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Startups in Russia: Ownership and performance

Abstract. During two decades the Russian government has invested heavily in support of high-tech startups. However, considering high level of information opacity of startups, we focus on equity as the primary source of their financing, and on owners as the main source of support for such firms. This paper examines how ownership characteristics affect the performance of high-tech performance of startups in nuclear and space industries. We focus on how different types of owners (founders, state, and venture capital) contribute to 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 found evidence of a negative relationship between a support from government-related organizations and chosen indicators of startup performance. Our findings confirmed the significant impact of private venture capital on startup performance, however the effect is industry-specific. While family equity contributions were not found to have a significant impact on startup performance, we identified a positive relationship between owner or CEO change and future startup performance. We discuss potential interpretations of the findings and provide strategic management insights for startup owners and investors.

Keywords: *startups; ownership; development institutions; emerging markets.*

JEL Classification: M13, G32, G34, O38.

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1. Introduction

Since 2006, the Russian government has allocated more than RUB 500 bln to different projects for innovation development, including the establishment of development institutions, building technoparks and direct funding of innovative companies. In particular, in 2006, the Russian Venture Company (RVC) was established by the Government of the Russian Federation to develop the Russian venture capital market with authorized capital of RUB 30 bln[1]; in 2007, RUB 130 bln were invested in Russian Corporation of Nanotechnologies for the development of nanotechnology projects, which have substantial economic or social potential (State Corporation Rosnanotech, 2009 Annual report, p. 29), and more than RUB 230 bln were provided in the form of state guarantees to JSC Rusnano, successor of Russian Corporation of Nanotechnologies (JSC Rusnano, 2018 Annual report, p. 79). In 2010, then President Dmitriy Medvedev signed a Federal law founding the Skolkovo innovation system, which created a special environment for new technology companies in the Moscow region, and from 2013–2018 the amount of government expenditures exceeded

[1] https://www.rvc.ru/en/about/

[2] Government program "Economic development and innovation-based economy", approved by the Decree of the Government of the Russian Federation of 15.04.2014 No. 316.

Журнал НЭА,
№4 (52), 2021,
с. 67–97

RUB 110 bln[2]. In 2015, the National Technology Initiative was launched to develop Russian high-tech companies for global technological leadership by introducing changes in regulations, human resource development and financial support of such companies.

Indeed, small firms and entrepreneurship are proven to be significant for economic growth of the country (Wennekers, Thurik, 1999; Wong, Ho, Autio, 2005; Stel, Carree, Thurik, 2005; Acs, Szerb, 2007; Valliere, Peterson, 2009; Aparicio, Urbano, Audretsch, 2016; Urbano, Aparicio, 2016). However, recent studies (Shane, 2009; Guzman, Stern, 2016) suggest focusing not just on the number of startups in the economy, but rather on the quality of entrepreneurship. The quality can be measured based on different startup characteristics to assess the real state of entrepreneurship and its contribution to economic growth. Despite a vast academic literature there are no unambiguous answers to which startup characteristics are significant for a company's success.

The Russian startup market represents an interesting case of emerging market with a growing number of startups and with a significant amount of government support and the presence of a qualified workforce with a good technical background and at the same time underdeveloped venture capital investment market (less than 0,1% the global venture capital investments in 2018[3]).

The empirical literature on Russian entrepreneurship is mostly focused on the analysis of institutional factors influencing new and innovative companies' performance. In particular, based on a survey of 203 small enterprises in Samara (Hartarska, Gonzalez-Vega, 2006) investigated the impact of the security of property rights and financing constraints on companies at different stages of development. The other authors (Molz, Tabbaa, Totskaya, 2009) conducted 15 face-to-face semistructured interviews and confirmed that a weak institutional environment is a significant barrier to the contribution of small and medium enterprises (SME) to economic growth. The research by (Chadee, Roxas, 2013) was focused on the quality of regulation, the rule of law, and corruption as the main factors influencing the innovative capacity of the Russian companies. (Barinova, Eremkin, Zemtsov, 2015) summarized the findings of theoretical and empirical papers on national and regional factors of development of the innovative companies in Russia.

This research takes a microeconomic approach and focuses on the ownership characteristics of startups as a factor influencing firms' performance in Russia. Due to the information opacity of younger firms, especially of those which develop high-tech products, equity financing is considered to be one of their main sources of capital and support (Huyghebaert, Van De Gucht, 2007).

We assume that different sources of support, both private and government, which are reflected in the ownership structure of a startup, can provide startups not only with financing, but also with the necessary expertise, access to infrastructure, supply of the human resources, help in over-

[3] Authors' calculations based on the information presented in KPMG Venture Pulse Q4 2018 and Russian Venture Capital Association (RVCA) Yearbook 2018.

Журнал НЭА,
№4 (52), 2021,
с. 67–97

coming administrative barriers and diversification of ideas. In a survey of Russian tech-startups (Soloviev, Scherbakova, Mosolov, 2018) 40% of startup founders responded that financing is the only type of support necessary for their further development, while the rest of the sample said human capital, networking opportunities and training and expertise were needed.

Therefore, we hypothesize that the government and private institutions positively contribute to startup performance, and we investigate the relationship between the presence of these sources of support in the ownership structure of a startup and its performance using a sample of Skolkovo participants which are the residents of Nuclear and Space clusters.

While many academic studies of startup performance focus specifically on firms from such innovation clusters as Silicon Valley (Suzuki, Kim, Bae, 2002; Adams, 2011), we consider startups which are participants of Skolkovo project, the largest high technology cluster in Russia. This allows us to get a more homogeneous sample, since the firms have an access to similar opportunities and the effect of particular characteristics of startups can be studied in more detail. Although there exist special legal and tax conditions for young firms and spatial concentration of startups can generate strong cross-firms spillovers, we believe that sample of Skolkovo participants can be considered as a proxy for sample of Russian startups as the rules of Skolkovo allow high-tech startup from any region to become a participant based on transparent and clearly defined criteria.

Moreover, we define a firm to be a startup in line with initial Skolkovo regulations as project participant performing R&D activities, the results of which are to be commercialized not later than five years after participant status was awarded ("Regulations on the assignment and loss of a status of a project participant to create and ensure the functioning of the Skolkovo Innovation Center", approved by the Skolkovo Foundation Board on June 21, 2012). Although for most firms in our sample such definition is consistent with understanding of a startup as a company in the early commercialization stage of innovation, it also includes companies on other stages of the innovation process (e.g. firms with no revenue and firms with sales abroad).

Observation period for our sample of startups includes data from 2010 till 2016, which can help us to capture the influence of sanctions introduced from 2014. The sanctions from different countries and international organizations included restrictions on financing and investing into the projects and companies in Russia, including banks (Gurvich, Prilepskiy, 2015); therefore the influence of government support of companies during this period of time was particularly important for companies especially in sectors with historically high role of government such as space and nuclear industries.

We extend the research of S. Zemtsov and A. Chernov (Zemtsov, Chernov, 2019) about growth factors of high-tech Russian companies by focusing on the firms at their early stage: average age of the company in our sample is 4 years, while Zemtsov and Chernov consider companies estab-

Журнал НЭА,
№4 (52), 2021,
с. 67–97

lished before 2009. We also elaborate their research by introducing independent variables related to ownership characteristics which were found to be significant for startup performance. Therefore, we contribute to the existing literature by demonstrating the significance of the relationship between institutions' support and the high-tech startups' performance in the emerging market with significant government participation in the economy.

The findings provide strategic management insights for startup entrepreneurs for improving and adapting the ownership structure of startups or choosing the optimal ownership structure at the time of startup creation to enhance the performance of the firm.

