards, creating conditions and opportunities for self-realization [The Russian government, 2019]. Despite turbulent geopolitical and economic environment, the government continues to be committed to realization of national projects as basic and integral benchmarks for the country's development up to 2030 [President of Russia, 2022].

While some of national projects such as “Education”, “Demography”, “Safe quality roads” traditionally fall under the responsibility of government in countries worldwide, the issues related to “Labor productivity” or “Small and medium entrepreneurship and support of individual entrepreneurial initiative” are often left to the market forces (“invisible hand of the market”). Given this, one might inquire as to the reasoning behind a government’s decision to focus on the development of entrepreneurship.

The specificity and opacity of SMEs in high-tech industries complicates the capital raising, especially in the emerging markets where asymmetric information leads to credit rationing [De Wet, 2004]. SMEs differ from corporations on average by their shorter history of operations, limited information about firm quality (for example, in many cases with a credit score based on the credit history of an owner) [Berger, Black, 2011].

Among the challenges faced by SMEs in emerging markets access to finance, insufficiency of expertise and barriers to international trade are identified as key obstacles for companies’ growth [Sultan, 2019]. Financing SMEs is considered as a risky business throughout the world; however, in emerging markets it is much more difficult to find investors with suitable risk profiles. Therefore, development of SME finance especially in emerging markets requires not only smart investors and public but also subsidies and tools of market discipline [Wood, Pratt, Hoff, 2006].

This explains the motivation of government participation in the support of high-tech SMEs in emerging markets. Many developing markets recognize the need to foster tech companies by introducing liberalization of tax and customs regimes for such companies, funding government venture funds and other venture initiatives, and building technoparks with significant infrastructure equipment.

Currently Russian startups in advanced tech industries represent only 0,4% of the total number of startups globally, which is way less than the share of startups from developed countries and BRIC [Салтанова, 2021]. According to Barinova et al., the number of new high-tech companies in Russia decreases from 2016, and during the first year of the pandemic the number of newly registered Russian high-tech companies

decreased by 16,8% [Баринаова и др., 2020; Земцов и др., 2021]. Moreover, the total number of companies in Russia involved in research and development as identified in Spark-Interfax decreased by more than 30% from 2010 to 2020.

National project “Small and medium entrepreneurship and support of individual entrepreneurial initiative” is aimed to provide support to the entrepreneurs at every stage of the life-cycle: from business idea, registration and help in access to financing to implementation of project in particular industries and internationalization of the business [Passport of national project “SME and support of individual entrepreneurial initiative”, 2018]. Besides national projects, the Russian government also allocates significant budget money to create a favorable environment for high-tech SMEs by establishing various government institutions for innovation development. During 2006-2020 more than 965 billion rubles of government funding were directed specifically into government institutions for innovation development [Соколов, 2021]. At recent meeting of Council for Strategic Development and National Projects fast-growing high-tech businesses were identified as primary recipients of support from financial system [President of Russia, 2022].

In this research we focus on available sources of financing for high-tech companies in Russia as a country with underdeveloped private capital market and significant government participation in the economy. Does existing government support positively contribute to high-tech SMEs performance and effectively substitute other sources of venture financing in Russia? The lack of information and the difficulty of obtaining the data complicates such analysis and explains the insufficient evidence from academic research on performance of high-tech SMEs in Russia. At the same time, a significant period since the establishment of the government institutions provides an opportunity to identify and compare the efficiency of financing available to Russian high-tech SMEs.

Overall, this dissertation fills the research gap in empirical and quantitative studies of efficiency of government support in form of equity and grant financing for high-tech SMEs in Russia as in laboratory for emerging markets with significant government subsidies to the sector.

Therefore, **the aim of the research** is to reveal the impact of grant and equity financing on performance of high-tech SMEs in Russia, with a particular focus on a government financing.

The objectives of the research are as follows:

- To describe a landscape of Russian SMEs which are focused on research and development in life sciences and engineering;
- To examine ownership and management characteristics of high-tech SMEs in Russia;
- To investigate the impact of government institutions' grant financing on tech companies' performance in Russia with regard to the life cycle of the companies.
- To determine the relationship between equity financing from various sources and high-tech SME's performance with particular focus on government institutions' investments;

Current academic research.

In line with resource-based view of a new venture company [Coleman, Cotei, Farhat, 2013] we considered major resources which can contribute to firm performance, with a specific focus on equity and grant financing.

