Performance of FinTechs: Are founder characteristics important?*

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Abstract

Building on the resource-based view of entrepreneurship, we examine the association between founder characteristics and performance of FinTechs, high-growth technology-driven companies. We use cross-sectional regression models on a dataset of 132 FinTechs from Russia. The results show that FinTechs established by companies perform better than FinTechs established by individuals. Further, FinTechs founded by persons with banking backgrounds grow more quickly. In contrast to economics or business education, a combination of IT education and banking experience is also associated with greater company growth. Our results provide insights into the resource-based view of entrepreneurship, demonstrating that a FinTech founder's characteristics play an important role in its success. While parent company support creates a stronger competitive advantage for FinTechs in the establishment phase, the combination of IT education and banking experience are a difficult-to-imitate asset for FinTechs founded by individuals.

Keywords FinTechs, performance, founder characteristics, type of founding entity
JEL Codes: L25 M13 L26

1. Introduction

In the last decade, the financial services landscape has changed due to the emergence of FinTechs – companies that combine modern technologies (e.g. cloud computing, mobile Internet) to provide financial services (e.g. payments, lending). Their growing influence is evidence of the increasing flow of investments into FinTechs. According to KPMG (2019), in 2018, the global annual volume of investments in FinTechs amounted to $111.8 billion, over 120 % higher than in 2017. Nearly 82 % of banks and other financial organisations plan to collaborate with FinTechs in the future, and over 88 % have some fear of not being able to compete with FinTechs (PWC 2017). Since FinTechs are expected to play a considerable role in shaping the global financial industry, it is important to understand the various factors impacting their development. The recent litera-

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ture review by Kavuri and Milne (2019) highlights the need to investigate the drivers of FinTech success. We address this gap from the perspective of FinTech founders.

The resource-based view (RBV) of entrepreneurship considers resources to be key drivers of firm performance. Resources that are rare and inimitable make it possible for a company to develop a competitive advantage and to achieve superior performance (Barney/Wright/Ketchen 2001) – the characteristics of founders can be considered such a resource. Review papers by Sorensen and Chang (2006) and Klotz et al. (2014) show that the relationship between a company's performance and its founders' characteristics (e.g. level of education, gender) remains mixed, and the outcomes tend to vary across industries, selected founder characteristics and performance indicators. This indicates that the association should be investigated in more homogeneous firms. To our knowledge, no previous paper has investigated the impact of various founder characteristics on FinTech performance. Compared to many other enterprises, FinTechs, as high-technology companies, are exposed to a more complex business environment, which calls for founders with multidisciplinary knowledge and skills. Therefore, this context would provide an interesting testing ground for RBV of entrepreneurship.

We use a unique dataset of Russian FinTechs at the end of 2017. Despite the peculiarities of history as well as the economic and political situation in Russia, the country deserves attention for the following reasons. First, the FinTech market in Russia demonstrates an investment growth rate similar to global trends (Shustikov 2018), and it is among the top 20 in the world in terms of the number of FinTechs established in the country (Laidroo/Avarmaa 2019). Second, Russian M&A deals in FinTech periodically reach the global top of FinTech deals, like the Yandex deal in 2018 (KPMG 2019). Third, the share of FinTech users in Russia (nearly 42 %) is the same as in the UK and in Europe (Ernst & Young 2017). Fourth, there is a similar distribution of FinTech companies by area of activity in Russia as there is in the world (Soloviev 2018). Considering the size of Russia, this demonstrates that the country is an interesting case for investigating FinTech founder aspects.