The structure of the article is as follows. Section 2 presents a literature review which is followed by the development of the main hypothesis. Section 3 describes our variables and methodology, in Section 4 our sample is described. The main results and research limitations are presented in Section 5, Section 6 concludes.

2. Literature review and hypothesis development

This article focuses on the ownership characteristics of startups for two main reasons. First, participation in the ownership structure allows a person or an organization to participate in firm activities and development of the startup strategy. For example, based on the data of the Federal Reserve's 2003 Survey of Small Business Finances, J. Ang, R. Cole, and D. Lawson (Ang, Cole, Lawson, 2010) confirmed that owners' personal preferences account for up to 60% of the explained variation in their capital structure decisions in single-owner corporations.

Second, 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 brings the respective difficulties of obtaining debt financing. In particular, the specificity and tangibility of the assets makes it harder for the owner of a startup to use assets as collateral (Cressy, 1996) and increases the awareness of debt holders because of higher agency costs (Gompers, 1995). 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 (Mann, Sanyal, 2010; Minola, Cassia, Criaco, 2013; Mac an Bhaird, 2010, p. 12).

This result was confirmed on a sample of Russian companies: V. Hartarska and C. Gonzalez-Vega (Hartarska, Gonzalez-Vega, 2006) provided evidence of the importance of internal funds for younger firms with higher information costs in Russia, and on the higher availability of loans for firms with more transparent transactions. Therefore, our interest concerns the analysis of external equity financing as the main source of startup support.

Government development institutions for innovation, mentioned in the

Журнал НЭА,
№4 (52), 2021,
с. 67–97

introduction, were created by the Russian government to support innovative companies. In this research, we focus on direct equity financing by government development institutions to estimate their influence on startup performance. However, some top-ranking Russian universities and scientific research institutions (such as NRU HSE, MSU, and the Russian Academy of Sciences) have established business incubators to directly support young companies founded by the students or research fellows. As such institutions are mostly state-owned and funded by the government; we include such institutions in the category of government development institutions.

Although in this paper we focus only on one particular form of support provided by government development institutions – equity financing – such organizations can provide startups with other kinds of support, which are challenging to evaluate quantitatively. In particular, Rusnano group which acts as a co-investor in nanotechnology projects besides providing different forms of financing, facilitates the overcoming of administrative barriers, protects the property rights of young companies and uses its own expertise (which is relevant to the startup itself and signals outside investors). RVC acts as a government fund of funds: government participation in the company's financing through funds is supposed to be a guarantee for private investors. Industry and business experts from funds can participate in startups by taking management positions or positions on boards, which represent management and expertise support.

Most studies of developed markets did not confirm the ability of government-managed venture capital funds to significantly support firm's performance and innovation (Grilli, Murtinu, 2014; Bertoni, Tykvová, 2015). Others showed the underperformance of such funds compared to independent venture capital firms (Luukkonen, Deschryvere, Bertoni, 2013; Brander, Egan, Hellmann, 2010; Cumming, Grilli, Murtinu, 2017). Although there were successful government venture initiatives (such as Small Business Innovation Research (SBIR) program in the US (Lerner, 1996), Innovation Investment Fund (IIF) governmental program in Australia (Cumming, 2007)), the literature underlines several characteristics of governmental venture capital funds which makes them less effective. These characteristics include opaque selection processes, the impact of political and social pressure on the decision-making process, undefined exit paths, the lack of involvement in the management of startups, inexperienced and less motivated civil servants (Afful-Dadzie E., Afful-Dadzie A., 2016).

Although we assume similar features for Russian government institutions, we expect the performance of government-managed venture capital funds to be different for the Russian startups. First, we should keep in mind the underdevelopment of the Russian venture market. For example, according to the research of the Russian Venture Capital Association (RVCA, 2018) the total amount of venture capital (VC) investments in Russia in 2017 was USD 125 mln. This is less than 0.2% of the USD 67 bln of VC investment in the USA (Meisler, Cannon, 2018).

Журнал НЭА,
№4 (52), 2021,
с. 67–97

Secondly, taking into consideration the high share of the economy directly controlled by the state (46% of GDP in 2016 according to Abramov, Aksenov et al. (2018)), the Russian government can be considered as one of the most significant sources of capital for the market participants including startups. Skolkovo represents an innovation ecosystem which includes Skolkovo Technopark. The startup residents of Skolkovo Technopark have shared access to laboratories and R&D infrastructure of the Technopark, while investors and large corporations also benefit from accumulating the innovation projects in the particular area.

According to the report of (UNCTAD, 2019), the majority of special economic zones (SEZs), including such innovation systems as Skolkovo, are particularly widespread in the developing countries: out of 5383 SEZs from 147 countries more than 88% of SEZs are located in the developing countries (with China hosting more than 50% of all SEZs). Authors of the report underline that globally there are three groups of countries with lower density of SEZs: developed countries which are already sufficiently attractive for investments, countries with geographical challenges and countries with weak governance capabilities. Therefore such special economic zones will be most likely to be established and later on positively contribute to economic growth in such countries as China, India and Russia.

Thirdly, recent research on the Russian institutional environment (Yukhanaev, Fallon et al., 2015; Kravchenko et al., 2015) confirmed the presence of regulatory and administrative barriers restricting SME growth in Russia. However, government development institutions such as Skolkovo are supposed to provide startups with qualified support in overcoming such barriers and institutional voids as well as networking opportunities, which can positively influence startup performance. Indeed, the authors (Djankov, Miguel et al., 2005) showed that social network effects along with the local institutional environment are important factors in determining entrepreneurial behavior of Russian entrepreneurs based on the survey conducted in 2003–2004.

Government affiliated companies (or companies with state ownership) share in the ownership of a startup is also considered as a form of government support. We expect their presence to be a positive factor influencing startup performance similar to development institutions. Indeed, (Zemtsov, Chernov, 2019) confirmed that high-tech Russian firms supported by government affiliated companies grow faster. Moreover, we should take into consideration that since 2011 the Russian government launched an initiative to promote innovation in state-owned enterprises (SOEs) (Gershman, Thurner, 2016), therefore we expect the strong presence of such enterprises among the owners of startups.

Private equity and venture capital funds (PE and VC funds) are considered one of the most desirable sources of financing for a startup. Besides direct financing, their support for a new company can be provided in a number of ways: by bringing in management expertise (Fitza, Matusik, Mosakowski,

Журнал НЭА,
№4 (52), 2021,
с. 67–97

2000), networking (Davila, Foster, Gupta, 2003), and reputation, and therefore serving as a signal of startup quality for the other investors (Baum, Silverman, 2004; Bertoni, Colombo, Grilli, 2011). In line with the results of previous research, we expect that the presence of venture capital will have a positive impact on overall startup performance.

Family and friends are informal sources of startup support providing a startup with social capital and networks which influence the progress of the company (De Carolis, Litzky, Eddleston, 2009). In a recent study by (Edelman, Manolova et al., 2016), family social capital is found to be positively associated with the scope of startup activities by young entrepreneurs, while the opposite result was confirmed for family financial capital. However, according to (Conti, Thursby, Rothaermel 2013) money invested in a new company by friends and family can be a valuable signal for venture capital and business angels.

Taking into account market restrictions regarding access to company financing, we assume that for the Russian startups family and friends are also positive factors for firm performance. We investigate the possible implications of family members' participation, whom we define as people with the same surname. However, we were not able to collect other information regarding friends among owners about all companies in our data sample from public sources.

Managerial ownership is the financial investment of managers to support the company. Although the literature on firm performance underlines the significance of management ownership (Cui, Mak, 2002; Boeker, Wiltbank, 2005); its influence on technology firms is still controversial: while (Colombo, Croce, Murtinu, 2014) confirmed a positive relationship between the number of owner-managers and firm performance, (Wasserman, 2017) found that startups where the founders are in control (as CEO or on the board of directors) are less valuable than those where founders gave up control.