A significant difference between small and privately owned firms and big public corporations concerns the level of information opacity [Coleman, Cotei, Farhat, 2016, p.11]. Information opacity is reflected in the respective barriers for debt financing. Therefore, the pecking order hypothesis for high-tech companies is different: the primary source of startup financing is expected to be owners' resources; external equity is predicted to be the secondary source; and external debt is used as the last option for startup financing [Minola, Cassia, Criaco, 2013; Mann, Sanyal, 2010; Mac an Bhaird, 2010; Sjögren, Zackrisson, 2005].

Additionally, to overcome an information asymmetry and secure external funding, firms extensively use various mechanisms and signals [Connelly et al., 2011]. For high-tech and small businesses government grants were found to be an important signal for outside investors [Islam et a., 2018].

Most studies about SME characteristics and their performance focused on firms in a developed capital market. Although debt financing has a significant role in capital structure of the firms in the emerged markets [Berger, Udell, 2003], the data about debt structure of SMEs are much more limited as such companies use non-public debt instruments (mostly loans from banks and microfinance institutions). Moreover, based on the joint study of “OPORA Russia”, “Promsvyazbank” and “Magram Market Research” it was confirmed that compared to SMEs from developed capital markets, SMEs in Russia are more often denied in loans despite government subsidies [Musatova, M., 2020].

Overall, studies of developing markets show that high-tech firms face additional difficulties: for example, administrative barriers are higher for such firms [Баранов, Долгопятова, 2012]. Therefore, the role of equity investments and grants as key sources of financing for high-tech SMEs in Russia merits particular attention.

The research on SME and innovation companies in Russia mainly analyzed the influence of macroeconomic factors [Образцова и Чепуренко, 2020; Баринова, Еремкин, Земцов, 2015; Chadee, Roxas, 2013; Molz, Tabbaa, Totskaya, 2009; Aidis, Adachi, 2007; Hartarska, Gonzalez-Vega, 2006; Долгопятова, 1999] or firms on later stages of life-cycle [Земцов, Чернов, 2019; Iwasaki, Muzabata, Muravyev, 2018; Yusupova, Khalimova, 2017].

Additionally, the stream of academic research of Russian SMEs focuses on the specificity of managerial and entrepreneurial characteristics and styles of such firms in Russia, as well as their significance for firm performance [Shirokova et al., 2020; Salienko, Baev, Klyueva, 2020; Pletnev, Barkhatov, 2016; Pletnev, Nikolaeva, 2016; Mikhailitchenko, Lundstrom, 2006; Batjargal, 2003].

Despite the significant volume of government subsidies for Russian institutions for innovation development, the empirical and quantitative research on the efficiency of such support for high-tech business is limited and controversial. Based on the survey of 75 Russian medium tech companies, Medovnikov et al. showed that only 17% of companies that used government support responded that it accelerated their development [Медовников и др., 2016]. However, survey of 245 CEOs of companies

that received grants from FASIE showed that 80% of CEOs found this support to be useful [Дежина, Медовников, Розмирович, 2019].

Simachev and Kuzyk also showed that support from state development institutions, direct financing and tax reliefs contributed to the firm revenue growth [Симачев и Кузык, 2020]. At the same time, the effect of government support to SMEs during the pandemic was also found to be heterogeneous and mostly ineffective [Чепуренко и др., 2021; Земцов и др. 2020].

Overall, we hypothesize that the effects of equity and grant financing for high-tech SMEs in Russia are not trivial given previously found heterogeneity in surveys and studies on limited samples; and these effects can be different from the ones observed in developed capital markets. Based on the previous academic studies, in this research we study the effects of financing on firm performance by analyzing set of measures of the firm performance which account for specificity of industries and life-cycle stages of the companies.

The **object of the research** is a Russian high-tech small or medium enterprise, with a particular focus on the companies which interacted with government institutions in the form of equity and grant financing. Therefore, we study companies which are defined as SME according to the Federal Law of July 24, 2007 № 209-FZ “On the development of small and medium-sized businesses in the Russian Federation”. However, in this research the affiliation of the company with high-tech industries is based either on the rules of government institutions or Russian National Classifier of Types of Economic Activity.

According to academic literature startups are often defined as companies with a short history of operations [Coleman, Cotei, Farhat, 2016; Huyghebaert, Van De Gucht, 2007; Cassar, 2004] or as young high-tech firms [Wasserman, 2017; Davila, Foster, Gupta, 2003]. In this research, we do not limit the age of small and medium technology companies included in our sample. However, we use the term “startup” for high-tech SME associated with government institutions (Skolkovo project) similar to Bruton and Rubanik [Bruton, Rubanik, 2002].