We examine the association between founder characteristics and FinTech performance. Specifically, we use cross-sectional regression models on a dataset of 132 Russian FinTechs, 88 of which have been established by individuals and the rest by existing companies. We measure FinTech performance by year-on-year revenue and asset growth during 2016–2017 as well as return on assets (ROA) in 2017. The results show that FinTech performance depends on the type of founder (company or individual) as well as on the previous work experience and education of the founding individual. The FinTechs founded by other companies tend to grow more quickly and be more profitable than similar companies found-

ed by individuals. This suggests that the support of the parent company is a difficult-to-imitate resource, which creates a competitive advantage. If the founder is an individual, the FinTech grows more quickly when the founder has previous banking experience. Interestingly, a founder's education in economics or business provides no clear advantage over other types of education; however, the combination of the founder's previous banking background and IT education is associated with significantly greater growth in FinTech revenue and assets. This demonstrates the relevance of specialised knowledge for FinTech development.

Our paper contributes to the literature on FinTechs by being the first to investigate the relationship between founder characteristics and FinTech performance and thus addresses the gap that Kavuri and Milne (2019) identified. It also complements the FinTech literature in Russia that has thus far been limited to assessments of local FinTech development trends (Nikitina/Nikitin/Galper 2017; Eskindarov/Abramova/Maslennikov/Amosova/Varnavskii/Dubova 2018) and problems associated with digitalisation (Krivosheeva 2018). We also contribute to the RBV of entrepreneurship (Barney 1991; Prahalad/Hamel 1997; Čater/Čater 2009; Madhani 2010; Jardon/Molodchik, 2017) by investigating a combination of founder education and experience as a difficult-to-imitate resource for FinTech companies that is likely to be relevant for other high-growth, technology-driven ventures. Kellermans et al. (2016) argued that the performance implications of the founder as a resource need to be investigated separately from those of other human resources -we address this gap.

The paper is structured as follows. Section 2 provides an overview of the theoretical and empirical background. We discuss our data and methodology in Section 3 and our results in Section 4. Finally, Section 5 contains the discussion and concludes.

2. Literature review

The RBV that emerged in the field of strategic management in the 1980s and 1990s (Wernerfelt 1984; Barney 1991; Prahalad/Hamel 1997) suggests that the resources a company possesses are the primary determinants of its performance and may contribute to its sustainable competitive advantage. A firm that acquires and controls valuable, rare, inimitable, non-substitutable resources and capabilities – and is able to apply them – can achieve a sustainable competitive advantage (Barney 1991). Among the different company resources (physical, human, organisational capital), human capital is a critical source of competitive advantage because it is usually heterogeneous, rare and difficult to imitate (Peteraf 1993). Since its emergence, the RBV has been extensively tested in the empirical literature and has gained a moderate level of support (Newbert 2007). Although the RBV was initially developed for established companies, researchers have increasingly applied its insights to understand new venture performance

(Kellermans et al. 2016; Marullo/Casprini/Di Minin/Piccaluga 2018). Kellermans et al. (2016) call for separating the two types of human capital – owners and employees – and seeking evidence on the performance implications of each type of human capital. We intend to fill this gap by focusing on the association between founder characteristics and venture performance.

As Dixon and Day (2010) highlighted, applying RBV depends heavily on the company's external environment. Therefore, while formulating the hypotheses, we consider the specifics of the FinTech activity as well as the peculiarities of the historical and institutional context of Russia.

2.1 The performance of FinTechs and type of founding entity

It is possible to broadly distinguish between two types of founders: companies and individuals. Based on the RBV, firms established by different types of founders are likely to experience different founding conditions. Founding conditions are interpreted as financial or human resources, which are required to achieve effective company functioning (Cooper/Gimeno-Gascon/Woo 1994). Compared to individuals, companies are likely to have more resources and experience in analysing the market – as a result, they should be able to develop products or services with greater potential. Established companies also tend to have more useful professional contacts to promote their business ideas (Hannanova 2008) and better access to financing due to lower information asymmetry between the company owners and funding providers (Spence 2002). If resources are more easily available to established firms than individuals, FinTechs established by firms are likely to perform better. In the context of Russia, established firms may also be more experienced (compared to individuals) in handling the institutional peculiarities of the regulation-sensitive field of FinTech. Therefore, we propose the following hypothesis:

H1. FinTechs founded by individuals perform worse than FinTechs founded by companies.