These considerations lead us to the main hypothesis of our research: *support of a startup provided both government and private institutional investors (such as government development institutions, government affiliated companies, PE and VC funds) makes a positive contribution to the startup performance.*

When we investigate the effect of ownership structure we should keep in mind the previous research about other aspects of ownership characteristics. In particular, recent research (e.g. (Fitza, Tihanyi, 2017; Wang, Shailer, 2015; Bruton, Filatotchev et al., 2010; Xia, Walker, 2014)) confirmed the presence of *ownership structure effects*, including ownership concentration, the impacts of listing, and foreign and government ownership of companies. However, according to (Aguilera, Crespi-Cladera, 2016) studies of emerging markets revealed significant differences in the impact of such ownership characteristics across and within developing countries. For example, for eight East Asian countries (Claessens et al., 2002) found a positive effect of concentrated ownership on firm value, similar to to (Chong, Lopez-de-Salines,

Журнал НЭА,
№4 (52), 2021,
с. 67–97

2007), who confirmed higher valuations for firms with high ownership concentration in Latin America. At the same time M. Omran et al. (2008) found no significant effect of ownership concentration on firm performance based on a sample of companies from Egypt, Jordan, Oman, and Tunisia.

3. Methodology

The focus of the research is to investigate the influence of ownership structure as one of the factors influencing startup performance. As a measure of startup success we use three accounting based proxy variables of startup performance: *Return on assets (ROA), Profitability and Revenue growth.*

ROA is a widely used indicator of firm performance (e.g. Artz, Norman et al., 2010; Marti, Rovira-Val, Drescher, 2015; Terjesen, Couto, Francisco, 2016; Huang, Li et al., 2015; Fitza, Tihanyi, 2017). We calculated ROA as the ratio of net income to total assets, collected from the Spark Interfax database.

Profitability is also used as a characteristic of a new small firm performance in the number of studies (e.g. Lu, Beamish, 2001; Wolff, Pett, 2006). Profitability in this research is calculated as the ratio of net income to revenue.

We also use *Revenue growth* as a dependent variable which can proxy the potential of the company. Although growth characteristics are often considered to be more important than the profitability of startups especially at the early stages (Coleman, 2018), our data includes less observations of revenue growth (as revenue growth rate is calculated as a ratio of revenue in period t to the revenue in period $t - 1$) and has a number of outliers.

Our key independent variables reflect the share of different sources of ownership.

The share of government development institutions is defined as the percentage of the ownership which is directly or indirectly controlled by such institutions, which are supposed to correct market failures by attracting private investors and building infrastructure. Along with the list of government development institutions which is published on the site of the Ministry of Economic Development of the Russian Federation we include in the calculation of this variable share of *universities* and *regional government institutions*. We consider these organizations to be affiliated with the government and oriented towards the same goals.

The share of government affiliated companies is calculated as a percentage of ownership which is directly or indirectly controlled by one of the government corporations (the State Space Corporation “Roscosmos”, the State Atomic Energy Corporation “Rosatom”, the State Corporation “Rostec”) or by companies which are partially owned by the government (such as “Gazprombank”, VTB).

PE/VC share is the percentage of startup equity which is directly or indirectly controlled by private equity fund or venture capital fund.

Журнал НЭА,
№4 (52), 2021,
с. 67–97

Family members is a binomial variable which reflects the presence of owners with the same surname in the startup ownership structure (1, where there are people with the same surname; 0, otherwise). Although we understand that there are more characteristics which define a family, we were not able to find the corresponding information.

CEO share is defined as the percentage of ownership which is directly and indirectly (via parent companies) controlled by the CEO of a startup.

We also include in our dependent variables measures of different ownership characteristics which proved to have a significant influence on firm performance in the previous research.

Offshore share and *Foreign share* is the percentage of the company's equity which belongs to entities located in the offshore or foreign countries. We define an offshore country in accordance with the Offshore tax zones list published by the Ministry of Finance of the Russian Federation.

Institutional founder, Company founder is the number of institutions and/or companies present in the ownership structure of a startup on the date of its registration as a legal entity.

Number of owners, Number of women-owners is the number of owners including all types of owners and the number of women-owners present in the ownership structure in the particular year.

Biggest share is the largest percentage of direct ownership which belongs to one person or organization.

Change of owner, Change of CEO are binomial variables reflecting a change of owner in the particular year (1, there was a change of owner or CEO; 0, otherwise).

As control variables we include other characteristics of startups which may influence startup's performance:

Woman-CEO is a binomial variable reflecting CEO gender (1, if CEO is a woman; 0, otherwise).

Age is a difference between the year of observation and the year of company's registration as a legal entity.

Logassets, leverage are variables reflecting the size and debt burden of a startup. Logassets is calculated as a logarithm of total assets, leverage is a ratio of total debt to total assets.

Nuclear is a binomial variable reflecting the cluster of a startup (1, if a startup belongs to the Nuclear cluster; 0, if a startup belongs to the Space cluster).

Skolkovo, Moscow are binomial variables which define startup location (1, if company is located in Moscow or Skolkovo respectively; 0, if otherwise).

We use random effects regression models with heteroskedasticity-consistent standard errors. Hausman tests confirmed that random effects models are more appropriate to apply to our data set compared to fixed effect models. Partially this can be explained by the use of an unbalanced sample due to missing observations for some years in the Spark system. Additionally, we assume that such test results can be driven by the fact that startups evolve

Журнал НЭА,
№4 (52), 2021,
с. 67–97

rapidly and can significantly change during the first years of the company's life, so a comparatively low number of time-invariant effects are observed. To account for potential endogeneity of ownership structure characteristics, we lagged the corresponding independent variables by one year.

4. Data

The definitions of a startup in the literature differ. Some researchers refer to *startups* as companies with a short history of operations (Cassar, 2004; Huyghebaert, Van De Gucht, 2007; Coleman, Cotei, Farhat, 2016); other researchers define them as young high-tech firms (Davila et al., 2003; Wasserman, 2017). Regarding studies of the Russian market, (Bruton, Rubanik, 2002) refer to startups as high-tech firms which are also participants of the Zelenograd Scientific and Technological park and which were chosen by its management on the basis of the companies' products.

We use a sample of startups which are Skolkovo participants. Therefore, we define startups in line with the definition of Skolkovo regulations as project participants performing R&D activities, whose results are to be commercialized not later than 5 years after participant status was awarded. According to Federal law No. 244-FZ of 28.09.2010, project participants have to be established solely for the purpose of exercising scientific research activities.

Skolkovo Innovation Center is a business area established and subsidized by the Russian government and managed by the not-for-profit Skolkovo Foundation. The Center consists of startups and companies which are developing innovative technologies as well as the Skolkovo Institute of Technology and Skolkovo city. The Skolkovo Foundation provides startups with a number of services including grants and expertise, acceleration services, regional and international development and accounting, recruiting and legal services. The startups that are the Skolkovo participants can use those services on preferential terms. Skolkovo residents are subject to tax benefits and the reimbursement of customs duty and value added tax (VAT) on goods for research activities.

To become a Skolkovo resident, a startup submits an application which is tested by experts in the field for novelty, innovation, commercialization opportunities and other requirements established by Skolkovo Foundation.

Each Skolkovo startup has to be a resident of one of the clusters: IT, Energy, Biomedicine, Nuclear or Space (as of 31.12.2017). In this research we focus on the Nuclear cluster, its key activities are based on nuclear science developments and technologies of property modification and the characterization of materials (e.g. composite materials, superconductors) and the Space cluster, which develops navigation, geo-information and telecommunication products as well as products, the development of which involves space and aviation technologies. We focus on these particular clusters as we expect to get more explicit results regarding the presence of institutional

Журнал НЭА,
№4 (52), 2021,
с. 67–97

owners, especially government affiliated companies and government development institutions. According to Russian Venture Capital Association (2018) in 2017, 66% of investments with government capital were in the industrial sector, while investments of private VC funds were focused in the IT sector (74% of total investments).