Our **research methodology** is based on the synthesis and adaptation of existing methodologies to emerging market conditions taking into account life cycle stage and various measures of firm performance. It includes steps as follows:

1) Application of automated data collection methods as well as manual data collection for the construction of the databases;

2) Statistic and correlation analysis of variables which characterize ownership structure, management, the operational and financial performance of high-tech SMEs in Russia;

3) Econometric analysis of the relationship between firm's type of financing and performance:

Research question	Section	Dependent variable(s)	Methodology	Dataset
Effect of grant financing on performance of high-tech SMEs in Russia	Section 3.1: early-stage SMEs	Survival	Cox proportional hazard models	Foundation for Assistance to Small Innovative Enterprises in Science and Technology (FASIE) "Start-1" program (both grant recipients and non-recipients)
	Section 3.2: experienced SMEs	Revenue, Assets, Employees, Debt, Productivity, Profitability	Propensity score matching and fixed-effects panel regression for the matched sample	FASIE "Razvitie-NTI" (Development – National Technological Initiative) program, 2 phases
Relationship between equity financing and performance of high-tech SMEs in Russia	Section 4: high-tech SMEs	ROA, Profitability, Revenue growth	Panel models	Skolkovo startups in the Space and Nuclear clusters

To study the effect of grant financing in Russia (Section 3) we focused on the available grant programs by FASIE, one of the oldest government institutions involved in the support of high-tech enterprises with high perspectives for commercialization. FASIE offers several types of programs dependent on the life-cycle stages of the companies: "Umnik", "Student startup", "Start" for business ideas on development and seed stages; "Razvitie (Development)", "Commercialization" and "Internalization" for

companies at later stages. As the programs target different companies, the expected effect from the grant financing varies.

In Section 3.1 we focus on grants for firms at early stages of life-cycle. The primary indicator for such firm performance is survival [Churchill and Lewis, 1983, Soto-Simeone, Sirén, Antretter, 2020]. Therefore, for the evaluation of the effect of grant financing for seed companies, we estimate Cox proportional hazard model of company survivorship, which is a commonly used model in academic literature [Smith, Feldman, Anderson, 2018; Cabrer-Borrás, Belda, 2018; Wagner and Cockburn, 2010].

In Section 3.2 we focus on the grants that target later stage firms that have already an experience with sales of high-tech products. Given higher level of data availability for the firms that already had sales, on the first step we identified factors which influence decision making of grant financing by estimating a binary choice model. Second, we use these factors for propensity score matching with a sample of the companies that did not receive grant. Third, fixed-effects regression models are estimated on the sample of companies after matching. The terms of the competition specify that the expected results for the companies that received grant include the launch of knowledge-intensive production, growth in sales of innovative products, and an increase in the number of high-performance jobs. In this regard, as performance measures, we focus on the indicators of employment, firm size and revenues.

In Section 4 we focus on the effect of equity financing for high-tech SMEs in Russia. The data about equity investment and ownership structure of companies is very limited, given that the investors prefer to publish information about investments with high expected or realized returns. However, Skolkovo fund regularly publishes the list of project participants, which consist of the companies on different stages. We focused on two clusters - nuclear and space startups - to get more explicit results regarding the presence of institutional owners, especially government affiliated companies and government development institutions. For estimation of the effect of equity financing we used random effect regression model (with key independent variables lagged by 1 period). For estimation of the effect of equity investments, we focus on return on assets (ROA), profitability, and revenue growth, which are most frequent measures of

performance in growth (change in sales), profit (net profit margin) and efficiency (ROA based on Net Income and EBIT) dimensions in entrepreneurial research [Murphy, Trailer, Hill, 1996]. Besides availability of these indicators in public sources of information, ROA is a measure of efficiency performance that does not depend on the capital structure of the company and allows to compare results for firms in different industries; and due to existence of trade-off between profitability and revenue growth in some cases [Robinson, 1999], it is important to consider both measures.

Overall, **the database for the research** consists of three samples with multidimensional data collected from 6 sources. To describe the landscape of Russian high-tech SMEs we used the list of 19,572 SMEs downloaded from the Register of Small and Medium Enterprises (*rmsp.nalog.ru*). The list of companies was enhanced by an automated collection (web scraping) of the names from *Startuplist.ru* (digital platform of interaction between government institutes for development) to identify companies that were supported by the government institutions for innovation development and then further enhanced by information from Spark-Interfax.