2.2 The performance of FinTechs and characteristics of founders

Founders must identify their company's strategy in a rapidly changing technological environment. Their characteristics influence their knowledge creation in establishing a new venture, and their capabilities comprise the firm's resources, based on which the company may create a competitive advantage (Arvanitis/Stucki 2012). Therefore, founder characteristics are likely to be important determinants of start-up performance.

FinTech activities are directly related to innovations and information technology that are changing at an accelerated pace. To keep up with the trends and be competitive in the market, a FinTech company founder needs to be flexible to

change and capable of processing new information. Previous literature on founder characteristics has reported a number of reasons why younger people are in a better position for starting and managing a new venture. The age of the founder is assumed to be connected with the capability to analyse and handle a large amount of information. Older founders may face difficulties in perceiving new information and mastering new technologies (Hambrick/Mason 1984). As a result, older people might have a hard time competing with the more progressive younger generation in the field of digitalisation and informatisation (Salthouse 2009; Cai/Stoyanov 2016). With age, people may also become more sensitive to physical and psychological stress (Child 1974) and may need additional skills and professional support to overcome social barriers to start and run a business (Kenny/Rossiter 2018). The context of Russian history and its impact on company performance also needs to be considered. The Soviet-style economy did not value entrepreneurial activity; however, the modern-day FinTech landscape requires entrepreneurial spirit that is more natural for the younger generations of Russians. As they are more used to entrepreneurial activity and profit-seeking, the companies they have founded are likely to perform better.

In contrast, it has also been argued that older entrepreneurs are able to conduct successful businesses because of their accumulated life experience and their human and social capital (Singh/DeNoble 2003; Pitkänen/Parvinen/Töytäri 2014). Still, considering that in Russia, the life experience of the older generation is unlikely to support superior FinTech performance, and taking into account that FinTech activity requires strong IT skills (which are more natural for the younger generations), we propose the following hypothesis:

H2. FinTechs with younger founders perform better than FinTechs with older founders.

Herrmann and Datta (2002) argued that educated entrepreneurs have an appropriate knowledge base that helps them to master new information, make informed decisions and adapt to changing conditions. It has also been shown that education directly related to business management provides more suitable preparation for future entrepreneurs than other types of education (McMullan/Gillin 1998; Škudienė/Auruškevičienė/Pundzienė 2010). FinTechs operate at the junction of financial services and technology – this requires certain skills that may be acquired through either formal education or real-life experience. Although FinTechs are connected to the financial world, education in IT might provide a better starting point, as the technological component generally forms the source of FinTechs' competitive advantage in comparison to traditional financial services companies. Thus, we formulate the following hypothesis:

H3. FinTechs with founders possessing IT education perform better than other FinTechs.

The importance of personal experience for new venture success is supported by several arguments. First, former experience in the particular area allows actors to learn the specifics of the industry, analyse the target market and competitors and determine the features of the products or services provided (Cooper/Gimeno-Gascon/Woo 1994). Second, the experience can be linked to many business contacts, which could help to attract the resources needed to develop the company and organise the sale of services (Granovetter 2002). As FinTechs compete and collaborate with traditional financial intermediaries, having experience in the financial sector is a clear advantage for an entrepreneur. Therefore, we propose the following hypothesis:

H4. FinTechs run by founders with experience in banking perform better than other FinTechs.