The list of Skolkovo startups is presented on the Skolkovo website. Data about the ownership, managerial and financial characteristics of the startups and their parent companies was manually collected from the Spark system[4], established by "Interfax", a major Russian information group. Spark aggregates data about companies in the CIS region from the official sources (e.g. Federal Tax Service, Federal Statistics Service), public sources and from their own call centers, and provides its users with a risk assessment and the credit history of the company.

As on 30.06.2018 there were 435 startups on the Skolkovo website in the Space and Nuclear clusters. However, five startups were not identified in the Spark system.

Due to the availability of financial results we use the startup characteristics as on the last day of the year. We had to exclude ten startups registered as companies in 2018 and one startup liquidated in 2017. We also excluded three companies for which information about owners was inconclusive.

We start with a short description of the startups at the end of 2017. We are not going to include these observations in our final sample as financial results for 2017 were not published at the time of data collection.

At the end of 2017 there were 416 startups, 207 of which are residents of the Space cluster and 209 — of the Nuclear. Most companies are registered in Skolkovo, Moscow, Moscow region or Saint Petersburg, which are the traditional Russian centers of scientific and financial activities (see Table 1). Nizhny Novgorod and Novosibirsk regions are also popular locations for establishing startups. This fact can be explained by the presence of high-ranking Russian universities and special scientific and research clusters (e.g. Akademgorodok in Novosibirsk region and Sarov in Nizhny Novgorod region). Most of the startups being the participants of Skolkovo at the end of 2017 were founded before 2013 or after 2014 that could reflect the problems in the Russian economy in 2014.

Table 1

Location and Year of Establishment of startups in 2017

Location of participant	Number of companies	Established	Number of companies
Skolkovo	155	2015	77
Moscow	121	2012	59
Moscow region	27	2016	51
Saint Petersburg	25	2011	50
Nizhny Novgorod region	12	2017	47
Novosibirsk region	11	2014	45
Other	66	Other	88

[4] https://www.spark-interfax.ru

Журнал НЭА,
№4 (52), 2021,
с. 67–97

The descriptive statistics of the other general ownership characteristics are presented in Table 2. The median number of startups owners in 2017 was two. However, out of the sample of 416 startups in 2017, only 62 (or 15%) had at least one woman-owner in their ownership structure, which is lower than the 42% of women-founded businesses observed in the study of the US startups backed by MassChallenge accelerators (Abouzahr, Taplett, Krentz, Harthorne, 2018).

Russian startups exhibit a high level of ownership concentration (the average biggest share in 2017 was 73.1%) and a low level of managerial ownership (the average CEO share was 42,9%). A study of SME in China in 2007–2009 by (Yong-hai, 2010) revealed that mean CEO stock ownership for such companies is 74%.

Table 2

Descriptive statistics of startups in 2017

Statistic	Number of companies	Mean	St.Dev.	Min	Q1	Q3	Max
Number of owners	416	2.41	1.77	1	1	3	10
Number of woman owners	416	0.16	0.41	0	0	0	2
Biggest share	416	0.73	0.27	0	0.5	1	1
CEO share	416	0.43	0.40	0	0	0.9	1

Although Spark is one of the most comprehensive databases of Russian SME, the collected data still contained some inconsistencies. For example, we had to exclude observations for which the size of total assets was smaller than RUB 10,000, which is inconsistent with the Russian legislation. Moreover, for descriptive statistics of the sample during the period 2010–2016 we excluded outliers for which ROA and Profitability was lower than minus 1000% or higher than 1000%.

Our sample for the descriptive statistics contains data on 179 startups during 2010–2016. However, due to data availability, we have an unbalanced panel with 450 observations. As we used the definition of a startup in line with Skolkovo regulations, we included 24 firms established before 2010, and among them four firms established during the period of 1992–2000.

In Table 3 we report the descriptive statistics for this sample. We can see that despite the expected potential interest of government development institutions and government affiliated companies, the average share of their ownership in the startups is 7.0 and 1.8% respectively. However, the average share of PE and VC funds in startups in our sample is even smaller – 0.8%.

The average CEO share was 35.7%. There is little evidence for the participation of offshore and foreign companies in the ownership structure of startups in our sample which is consistent with the specialization of the clusters. Our descriptive statistics indicate that on average a change of owners in our sample was observed more often than a change of the CEO.

Журнал НЭА,
№4 (52), 2021,
с. 67–97

The startups in the final sample are on average 3.9 years old and have a high level of leverage 81% (for, example, according to (Coleman et al., 2016) financial capital of US new businesses consisted of 17.5% business debt and 33.7% personal debt obtained in behalf of the business) (Table 3).

Table 3

Descriptive statistics of the final sample, %

Statistic	Number of observations	Mean	St.Dev.	Median
Share of government development institutions	450	0.071	0.193	0.000
Share of government affiliation	450	0.018	0.112	0.000
PE/VC share	450	0.008	0.051	0.000
Presence of family members	450	0.069	0.254	0.000
CEO share	450	0.356	0.378	0.216
Offshore share	450	0.012	0.097	0.000
Foreign share	450	0.038	0.179	0.000
Number of institutional founders	450	0.198	0.489	0.000
Number of company founders	450	0.387	0.606	0.000
Number of owners	450	2.524	1.806	2.000
Number of women-owners	450	0.189	0.414	0.000
Change of owner	450	0.173	0.379	0.000
Biggest share	450	0.712	0.271	0.700
Woman CEO	450	0.118	0.323	0.000
CEO change	450	0.098	0.297	0.000
Age	450	3.937	3.927	3.000
Leverage	450	0.806	1.089	0.629
Nuclear	450	0.591	0.492	1.000
Space	450	0.409	0.492	0.000
Skolkovo	450	0.131	0.338	0.000
Moscow	450	0.449	0.498	0.000
Total asset, RUB th	450	36 682	101 121	6 816
Total debt, RUB th	450	18 408	73 339	2 954
Revenue, RUB th	450	16 835	36 083	5 296
Net profit, RUB th	450	2 464	16 794	173
ROA	450	0.004	0.918	0.042
Profitability	450	–0.159	1.528	0.043
Revenue growth	268	9.551	76.794	0.409

Before proceeding to the empirical results of the hypothesis testing, we should pay attention to the correlation matrix of the variables (see Appendix 1). According to our results the share of government development

Журнал НЭА,
№4 (52), 2021,
с. 67–97

institutions is negatively and significantly correlated with the profitability of the company, while there was no significant correlation with ROA. According to the correlation matrix, government development institutions are more likely to participate in firms with larger assets.

According to the correlation matrix the only type of owners found to have positive and significant relationship with firm performance (profitability) is the share of CEO ownership. Our results indicate that the CEO has a larger share of ownership in startups with fewer assets and higher leverage. We can conclude that when the new types of owners enter the ownership structure of a startup, they usually dilute the CEO's share: as we observe negative and significant correlation between CEO share and the share of other types of owners.

5. Results

Table 4 presents the results of the best fit regressions based on the Akaike information criteria (AIC) for the startup performance on the set of ownership characteristics and other control variables. Models with a full set of variables are presented in Appendices 2 and 3.

For estimation of the models we exclude outliers in the dependent variables: as for ROA models the sample includes only startups with ROA lower than 100% and higher than –100%; for profitability we considered startups with Profitability lower than 100% and higher than –100%; for Revenue growth startups with revenue growth lower than 200% and higher than –200% were taken.