To estimate the impact of grant financing, we collected the second database, which includes information about SMEs which participated in competitions organized by FASIE. We were able to identify 764 startups participated in competition for the program “Start” and 1296 more experienced firms that applied for the “Razvitie-NTI” program in 2016-2017 based on the name and the region of the company as published by FASIE. Then the data about the operational and financial performance of these identified companies during 2015-2021 was accessed from Ruslana (Bureau van Djik).

To estimate the effect of equity financing, the list of startups for nuclear and space industries was manually collected from the Skolkovo website. Information about firms’ characteristics (e.g., age, location, size) and financial statements of the companies were accessed from Spark-Interfax and/or Ruslana (Bureau van Djik), ownership structures (number, gender of owners, management ownership) were tracked and individually collected for each company in Spark-Interfax. This information was traced during 2010-2017 for 416 companies.

Contribution. This research contributes to the understanding of the effects of different forms of financing on performance of high-tech SMEs in countries with limited private investments and significant government support. To study these effects, we developed methodology based on works of Smith, Feldman and Anderson [2018], Epure and Guasch [2020], Srhoj, Lapinski and Walde [2020], and adapted it to the Russian market. Then we collected data from 6 information sources to test the effects on Russian high-tech SMEs.

Overall, based on the analysis of the existing literature on financing of high-tech SMEs, we contribute to scientific research by (1) demonstrating the role of equity financing provided by the government and private sources on Russian tech companies; (2) revealing the effect of grant financing for companies on seed stage and more experienced firms. The results derived in this research are novel, as we are among the first authors who analyzed the effect of equity and grant financing for Russian high-tech SMEs based on empirical data. Our results can be summarized as follows:

1. Grant financing was confirmed to positively influence on survival of high-tech SMEs in Russia.

For early-stage SMEs a survival analysis was conducted on the sample of 764 companies that participated in FASIE Start-1 program (for early-stage companies, up to 10 million rubles). On the first step, to adjust for selection bias probit model was used to estimate the probability of receiving a grant by high-tech SMEs. At the second step Cox proportional hazard model was applied with predicted probabilities of receiving a grant as independent variables.

We showed that grants of up to 2 million rubles given on a competitive basis to startups at the seed stage can increase the probability of survival of a young company by more than 50%. This result is in line with previous findings of the effect of grant on firm survivorship both for the early stage SMEs in emerged [Pellegrini, Muccigrosso, 2017] and emerging [Butler et al., 2016] markets.

2. We found no evidence of grant contribution to financial and operational performance for more experienced high-tech SMEs.

3. Grant financing was found to have a positive impact on access to debt for SMEs with experience in the development and sale of knowledge-intensive products.

The impact of grant financing on financial and operational performance of more experienced high-tech SMEs was studied on the sample of 1296 companies that participated in the FASIE “Razvitie – NTI” programs (R&D support for implementation of plans in accordance with National Technological Initiative, up to 20 million rubles). The grant impact on the company's activity was analyzed using fixed-effects regression models to estimate the average treatment effect after propensity score matching procedure.

Based on the estimation of average treatment effect on the treated in a sample of companies that received (treated sample) and applied but did not received (control sample) a grant, we found no evidence that grants significantly improve the financial and operational performance of more experienced high-tech firms measured by revenue, employees, profitability, and productivity.

However, the companies with grant financing were observed to survive longer and attract more debt later. Such results are in line with findings of Rodionov, Semenov, and Oskin that grant financing can be a determinant of future venture capital investment in Russia [Rodionov, Semenov, Oskin, 2021] and confirm the signaling value of government grants.

4. No evidence of positive contribution of equity financing from government-related organizations to firm performance was found based on the sample of Russian SMEs that participated in Skolkovo project.

To study the effects of equity financing we analyzed the performance of startups in nuclear and space industries using an unbalanced panel of startups from Skolkovo, the largest Russian innovation cluster, from 2010 to 2016. We focused on these particular industries to get more explicit results regarding the presence of institutional owners, especially government affiliated companies and government development institutions.

We found no evidence of the positive effect of the share of government-related organizations in ownership on firm performance proxied by ROA, profitability, and

revenue growth. Such results can be explained by the fact that such organizations could be more interested in investments in strategically important startups rather than in companies that provide high returns. Additionally, we should take into consideration the specific features inherent in government institutions and identified by Alperovych, Groh, and Quas [Alperovych, Groh, Quas, 2020]: focus on underdeveloped regions, exposure to political interference, and lack of managerial competence. Such features can prevent government development institutions from competing with private venture capital.