3. Data and methodology

We began our selection process with a population of Russian FinTechs included on a Fintech map at the end of 2018 composed by RusBase[1]; it contained a total of 322 companies. To be included in our dataset, the FinTech had to be registered in Russia and had to be founded 2001–2016; this enabled us to use the financial data available for 2016 and 2017. As we were only interested in FinTechs, we only included companies that utilised modern technologies (e.g. cloud computing, mobile Internet) to provide financial services (e.g. payments, lending). We also divided FinTechs into different segments based on their distinctive business models. Dorfleitner et al. (2017) suggested categorising FinTechs into financing, asset management, payments and other FinTechs. Alternative classifications exist that go beyond traditional financial services. For example, the World Economic Forum (2015) distinguishes FinTechs involved in payments, deposits and lending, capital-raising, insurance, investment management and market provisioning (including machine learning and big data). The International Organization of Securities Commissions (2017) maps FinTech activity across eight categories: payments, insurance, planning (personal finance), lending and crowdfunding, blockchain, trading and investments, data and analytics and security. We decided to follow a taxonomy that would correspond to the distinctive business models of Russian FinTech companies and would grasp in detail the technology-driven activities that Dorfleitner et al. (2017) did not specifically cover. Therefore, our taxonomy is more similar to the one the International Organization of Securities Commissions (2017) proposed. It covers traditional financial services (payments, deposits and lending, investment management) and technology-driven business models (distributed lender technology, banking infrastructure and analytics). Our technology-driven business models fall under Dorfleitner et al.'s (2017) 'other FinTechs group'. We also broadened the financ-

1 https://rb.ru/fintech/.

ing category they proposed to include deposits, as proposed in the World Economic Forum (2015).[2] After applying the above-mentioned inclusion and exclusion criteria, the population decreased to 182 FinTechs.

We retrieved data on the financials and founders of FinTechs from SPARK, a Russian database connected to various state databases. We merged these data with hand-collected information on founder education and observations from the social media platforms Facebook and LinkedIn. Due to some missing data and extreme observations[3], the final dataset we used in our estimations contained data on 132 companies, 88 (66 %) of which were established by an individual and 44 of which by a company.

We focus mainly on FinTech performance measured by growth indicators such as revenue growth (*revg*) and asset growth (*assg*). These indicators allow us to capture start-up performance better than profitability indicators because start-ups tend to initially operate at close to zero income (Rompho 2018). We also have to take into account the Russian cultural and institutional context, which may be more tolerant toward misreported profits (Malofeeva 2018). In such an environment, indicators unrelated to profits may provide a more objective picture of reality. Still, to provide some comparison with more traditional performance measures, we use return on assets (*roa*) as a robustness indicator.

We investigate the associations between founder characteristics and FinTech performance in the context of univariate tests (using either Kruskal–Wallis or the Mann–Whitney U test) followed by a regression analysis. Regression models using performance as dependent variables were common in most of the previous studies (e.g. Arumona/Onmonya/Omotayo 2019, Kaur/Singh 2019; Prosvirkina/Wolfs 2019). As regression models allowed us to control for the impact of multiple variables on FinTech performance simultaneously, we use founder-specific variables, FinTech size (measured by the natural log of total assets) and other FinTech characteristics as explanatory variables. In terms of founder-specific indicators (marked with the prefix *f_*), we focus on the type of founder (company or individual) and several individual-specific characteristics of founders.[4] The latter includes the founder's age, education, work experience in banking and education combined with experience in banking. We also control for the founder's gender (see Table 1 for details on the dummies employed). FinTech characteristics (marked with the prefix *c_*) cover the FinTech's location (Moscow or other), age and activity. FinTech business model variables (marked with the prefix *b_*)

2 We consider our investment management category to be equivalent to the asset management in Dorfleitner et al. (2017).

3 We eliminated extreme observations with revenue growth above 500 %, asset growth above 1500 % and ROA above 1500 %.

4 We focus on the person with the largest holding in the FinTech. There are only nine FinTechs with more than one founder.

include the FinTech's market (Russia or other), type of customers (business, private or both), channel of customer contact (personal, information system or both) and source of revenue (see Table 1 for the variables' definitions and descriptive statistics).