Our hypothesis on the relationship between the participation of government-related institutions and companies in ownership and firm performance was not confirmed by the regression output. According to Models (1) and (3), companies with higher participation of government development institutions exhibit lower ROA and show lower revenue growth in the following year. Model (2) indicates that companies with higher ownership of government affiliated ownership have lower levels of profitability in our sample.

A possible explanation for the rejection of our hypothesis can be linked to the fact that there could be different reasons for the support of a startup by government-related organizations rather than return on the investment. In particular, such organizations may be oriented towards strategic long-term goals while our sample covers the data for only seven years. The government is particularly interested in the social impact of a startup (e.g. job creation), which our research does not take into consideration.

We should also mention that the state support can be considered as a remedy for market failure, and is often addressed to the companies which were not able to secure private investments because of an underdeveloped capital market (Kösters, 2010).

Moreover, government-related organizations can impose barriers to startup development and put off other investors. For example, many investors considered recent arrest of Alexey Povalko, CEO of RVC, as a nega-

Журнал НЭА,
№4 (52), 2021,
с. 67–97

Table 4

Results for ROA, profitability and revenue growth

Statistic	ROA	Profitability	Revenue growth
	(1)	(2)	(3)
Development institution's share (–1)	−0.265*** (0.068)		−0.410* (0.229)
Government affiliated company's share (–1)		−0.213** (0.104)	
PE/VC share (–1)		0,568*** (0.096)	−2.990*** (0.312)
Offshore company's share (–1)	−0.405* (0.214)		
Foreign company's share (–1)	−0.127** (0.053)	−0.232*** (0.051)	
Number of women-owners (–1)	−0.113*** (0.036)	−0.123** (0.054)	
Change of owner (–1)	0.085** (0.38)		
CEO change (–1)		0.103* (0.053)	
Nuclear* PE/VC share (–1)		−1.155*** (0,173)	4.301*** (0,602)
Leverage	−0.185*** (0.051)	−0.091*** (0.017)	−0.087*** (0.026)
Skolkovo			0.597*** (0.166)
Constant	0.247*** (0.043)	0.225*** (0.030)	0.075 (0.063)
Observations	411	269	240
R^2	0,149	0,185	0.086
Adjusted R^2	0,137	0,163	0.066
F-statistic	68.539***	57.030***	22.011**

Note. In the table, «*», «**», and «***» correspond to 10, 5, and 1% level of significance, respectively.

tive signal (Saltykova, 2020). So, the companies which received a support from government institutions can be seen as potentially problematic as they attract particular attention and are involved in bureaucratic procedures. Additionally, the owners and managers of startups often point to incompetence of government institutions' teams: for instance, managers of company "Optogan" and "Usolie-Sibirskiy Silicon" mention that pressure from

Журнал НЭА,
№4 (52), 2021,
с. 67–97

"Rusnano" contributed to the failure of their projects (Tsybina, 2015; MK Baikal, 2014). The academic research of Russia's innovation policy also indicates the phenomenon of replacement of private funds with public one (Simachev, Kuzyk, Feygina, 2015).

However, our results are still different compared to previous studies (e.g. (Cumming, Grilli, Murtinu, 2017; Bertoni, Tykvová, 2015)) which showed a negligible rather than negative effect of government venture fund support.

According to model (2), the share of private venture capital is positive and significant for startup performance profitability for the Space cluster startups and negative for the Nuclear cluster startups. In general, this is in line with the previous studies, according to which venture funds can successfully identify promising startups and help realize their potential (Baum, Silverman, 2004). However, for the Nuclear cluster startups, we consider our results to be influenced by the choice of the industry, which are less attractive for venture funds due to the potential difficulties with commercialization.

The results of the third model indicate the opposite sign in relation between PE/VC fund ownership participation and revenue growth of a startup. However, (Kang, 2020) confirmed that revenue growth rates of a startup can have a negative relationship with startup profitability, while (Coleman, 2018) showed that for many entrepreneurs profitability and startup growth can be exclusive.

Our results did not reveal the significance of family members as owners. Nevertheless, we should take into consideration that our identification procedure for family members in ownership structure can be improved as it involved only comparison of surnames among the owners.

We found evidence of a positive significant relationship between change of CEO and startup profitability as well as change of the owner and startup's ROA, while managerial ownership (CEO share) and ownership concentration were not confirmed to be significant in our models. Positive relationship of startup performance and change of CEO/owner can be explained by greater diversification of ideas and expertise which can be observed when new people start working with the company, and which can be beneficial for company's development. This result is also in line with the study (Ewens, Marx, 2018) which showed that VC investors use the replacement of founders as a mechanism to add value to their portfolio companies.

However, we should mention that there is a possibility of endogeneity issue: the companies which show growth perspectives and higher profitability are more likely to be selected by VC investors (Guo, Jiang, 2013). Therefore, new investors for such companies are more likely to be documented in the ownership structure.

Our results for startup profitability indicate a negative and significant contribution of offshore and foreign ownership to startup profitability and ROA, which can be driven by the difficulties of such companies to adapt to the Russian institutional environment. There is some preferential

Журнал НЭА,
№4 (52), 2021,
с. 67–97

treatment of startups owned by the Russian companies. For instance, some government support programs (e.g. National Technology Initiative) do not provide grants to startups which are more than 50% foreign owned. These results are partially in line with findings by (Zemtsov, Chernov, 2019), who confirmed that the presence of foreign owner does not affect the company's growth rates.

We found evidence of a negative relationship between the presence of women owners and profitability of a startup. The academic literature provides a number of controversial studies about gender-based firm performance differences. For example, the result can be explained by the presence of omitted-variable bias which can lead to biased estimators. Confidence and risk appetite can be used as examples of omitted variables. This way (Huang, Kisgen, 2013) showed that male executives exhibit relative overconfidence in significant corporate decision making compared to female executives, while the results of (Galasso, Simcoe 2011) suggest that overconfident CEOs are more likely to pursue innovation, which we assume can be a successful startup strategy.

We confirmed the negative and significant relationship between leverage and startup performance. Skolkovo-based startups also exhibited higher revenue growth ceteris paribus. However, to confirm the influence of location and improve estimated coefficients, multilevel analysis should be performed (with firms' characteristics for Level 1 predictors and regional characteristics for Level 2). Moreover, interpretation of the location coefficients needs to take into account the specific rules of Skolkovo project: in particular, in the early stages of Skolkovo project, startups which actually operated in another region had to be registered in Skolkovo for bureaucratic reasons.

For the robustness check of the results we used dummy variables which indicate the presence of the particular type of support rather than the share of the ownership.

Government support (–1) is a binomial variable reflecting the presence of government development institution **or** government-affiliated company in an ownership structure of a startup in the previous period (1, if present; 0, otherwise); *Government development institutions (–1)*, *Government-affiliated company (–1) and PE/VC (–1)* reflect the presence of government development institution, or government-affiliated company, or PE/VC company respectively in an ownership structure of a startup in the previous period.

The results presented in Table 5 partially support the previous findings: while government support is not significant for ROA and profitability of a startup, the presence of such an institutional founder at the date of a company's establishment has a significant and negative relationship with these characteristics of startup performance. The sign of the coefficients of PE/VC presence in the ownership structure also did not change.