5. The effect of private equity financing on high-tech SMEs performance in Russia is mostly insignificant; however, the impact of private venture capital on firm performance is industry-specific.

We found evidence of a significant contribution of venture capital considered as a private source of financing to firm performance in Russia; however, the effect is industry-specific: positive and significant for startup performance profitability for the Space cluster startups.

While family equity contributions were not found to have a significant impact on high-tech SME performance, we identified a positive relationship between the owner or CEO change and future firm performance.

Although CEO share is negatively correlated with the age and size of the company, the relationship between the share of CEO in ownership structure and performance was not confirmed.

To sum it up, the findings of this research indicate that in the setting of emerging markets, financial government support cannot fully substitute the expertise and capital of private investors but can complement it and help eliminate the institutional voids by using different channels.

Overall, the main idea of government financing of high-tech SMEs is to overcome market failures. It should provide financing to the firms in the situations when there are no market investors with suitable risk profiles. In this research we showed that government financing is indeed significant for the firms at early stages of life cycle. However, the state institutions are not able to contribute by equity and grant

investments to the financial and operational performance of companies at later stages, for which the capital market is more developed. According to the previous academic studies, the potential explanation of this can be the inability of government institutions to select the firms for investment.

However, further research should consider the effect of other measure of government support (including tax and custom exemption, assistance in internationalization), as well as the effect of collaborative actions with private businesses and institutions.

Limitations. A standard limitation of research of SMEs especially in technological industries concerns the data availability. Although we use various methods to control for endogeneity, unobserved characteristics which could not be captured from available data can lead to biases in the results (omitted variables). Such characteristics can be considered as predictors for both recipients of the support and firm performance. High-tech SMEs are highly specific, and the applications for grant as well as applications to become a participant of Skolkovo project are evaluated by experts and professionals based on specific criteria, which are not published in detail.

Moreover, we should pay a particular attention to the specificity of our sample. In the empirical section of our research, we focused on companies which were participants of Skolkovo innovation system or of FASIE competition. Although we were able to get significant results about the effect of equity and grant financing on firm performance for particular companies, such self-selection of the firms limits the possibility of making pronounced conclusions about the general population of Russian high-tech SME.

Theoretical implications. Our research contributes to the stream of academic literature on entrepreneurship and entrepreneurial finance. We synthesized the conclusions from previous research about the peculiarities of the pecking order and signaling theories for young tech companies to explain the focus on equity and grant financing of SMEs on emerging markets. Afterwards, we analyzed previous studies about measures of support for SMEs and classified them based on possible sources of

entrepreneurship financing and their influence on specific measures of firm performance.

We modified existing methodologies for studying the impact of different types of financing by considering conditions of markets in Russia. These methodologies can be applied in further research for analysis of the effects of investments to the non-public firms in the setting of emerging markets. We contribute to the empirical research on the effect of the impact of private and government financing in the form of a grant and equity, with the evidence from Russia as the country with significant government participation in the economy.

Practical implications. This research provides insights for public authorities to design an effective system of entrepreneurship support using appropriate instruments concerning policy goals.

While direct government financial support of firms with strategic technologies can be important for survival and long-term performance of such firms, equity investments of government institutions in such companies are unlikely to provide positive short-term financial return. Moreover, direct government funding should target firms at early stages of life cycles, while for experienced firms other measures for providing access to financing should be considered. The research also confirms the need for further studies of the efficiency of government support, which will take into account other forms of state participation besides funding, and also consider the effect of collaboration and common efforts with corporations and established businesses.

The findings of this research provide strategic management insights for entrepreneurs looking for support of their business to enhance the firm's performance. While government support can be vital for seed stages of the firms, at further stages of life cycle the search of investors should be focused on private market participants. **The results of the research are published** in the papers:

1. Guseva, O., & Stepanova, A. (2019). Owners and CEOs of startups: Evidence from Russia. *Journal of Corporate Finance Research*, 13(1), 107-119
2. Guseva, O. A., & Stepanova, A. N. (2021). Startups in Russia: Ownership and performance. *Journal of the New Economic Association*, 52(4), 67-97

3. Guseva, O. (2021). Support of State and Private Institutions for Biomedical Start-ups in Russia. *Journal of Corporate Finance Research*, 15(2), 27-41.