As can be seen from Table 1, FinTechs' size and performance are rather heterogeneous. In terms of founder characteristics, 48 % of the individuals who founded a FinTech in Russia are below 40, and in 81 % of cases, they are male. A total of 76 % of the founders have previous education in IT or economics, and 51 % have previous work experience in the banking sector. FinTechs tend to have rather similar characteristics: 75 % of the FinTechs are registered in Moscow, and 64 % are less than five years old. Also, FinTech activity is rather evenly distributed between the identified six activity categories, demonstrating that there is no clear dominant specialisation. In terms of business model characteristics, there is a rather strong focus on the Russian market. Although 42 % of FinTechs concentrate on business-to-business services, many FinTechs are also involved in business-to-customer activities or engage in both types of activities. We also observe that both the information systems and personal contact are rather equally used when providing their services. Russian FinTechs' revenue sources are rather diverse, with commission fees and interest income dominating over other sources of income.

As we have only financial data for 2016 and 2017, we estimate cross-sectional regression models in which we calculate the performance indicators revenue and asset growth over 2016–2017 and ROA from 2017. As no data were available for the control variables in 2016 (with the exception of size), we take all the control variables from 2017.[5]

5 We acknowledge that our inability to use all explanatory variables in 2016 creates potential endogeneity concerns. Still, considering that most of the explanatory variables are not heavily time-variant, using the 2016 indicators would not enable significantly more reliable results.

Table 1: Variable definitions and descriptive statistics

Variable	Description	Obs.	Mean	Std. Dev.	Min	Max	Count of ones
FinTech performance measures							
revg	Growth in revenue 2016–2017 in %	132	22.66	69.87	-95.93	413.68	-
assg	Growth in assets 2016–2017 in %	132	98.44	199.36	-75.31	908.12	-
roa	Return on assets 2017 in %	132	15.53	86.51	-382.03	589.47	-
Founder characteristics							
f_individ	Dummy 1 if founder is an individual, 0 otherwise	132	0.67	0.47	0.00	1.00	88
f_age	Dummy 1 if founder is less than 40 years old, 0 otherwise	88	0.49	0.50	0.00	1.00	43
f_male	Dummy 1 if founder is a male, 0 otherwise	88	0.81	0.40	0.00	1.00	71
f_edu_it	Dummy 1 if founder has IT education, 0 otherwise (used as a base value and omitted in regressions)	88	0.26	0.44	0.00	1.00	23
f_edu_o	Dummy 1 if founder has other education than IT or economics, 0 otherwise	88	0.24	0.43	0.00	1.00	21
f_edu_ec	Dummy 1 if founder has education in economics/business, 0 otherwise	88	0.50	0.50	0.00	1.00	44
f_bank	Dummy 1 if founder has previous work experience in banking	88	0.51	0.50	0.00	1.00	45
f_bank_it	Dummy 1 if founder has previous work experience in banking and IT education, 0 otherwise (used as a base value and omitted in regressions)	88	0.11	0.32	0.00	1.00	10
f_bank_ec	Dummy 1 if founder has previous work experience in banking and education in economics/business, 0 otherwise	88	0.50	0.50	0.00	1.00	44
f_bank_o	Dummy 1 if founder has previous work experience in banking and education in other areas besides IT and economics, 0 otherwise	88	0.24	0.43	0.00	1.00	21