Table 5

Robustness check

Statistic	ROA		Profitability		Revenue growth	
	(1)	(2)	(3)	(4)	(5)	(6)
Government support (–1)	0.001 (0.042)		0.063 (0.054)		−0.207* (0.113)	
Government development institutions (–1)		0.002 (0.047)		0.103* (0.059)		−0.332*** (0.126)
Government-affiliated company (–1)		0.027 (0.078)		−0.046 (0.101)		0.222*** (0.079)
PE/VC (–1)	0.169 (0.120)	0.168 (0.121)	0.257*** (0.051)	0.275*** (0.050)	−0.989*** (0.092)	−1.014*** (0.088)
Offshore company's share (–1)	−0.412* (0.217)	−0.414* (0.217)				
Foreign company's share (–1)	−0.127*** (0.047)	−0.129*** (0.048)	−0.207*** (0.053)	−0.212*** (0.052)		
Institutional founder	−0.114***	−0.115***	−0.082*	−0.103**		
	(0.039)	(0.039)	(0.042)	(0.042)		
Number of women-owners (–1)	−0.107***	−0.107***	−0.118**	−0.121**	−0.164*	−0.153
	(0.035)	(0.035)	(0.054)	(0.055)	(0.105)	(0.106)
Change of owner (–1)	0.081**	0.085**				
	(0.038)	(0.039)				
CEO change (–1)			0.098*	0.091*		
			(0.052)	(0.053)		
Nuclear * PE/VC share (–1)	−0.184	−0.183	−0.492***	−0.537***	1.558***	1.716 ***
	(0.128)	(0.130)	(0.103)	(0.093)	(0.219)	(0.227)
Leverage	−0.184***	−0.184***	−0.091***	−0.091***	−0.083***	−0.082***
	(0.051)	(0.051)	(0.017)	(0.017)	(0.028)	(0.027)
Skolkovo					0.589***	0.624***
					(0.164)	(0.159)
Constant	0.246***	0.245***	0.220***	0.223***	0.124	0.118
	(0.043)	(0.044)	(0.033)	(0.033)	(0.076)	(0.075)
Observations	411	410	269	269	240	240
R^2	0.149	0.150	0.183	0.186	0.090	0.110
Adjusted R^2	0.130	0.129	0.158	0.158	0.067	0.084
F-Statistic	67.954***	68.317***	55.826***	57.022***	23.227***	28.831***

Note. In the table, «*», «**», and «***» correspond to 10, 5, and 1% level of significance, respectively.

Журнал НЭА,
№4 (52), 2021,
с. 67–97

6. Limitations and future research

Our study has a number of limitations which should be addressed in the future research.

We measure startup performance in terms of accounting-based indicators, while we need to take into consideration social and strategic aspects of startup activities such as job creation, patent registrations and the innovation of the products. Our research also does not include typical control variables which reflect labor costs of a company due to data availability. We observe startups from the Nuclear and Space clusters, which are more difficult to commercialize compared to the IT sector. Thus, we expect that the introduction of other measures of startup success and startup characteristics could provide new insights into the influence of government support.

Moreover, we should point to the bias in our sample: from the beginning we chose only startups which are the participants of Skolkovo project, which is established by the Russian government. (Löfsten, Lindelöf, 2002) confirmed that there is a significant difference in the performance of firms depending on whether they are part of the science park in Sweden. (Yakovlev, Zhuravskaya, 2013) confirmed that enforced liberalization of business regulation in Russia between 2001 and 2004 positively contributed to performance of small businesses in Russian regions with good governance institutions. As Skolkovo project provided its startups also with fiscal incentives, we consider Skolkovo preferences to be an important factor influencing startup activity. Therefore in future research we need to include startups which are not affiliated with government projects in order to completely exclude government influence. Our sample is also subject to a survivorship bias as we consider only startups which were still present in Skolkovo in the middle of 2018.

Although we used lagged independent variables, we were not able to exclude the endogeneity concern completely: there are studies that confirm that particular groups of investors are able to differentiate certain types of startups from the very beginning: for example, according to (Baum, Silverman, 2004) venture funds are able to pick startups which have greater potential.

This research could be enhanced by qualitative data collected from interviews with CEOs and owners of Russian technology startups in order to confirm our interpretation of the results. This could enhance our understanding of the real support provided by the owners and give insights into how startups choose their ownership structure.

7. Conclusion

This study shows that alongside the macroeconomic environment observed by the previous research (Hartarska, Gonzalez-Vega, 2006; Molz, Tabbaa, Totskaya, 2009; Chadee, Roxas, 2013; Barinova, Eremkin, Zemtsov, 2015), microeconomic factors play an important role contributing to startup performance in Russia. This paper uses the unique dataset of Skolkovo start-

Журнал НЭА,
№4 (52), 2021,
с. 67–97

ups to investigate the relationship between support provided by different types of institutional investors in the form of equity financing and the startup performance in Russia. We use our results on Skolkovo startups to draw conclusions about Russian startups supported by the government in general as Skolkovo represents one of the biggest innovation ecosystems in Russia with clearly defined and surmountable barriers in order to become a participant.

We found no evidence of the positive relationship between the share of government-related organizations in ownership and firm performance proxied by ROA, profitability and revenue growth. Although the scope of this paper does not include endogeneity tests and requires further investigation taking into account the influence of financial results on state institutional participation, we assume that our results can be explained by the fact that such organizations could be more interested in investments in strategically important startups rather than in companies which provide high returns. Additionally, we should take into consideration the specific features inherent in government institutions and identified by (Alperovych, Groh, Quas, 2016): 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.

In line with previous studies 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.

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

We should also mention that the survey of top-managers of Russian innovation companies about the influence of the government institutions' support demonstrated the opposite results. In contrast to (Simachev, Kuzyk 2017) who found a positive relationship of such institutions on the innovative behavior of the firms, we confirmed the negative relationship between firm performance and government development institutions' support. Therefore, our findings should be developed further by qualitative research, including personal interviews with startups' managers and owners to find more detail about the support provided by government and private institutions, companies and family members and managers.

Our manually collected database can be used for further research on the performance of startups while keeping in mind the sample selection and survivorship biases.

Журнал НЭА,
№4 (52), 2021,
с. 67–97

APPENDIX

1. Correlation matrix

	Biggest	CEO	Offshore	Foreign	PE/VC	GovDev	GovAff
Biggest	1.00	0.28***	0.08	0.11**	–0.05	–0.18***	0.03
CEO	0.28***	1.00	–0.10**	–0.18***	–0.06	–0.27***	–0.14***
Offshore	0.08	–0.10**	1.00	–0.03	0.12**	–0.04	–0.02
Foreign	0.11**	–0.18***	–0.03	1.00	–0.03	–0.04	–0.02
PE/VC	–0.05	–0.06	0.12**	–0.03	1.00	0.03	–0.02
GovDev	–0.18***	–0.27***	–0.04	–0.04	0.03	1.00	–0.03
GovAff	0.03	–0.14***	–0.02	–0.02	–0.02	–0.03	1.00
Assets	0.01	–0.14***	0.06	0.05	–0.01	0.11**	0.23***
Debt	0.05	–0.07	0.09*	0.02	0.00	0.08*	0.01
Revenue	0.08*	0.02	–0.04	–0.02	–0.03	–0.12**	0.02
Netprofit	–0.03	0.02	–0.14***	–0.17***	–0.02	–0.11	–0.04
ROA	–0.03	–0.01	–0.05	–0.06	0.00	–0.05	0.01
Prftbly	–0.03	0.12***	–0.22***	–0.21***	0.01	–0.19***	–0.01
Leverage	0.06	0.10**	–0.01	–0.01	–0.02	–0.07	–0.04