The results of the research were presented and discussed at Russian and international conferences, seminars and workshops:

1. Report on Research Seminar of School of Finance “Empirical Research of Corporate Finance”, 17 May 2022;
2. Report on Research Seminar of School of Finance “Empirical Research of Corporate Finance”, 30 June 2021;
3. Report on XXI April International Academic Conference on Economic and Social, section L-25, 23 Apr 2020;
4. Report on REMI 1-st Annual Workshop, 30 Sep 2019, NRU HSE, St Petersburg, Russia;
5. Report on XX April International Academic Conference on Economic and Social, section L-04, 9 Apr 2019;
6. Report on 6th annual Ph.D. workshop "Financial Markets and Corporate Strategies: Comparative Studies", 13 Apr 2019;
7. Report on RENT XXXII – Research in Entrepreneurship and Small Business, Toledo, Spain, 15 Nov 2018;
8. Report on Analytics for Management and Economics Conference 2018, 21 Sep 2018;
9. Report on the Ph.D. workshop, Analytics for Management and Economics Conference, 19 Sep 2018.

The results of this dissertation were presented and discussed in the seminars organized by the Doctoral School of Economics in the Higher School of Economics.

Research findings are also used in the teaching process of course “Entrepreneurial Finance” for master students in the NRU HSE master program “Strategic Corporate Finance” and for academic supervisory of term papers and theses of master and bachelor students NRU HSE.

References

- Acs, Z. J., Estrin, S., Mickiewicz, T., & Szerb, L. (2018). Entrepreneurship, institutional economics, and economic growth: an ecosystem perspective. *Small Business Economics*, 51(2), 501-514.
- Aidis, R., & Adachi, Y. (2007). Russia: Firm entry and survival barriers. *Economic systems*, 31(4), 391-411.
- Alperovych, Y., Groh, A., & Quas, A. (2020). Bridging the equity gap for young innovative companies: The design of effective government venture capital fund programs. *Research Policy*, 49(10), 104051.
- Andrieu, G., La Rocca, M., La Rocca, T., & Staglianò, R. (2021). Debt financing and firm growth: European evidence on startups. Available at SSRN.
- Ayyagari, M., Demirguc-Kunt, A., & Maksimovic, V. (2014). Who creates jobs in developing countries?. *Small Business Economics*, 43(1), 75-99.
- Barringer B. R., & Ireland R. (2019). *Entrepreneurship: Successfully Launching New Ventures*, 6e. Pearson Education Limited.
- Batjargal, B. (2003). Social capital and entrepreneurial performance in Russia: A longitudinal study. *Organization Studies*, 24(4), 535-556.
- Berger, A. N., & Black, L. K. (2011). Bank size, lending technologies, and small business finance. *Journal of Banking & Finance*, 35(3), 724-735.
- Berger, A. N., & Udell, G. F. (2003). Small business and debt finance. *Handbook of entrepreneurship research: An interdisciplinary survey and introduction*, 299-328.
- Breitzman A., Thomas P. (2011). *Analysis of Small Business Innovation in Green Technologies*. URL: <https://www.sba.gov/sites/default/files/advocacy/rs389tot.pdf>
- Bruton, G. D., & Rubanik, Y. (2002). Resources of the firm, Russian high-technology startups, and firm growth. *Journal of Business Venturing*, 17(6), 553-576.
- Butler, I., Galassi, G., & Ruffo, H. (2016). Public funding for startups in Argentina: an impact evaluation. *Small Business Economics*, 46(2), 295-309.
- Cassar, G. (2004). The financing of business start-ups. *Journal of Business Venturing*, 19(2), 261-283.
- Coleman, S., Cotei, C., & Farhat, J. (2013). A resource-based view of new firm survival: New perspectives on the role of industry and exit route. *Journal of Developmental Entrepreneurship*, 18(01), 1350002.
- Coleman, S., Cotei, C., & Farhat, J. (2016). The debt-equity financing decisions of US startup firms. *Journal of Economics and Finance*, 40(1), 105-126.
- Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling theory: A review and assessment. *Journal of Management*, 37(1), 39-67.