	Assets	Debt	Revenue	Netprofit	ROA	Prftbly	Leverage
Biggest	0.01	0.05	0.08*	–0.03	–0.03	–0.03	0.06
CEO	–0.14***	–0.07	0.02	0.02	–0.01	0.12***	0.10**
Offshore	0.06	0.09*	–0.04	–0.14***	–0.05	–0.22***	–0.01
Foreign	0.05	0.02	–0.02	–0.17***	–0.06	–0.21***	–0.01
PE/VC	–0.01	0.00	–0.03	–0.02	0.00	0.01	–0.02
GovDev	0.11**	0.08*	–0.12**	–0.11	–0.05	–0.19***	–0.07
GovAff	0.23***	0.01	0.02	–0.04	0.01	–0.01	–0.04
Assets	1.00	0.81***	0.28***	0.12***	0.02	0.02	–0.10**
Debt	0.81***	1.00	0.13***	0.06	0.00	0.07	0.01
Revenue	0.28***	0.13***	1.00	0.45***	0.11**	0.09**	–0.12**
Netprofit	0.12***	0.06	0.45***	1.00	0.23***	0.35***	–0.12***
ROA	0.02	0.00	0.11**	0.23***	1.00	0.34***	–0.67***
Prftbly	0.02	0.07	0.09**	0.35***	0.34***	1.00	–0.09**
Leverage	–0.10**	0.01	–0.12**	–0.12***	–0.67***	–0.09**	1.00

Based on 450 observations of 179 startups during 2010–2016. For detailed description of variables see Methodology section: Biggest – Biggest share, CEO – CEO share, Offshore – Offshore share, Foreign – Foreign share, PE/VC – PE/VC share, GovDev – Share of government development institutions, GovAff – Share of government affiliated company, Assets – Total assets of the company, Debt – Total debt of the company, Revenue – Total revenue of the company, Net profit – Net profit of the company, ROA – Return on assets, Prftbly – Profitability.

2. Regression results for ROA

Statistics	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Development institutions' share (–1)	−0.171** (0.070)	−0.276*** (0.070)	−0.276*** (0.068)	−0.276*** (0.068)	−0.277*** (0.068)	−0.281*** (0.067)	−0.293*** (0.069)	−0.272*** (0.067)	−0.272*** (0.067)	−0.275*** (0.067)	−0.266*** (0.066)	−0.260*** (0.067)	−0.265*** (0.068)
Government-affiliated company's share (–1)	−0.109 (0.080)	−0.140 (0.096)	−0.142 (0.096)	−0.142 (0.096)	−0.143 (0.091)	−0.141 (0.088)	−0.129 (0.096)	−0.116 (0.092)	−0.117 (0.092)	−0.144* (0.087)	−0.138 (0.086)		
PE/VC share (–1)	0.296 (0.439)	0.228 (0.358)	0.253 (0.353)	0.254 (0.352)	0.279 (0.347)	0.272 (0.335)	0.078 (0.152)	0.083 (0.153)					
Presence of family members (–1)	−0.067 (0.051)	−0.082 (0.051)	−0.079 (0.051)	−0.079 (0.051)	−0.079 (0.051)	−0.081 (0.051)	−0.074 (0.050)	−0.070 (0.050)	−0.068 (0.049)	−0.076 (0.050)			
Private company's share (–1)	−0.072 (0.054)	−0.050 (0.051)	−0.055 (0.048)	−0.055 (0.045)	−0.054 (0.045)	−0.053 (0.044)	−0.052 (0.042)	−0.042 (0.039)	−0.041 (0.039)				
Offshore company's share (–1)	−0.394* (0.211)	−0.399* (0.209)	−0.400* (0.210)	−0.400* (0.210)	−0.408* (0.218)	−0.404* (0.216)	−0.404* (0.216)	−0.394* (0.217)	−0.392* (0.216)	−0.420* (0.217)	−0.413* (0.216)	−0.407* (0.216)	−0.405* (0.214)
Foreign company's share (–1)	−0.109* (0.064)	−0.116* (0.068)	−0.118* (0.068)	−0.118* (0.068)	−0.123* (0.064)	−0.122** (0.061)	−0.113** (0.058)	−0.103* (0.056)	−0.103* (0.056)	−0.128** (0.051)	−0.122** (0.051)	−0.120** (0.051)	−0.127** (0.053)
Institutional founder	−0.068* (0.039)												
Company founder	0.006 (0.031)												
CEO share (–1)	−0.039 (0.058)	−0.030 (0.056)	−0.037 (0.050)	−0.037 (0.050)	−0.037 (0.050)	−0.039 (0.051)	−0.037 (0.051)						
Number of owners (–1)	0.006 (0.013)	0.004 (0.013)											
Number of women-owners (–1)	−0.125*** (0.041)	−0.118*** (0.041)	−0.116*** (0.040)	−0.116*** (0.040)	−0.117*** (0.040)	−0.116*** (0.040)	−0.111*** (0.038)	−0.105*** (0.040)	−0.106*** (0.039)	−0.097*** (0.037)	−0.098*** (0.038)	−0.096** (0.038)	−0.113*** (0.036)
Change of owner (–1)	0.083** (0.037)	0.083** (0.038)	0.084** (0.038)	0.084** (0.038)	0.085** (0.038)	0.086** (0.038)	0.089** (0.037)	0.089** (0.038)	0.089** (0.038)	0.087** (0.038)	0.089** (0.038)	0.087** (0.038)	0.085** (0.38)
Biggest share (–1)	0.001 (0.107)	0.003 (0.107)											

End of table 2. Regression results for ROA

Statistics	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Woman-CEO (–1)	−0.046	−0.055	−0.055	−0.055	−0.054	−0.054	−0.057	−0.058	−0.058	−0.058	−0.063	−0.060	
	(0.041)	(0.043)	(0.043)	(0.043)	(0.042)	(0.041)	(0.040)	(0.039)	(0.039)	(0.037)	(0.038)	(0.039)	
CEO change (–1)	−0.004	−0.003	−0.003										
	(0.051)	(0.051)	(0.051)										
Nuclear * PE/VC share (–1)	−0.251	−0.208	−0.232	−0.233	−0.258	−0.244							
	(0.470)	(0.402)	(0.398)	(0.398)	(0.389)	(0.369)							
Age	−0.001	−0.001	−0.0003	−0.0003	−0.0002								
	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)								
Leverage	−0.191***	−0.192***	−0.193***	−0.192***	−0.192***	−0.193***	−0.191***	−0.191***	−0.191***	−0.189***	−0.190***	−0.189***	−0.185***
	(0.052)	(0.053)	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)	(0.052)	(0.051)
Logassets	0.002	0.002	0.002	0.002	0.002								
	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)								
Nuclear	−0.037	−0.042	−0.040	−0.040	−0.042	−0.041							
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)							
Skolkovo	−0.015	−0.019	−0.020	−0.020									
	(0.074)	(0.074)	(0.074)	(0.074)									
Moscow	0.01	0.009	0.009	0.009									
	(0.035)	(0.035)	(0.035)	(0.035)									
Constant	0.290*	0.281*	0.299***	0.299***	0.299***	0.319***	0.292***	0.273***	0.274***	0.263***	0.256***	0.252***	0.247***
	(0.151)	(0,149)	(0.109)	(0.109)	(0.113)	(0.051)	(0.052)	(0.048)	(0.048)	(0.045)	(0.044)	(0.044)	(0.043)
Observations	410	410	410	410	410	410	410	410	410	410	410	411	411
R^2	0.166	0.163	0.163	0.163	0.162	0.163	0.16	0.159	0.158	0.157	0.154	0.151	0.149
Adjusted R^2	0.117	0.117	0.122	0.124	0.128	0.133	0.134	0.135	0.137	0.138	0.137	0.137	0.137
F-Statistic	74.708***	73.132***	73.509***	73.691***	73.870***	74.427***	73.089***	72.754***	72.851***	72.392***	70.792***	69.572***	68.539***
AIC	49.341	45.348	41.351	39.351	35.354	31.359	27.363	25.363	23.364	21.369	19.369	17.368	15.368

Журнал НЭА, №4 (52), 2021, с. 67–97

3. Regression results for profitability

Statistics	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Development institution's share(–1)	0.091	0.082	0,078	–0.043	–0.048	–0.063	–0.049	–0.049	–0.055				
	(0.177)	(0.181)	(0.184)	(0.134)	(0.132)	(0.123)	(0.125)	(0.125)	(0.136)				
Government-affiliated company's share (–1)	–0.252**	–0.270**	–0.273***	–0.293**	–0.274**	–0.280**	–0.277**	–0.277**	–0.240***	–0.237***	–0.232***	–0.242***	–0.213**
	(0.118)	(0.118)	(0.106)	(0.120)	(0.111)	(0.110)	(0.109)	(0.109)	(0.091)	(0.090)	(0.088)	(0.090)	(0.104)
PE/VC share (–1)	0.526**	0.571**	0.644***	0.427**	0.378**	0.378**	0.406***	0.408***	0.414***	0.421***	0.434***	0.409***	0.568***
	(0.236)	(0.243)	(0.246)	(0.166)	(0.156)	(0.156)	(0.154)	(0.153)	(0.142)	(0.140)	(0.139)	(0.139)	(0.096)
Presence of family members (–1)	0,007	0,021	0,021	0,0005	0,001	–0.003	–0.004						
	(0.079)	(0.078)	(0.076)	(0.070)	(0.072)	(0.071)	(0.073)						
Private company's share (–1)	–0.083	–0.109*	–0.102	–0.084	–0.092	–0.096	–0.093	–0.093					
	(0.068)	(0.065)	(0.066)	(0.067)	(0.071)	(0.072)	(0.075)	(0.072)					
Offshore company's share (–1)	–0.110	–0.120	–0.121	–0.130									
	(0.437)	(0.445)	(0.436)	(0.437)									
Foreign company's share (–1)	–0.252***	–0.271***	–0.283***	–0.295***	–0.279***	–0.283***	–0.276***	–0.275***	–0.237***	–0.238***	–0.250***	–0.248***	–0.232***
	(0.090)	(0.089)	(0.080)	(0.082)	(0.076)	(0.075)	(0.075)	(0.075)	(0.070)	(0.070)	(0.071)	(0.062)	(0.051)
Institutional founder	–0.075	–0.065	–0.067										
	(0.055)	(0.055)	(0.056)										
Company founder	0.087**	0.091**	0.090**	0.081*	0.08*	0.076*	0.074	0.074*					
	(0.039)	(0.040)	(0.041)	(0.046)	(0.047)	(0.045)	(0.045)	(0.045)					
CEO share (–1)	0,049	0,022	0,022	0,028	0,025								
	(0.073)	(0.068)	(0.070)	(0.070)	(0.071)								
Number of owners (–1)	0,006												
	(0.018)												
Number of women-owners (–1)	–0.132**	–0.130**	–0.131**	–0.128**	–0.129**	–0.133**	–0.140**	–0.140**	–0.128**	–0.125**	–0.139**	–0.134**	–0.123**
	(0.066)	(0.065)	(0.065)	(0.065)	(0.064)	(0.065)	(0.065)	(0.064)	(0.062)	(0.061)	(0.058)	(0.057)	(0.054)
Change of owner (–1)	0.048	0.048	0.049	0.05	0.054	0.055	0.057	0.057	0.059	0.058	0.055		
	(0.039)	(0.040)	(0.040)	(0.040)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.038)		
Biggest share (–1)	–0.077												
	(0.146)												

Журнал НЭА, №4 (52), 2021, с. 67–97

End of table 3. Regression results for profitability

Statistics	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Woman-CEO (–1)	−0.082	−0.091	−0.082	−0.087	−0.083	−0.082	−0.076	−0.076	−0.075	−0.077			
	(0.056)	(0.057)	(0.058)	(0.056)	(0.055)	(0.055)	(0.055)	(0.054)	(0.054)	(0.055)			
CEO change (–1)	0.095*	0.094*	0.093*	0.096*	0.095*	0.094*	0.099*	0.099*	0.089*	0.089*	0.087*	0.100*	0.103*
	(0.049)	(0.051)	(0.050)	(0.050)	(0.051)	(0.051)	(0.052)	(0.052)	(0.052)	(0.052)	(0.053)	(0.053)	(0.053)
Nuclear * PE/VC share (–1)	−1.098***	−1.162***	−1.242***	−1.018***	−0.939***	−0.932***	−0.959***	−0.963***	−0.897***	−0.905***	−0.942***	−0.934***	−1.155***
	-0.35	-0.359	-0.353	-0.324	-0.301	-0.301	(0.307)	(0.303)	(0.259)	(0.253)	(0.234)	(0.232)	(0,173)
Age	−0.006	−0.006	−0.006	−0.006	−0.005	−0.005							
	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)							
Leverage	−0.092***	−0.094***	−0.093***	−0.092***	−0.097***	−0.096***	−0.095***	−0.095***	−0.094***	−0.094***	−0.092***	−0.093***	−0.091***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Logassets	0.009	0.008	0.009	0.009									
	(0.014)	(0.014)	(0.014)	(0.014)									
Nuclear	−0.079	−0.072	−0.075	−0.079	−0.077	−0.077	−0.077	−0.077	−0.070	−0.073	−0.076	−0.075	
	(0.049)	(0.049)	(0.048)	(0.048)	(0.047)	(0.047)	(0.047)	(0.048)	(0.047)	(0.048)	(0.048)	(0.047)	
Skolkovo	−0.045	−0.047											
	(0.082)	(0.081)											
Moscow	0.025	0.027											
	(0.051)	(0.055)											
Constant	0.231	0.210	0.212*	0.207*	0.286 ***	0.298***	0.274***	0.274***	0.272***	0.270***	0.265***	0.273***	0.225***
	(0.193)	(0.122)	(0.124)	(0.124)	(0.067)	(0.052)	(0.048)	(0.047)	(0.044)	(0.044)	(0.043)	(0.043)	(0.030)
Observations	269	269	269	269	269	269	269	269	269	269	269	269	269
R^2	0.218	0.214	0.211	0.209	0.208	0.208	0.206	0.206	0.199	0.198	0.196	0.193	0.185
Adjusted R^2	0.145	0.148	0.151	0.153	0.158	0.161	0.163	0.166	0.165	0.167	0.168	0.168	0.163
F-Statistic	65.904***	65.000***	64.394***	63.868***	63.974***	64.190***	63.699***	63.952***	61.428***	61.466***	60.681***	59.686***	57.030***
AIC	48.808	44.813	40.815	38.821	34.836	32.84	30.842	28.842	24.859	22.859	20.872	18.884	16.892

Журнал НЭА, №4 (52), 2021, с. 67–97

Журнал НЭА,
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Стартапы в России: структура собственности и успешность

Аннотация. В данной статье рассматриваются характеристики структуры собственности с точки зрения их влияния на деятельность технологических стартапов в России. Особое внимание в исследовании уделено типу собственника (основатель, государственная структура, частный институт). На основе несбалансированной панельной выборки стартапов, являющихся участниками Сколково, в период с 2010 по 2016 г. была обнаружена обратная зависимость между поддержкой со стороны государственных институтов и выбранными показателями успешности стартапа. В то же время подтвердилось значимое влияние инвестиций частных венчурных фондов в капитал стартапов, однако данный эффект различается для изучаемых отраслей. Результаты исследования не подтвердили взаимосвязи между наличием родственных связей между собственниками стартапа и его успешностью, однако была найдена положительная зависимость между сменой владельца или руководителя компании и последующей успешностью стартапа. В статье приводятся возможные объяснения обнаруженных взаимосвязей, а также обсуждаются стратегические выводы для собственников и инвесторов технологических компаний.

Ключевые слова: *стартапы; структура собственности; институты развития; развивающиеся рынки.*

Классификация JEL: M13, G32, G34, O38.

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