- Davila, A., Foster, G., & Gupta, M. (2003). Venture capital financing and the growth of startup firms. *Journal of Business Venturing*, 18(6), 689–708.
- De Wet, W. A. (2004). The role of asymmetric information on investments in emerging markets. *Economic Modelling*, 21(4), 621-630.
- Epure, M., & Guasch, M. (2020). Debt signaling and outside investors in early stage firms. *Journal of Business Venturing*, 35(2), 105929.
- Hartarska, V., & Gonzalez-Vega, C. (2006). What affects new and established firms' expansion? Evidence from small firms in Russia. *Small Business Economics*, 27(2-3), 195-206
- Heckman J. (1976). The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models. *Annals of Economic Social Measurement*, 5 (4), 475–492.
- Huyghebaert, N., & Van de Gucht, L. M. (2007). The determinants of financial structure: new insights from business start-ups. *European Financial Management*, 13(1), 101-133.
- Islam, M., Fremeth, A., & Marcus, A. (2018). Signaling by early stage startups: US government research grants and venture capital funding. *Journal of Business Venturing*, 33(1), 35-51.
- Iwasaki, I., Mizobata, S., & Muravyev, A. (2018). Ownership dynamics and firm performance in an emerging economy: a meta-analysis of the Russian literature. *Post-Communist Economies*, 30(3), 290-333.
- Mac an Bhaird, C. (2010). The Modigliani–Miller proposition after fifty years and its relation to entrepreneurial finance. *Strategic Change*, 19(1-2), 9-28.
- Mikhailitchenko, A., & Lundstrom, W. J. (2006). Inter-organizational relationship strategies and management styles in SMEs: The US-China-Russia study. *Leadership and Organization Development Journal*, 27(6), 428-448.
- Minola, T., Cassia, L., & Criaco, G. (2013). Financing patterns in new technology-based firms: An extension of the pecking order theory. *International Journal of Entrepreneurship and Small Business* 25, 19(2), 212-233.
- Molz, R., Tabbaa, I., & Totskaya, N. (2009). Institutional realities and constraints on change: The case of SME in Russia. *Journal of East-West Business*, 15(2), 141-156.
- Murphy, G. B., Trailer, J. W., & Hill, R. C. (1996). Measuring performance in entrepreneurship research. *Journal of business research*, 36(1), 15-23.
- Musatova, M. (2020). Financing architecture and current trends in the development of Russian small and medium enterprises. *Entrepreneurial Finance in Emerging Markets: Exploring Tools, Techniques, and Innovative Technologies*, 161-175.
- Passport of national project “Small and medium entrepreneurship and support of individual entrepreneurial initiative”. (2018). Approved at a meeting of the Presidium of the Presidential Council for Strategic Development and National

- Projects on December 24, 2018.
<http://static.government.ru/media/files/qH8voRLuhAVWSJhIS8XYbZBsAvcs8A5t.pdf>
- Pletnev, D., & Nikolaeva, E. (2016). Success indicators and factors for small and medium-sized enterprises in Chelyabinsk Region of Russia. In *Entrepreneurship, Business and Economics-Vol. 1* (pp. 115-127). Springer, Cham.
- Portincaso M., de la Tour A., Soussan P. (2019). The Dawn of the Deep Tech Ecosystem. The BCG Henderson Institute. URL: <https://www.bcg.com/publications/2019/dawn-deep-tech-ecosystem2019>
- President of Russia. (2022). Заседание Совета по стратегическому развитию и национальным проектам. <http://kremlin.ru/events/president/news/70086>
- Robinson, K. C. (1999). An examination of the influence of industry structure on eight alternative measures of new venture performance for high potential independent new ventures. *Journal of Business Venturing*, 14(2), 165-187.
- Rodionov I. I., Semenov A., & Oskin A. (2020). The Definition of Money Grand Received as a Key Determinant of Venture Investment Size in IT Russian Based Startups. *Journal of Corporate Finance Research*, 14(3), 19-27.
- Salienko, N., Baev, G., & Klyueva, V. (2019, October). Managerial Problems of Russian Technology Startups. In *International Conference on Reliability and Statistics in Transportation and Communication* (pp. 654-661). Springer, Cham.
- Shirokova, G., Osiyevskyy, O., Laskovaia, A., & MahdaviMazdeh, H. (2020). Navigating the emerging market context: Performance implications of effectuation and causation for small and medium enterprises during adverse economic conditions in Russia. *Strategic Entrepreneurship Journal*, 14(3), 470-500.
- Sjögren, H., & Zackrisson, M. (2005). The search for competent capital: financing of high technology small firms in Sweden and USA. *Venture Capital: An International Journal of Entrepreneurial Finance*, 7(1), 75-97.
- Smith, D., Feldman, M., & Anderson, G. (2018). The longer term effects of federal subsidies on firm survival: evidence from the advanced technology program. *The Journal of Technology Transfer*, 43(3), 593-614.
- Soto-Simeone, A., Sirén, C., & Antretter, T. (2020). New venture survival: A review and extension. *International Journal of Management Reviews*, 22(4), 378-407.
- Srhoj, S., Lapinski, M., & Walde, J. (2020). Impact evaluation of business development grants on SME performance. *Small Business Economics*, 1-17.
- Startup Barometer. (2020). Исследование рынка технологического предпринимательства в России 2020. URL: <https://vc-barometer.ru/startup>

- Sultan, T. (2019, April 1). Unlocking the potential of SMEs in emerging markets. *Financial Times*. <https://www.ft.com/content/857e4a80-5492-11e9-91f9-b6515a54c5b1>
- The Russian Government. (2019). Национальные проекты: ключевые цели и ожидаемые результаты. <http://government.ru/news/35675/>
- Thurik, R., & Wennekers, S. (2004). Entrepreneurship, small business and economic growth. *Journal of Small Business and Enterprise Development*, 11(1), 140-149.
- Van Stel, A., Carree, M., & Thurik, R. (2005). The effect of entrepreneurial activity on national economic growth. *Small Business Economics*, 24(3), 311-321.
- Wasserman, N. (2017). The throne vs. the kingdom: Founder control and value creation in startups. *Strategic Management Journal*, 38(2), 255-277.
- Yusupova, A., & Khalimova, S. (2017). Characteristics, features of development, regional and sectoral determinants of high-tech business in Russia. *Voprosy ekonomiki*, (12), 142-154.
- Wood, D., Pratt, C., & Hoff, B. (2006). Investing in the Backbone of Emerging Markets. Working Paper from Boston College Center for Corporate Citizenship's Institute for Responsible Investment. https://iri.hks.harvard.edu/files/iri/files/iri_-_sustainable_sme_investment_-_investing_in_the_backbone_of_emerging_markets.pdf
- Баранов, А. Ю., & Долгопятова, Т. Г. (2012). Инновационное поведение фирм и деловой климат в странах с переходной экономикой. *Российский журнал менеджмента*, 10(4).
- Баринова, В. А., Еремкин, В. А., & Земцов, С. П. (2015). Факторы развития инновационных компаний на ранних стадиях. *Государственное управление. Электронный вестник*, (49).
- Баринова В.А., Земцов С.П., Зинов В.Г., Кидяева В.М., Красносельских А.Н., Куракова Н.Г., Семенова Р.И., Федотов И.В., Халимова С.Р., Хафизов Р.Р., Царева Ю.В. (2020) Национальный доклад «Высокотехнологичный бизнес в регионах России». М.: РАНХиГС, АИРР.
- Дежина, И. Г., Медовников, Д. С., & Розмирович, С. Д. (2019). О государственной поддержке малых инновационных компаний Фондом содействия инновациям. *Социологические исследования*, (11), 110-119.
- Долгопятова, Т. Г. (1999). Институциональное развитие малого и среднего предпринимательства в российской экономике. *Экономическая наука современной России*, (3).
- Земцов, С., Чепуренко, А., & Михайлов, А. (2021). Вызовы пандемии для технологических стартапов в регионах России. *Форсайт*, 15(4), 61-77.

- Земцов, С. П., Чепуренко, А. Ю., Барина, В. А., & Красносельских, А. Н. (2020). Новая предпринимательская политика для России после кризиса 2020 года. Вопросы экономики, 10, 44-67.
- Земцов, С. П., & Чернов, А. В. (2019). Какие высокотехнологичные компании в России растут быстрее и почему. Журнал Новой экономической ассоциации, 41(1), 68-99.
- Медовников, Д. С., Оганесян, Т. К., & Розмирович, С. Д. (2016). Кандидаты в чемпионы: средние быстрорастущие компании и программы их поддержки. Вопросы экономики, (9), 50-66.
- Образцова, О. И., & Чепуренко, А. Ю. (2020). Предпринимательская активность в России и ее межрегиональные различия. Журнал Новой экономической ассоциации, 14(2), 199.
- Салтанова С. (2021) Отстать нельзя догонять. Россия на рынках передового производства. URL: <https://iq.hse.ru/news/463561256.html>
- Симачев, Ю. В., & Кузык, М. Г. (2020). Государственная поддержка предприятий: бенефициары и эффекты. Вопросы экономики, (3), 63-83.
- Соколов А. (2021). «Институты развития провалили инновации». Ведомости. URL: <https://www.vedomosti.ru/economics/articles/2021/03/01/859742-instituti-razvitiya>
- Чепуренко, А. Ю., Галицкий, Е. Б., Духон, А. Б., & Ослон, А. А. (2021). Государственная политика в отношении малого предпринимательства в период пандемии в оценках бенефициаров. Вопросы государственного и муниципального управления, (4), 66-89.