Variable	Description	Obs.	Mean	Std. Dev.	Min	Max	Count of ones
f_nobank_it	Dummy 1 if founder has no previous work experience in banking and has education in IT, 0 otherwise	88	0.15	0.36	0.00	1.00	13
Size							
lnta	Natural log of total assets in 2016	132	17.62	2.67	11.11	27.20	132
FinTech characteristics							
c_Moscow	Dummy 1 if the company is registered in Moscow, 0 otherwise	132	0.75	0.43	0.00	1.00	99
c_age	Dummy 1 if the company is younger than 5 years, 0 otherwise	132	0.64	0.48	0.00	1.00	84
c_act_paym	Dummy 1 if FinTech is involved in payments, 0 otherwise (used as a base value and omitted in regressions)	132	0.22	0.42	0.00	1.00	29
c_act_dlt	Dummy 1 if FinTech is involved in distributed ledger technology, 0 otherwise	132	0.17	0.37	0.00	1.00	22
c_act_binfra	Dummy 1 if FinTech is involved in banking infrastructure, 0 otherwise	132	0.18	0.39	0.00	1.00	24
c_act_anal	Dummy 1 if FinTech is involved in analytics, 0 otherwise	132	0.16	0.37	0.00	1.00	21
c_act_deplend	Dummy 1 if FinTech is involved in deposit and lending, 0 otherwise	132	0.17	0.37	0.00	1.00	22
c_act_invest	Dummy 1 if FinTech is involved in investment management, 0 otherwise	132	0.11	0.31	0.00	1.00	14
Business model characteristics							
b_market	Dummy 1 if company's main market is Russia, 0 otherwise	132	0.75	0.43	0.00	1.00	99
b_b2b	Dummy 1 if company is involved in business-to-business activities, 0 otherwise (used as a base value and omitted in regressions)	132	0.42	0.50	0.00	1.00	56

Variable	Description	Obs.	Mean	Std. Dev.	Min	Max	Count of ones
b_b2bc	Dummy 1 if company is involved in both business-to-business and business-to-customer activities, 0 otherwise	132	0.25	0.43	0.00	1.00	33
b_b2c	Dummy 1 if company is involved in business-to-customer activities, 0 otherwise	132	0.33	0.47	0.00	1.00	43
b_cust_is	Dummy 1 if customer is contacted through information system, 0 otherwise (used as a base value and omitted in regressions)	132	0.48	0.50	0.00	1.00	63
b_cust_p	Dummy 1 if customer is contacted in person, 0 otherwise	132	0.02	0.15	0.00	1.00	3
b_cust_isp	Dummy 1 if customer is contacted through information system and in person, 0 otherwise	132	0.50	0.50	0.00	1.00	66
b_r_app	Dummy 1 if company revenues come from centralised hosting of business applications	132	0.20	0.40	0.00	1.00	27
b_r_commission	Dummy 1 if revenues come from commission fees, 0 otherwise (used as a base value and omitted in regressions)	132	0.33	0.47	0.00	1.00	43
b_r_data	Dummy 1 if revenues come from data, 0 otherwise	132	0.09	0.29	0.00	1.00	12
b_r_interest	Dummy 1 if revenues come from interest income, 0 otherwise	132	0.23	0.42	0.00	1.00	30
b_r_license	Dummy 1 if revenues come from license fee, 0 otherwise	132	0.11	0.32	0.00	1.00	15
b_r_trading	Dummy 1 if revenues come from trading fee, 0 otherwise	132	0.04	0.19	0.00	1.00	5

Notes: All the founder characteristics are recorded as they were at the time of FinTech establishment. All the FinTech characteristics and business model characteristics are recorded as they were at the end of 2017.

While setting up the regression models, we had to consider the small sample size. In order to reduce the number of explanatory variables used simultaneously, we proceed step-by-step considering only the FinTech characteristics initially and then only the business model characteristics thereafter. As a result, we test H1 using two separate models on the entire sample:

$$Perf_i = f\begin{pmatrix} f\_individ; lnta; c\_Moscow; c\_age; c\_act\_dlt; c\_act\_binfra; \\ c\_act\_anal; c\_act\_deplend; c\_act\_invest \end{pmatrix} \quad (1)$$

$$Perf_i = f\begin{pmatrix} f\_individ; lnta; b\_market; b\_b2b;\ b\_b2c; b\_cust\_p; b\_cust\_isp; \\ b\_r\_app; b\_r\_data; b\_r\_interest; b\_r\_license; b\_r\_trading \end{pmatrix} \quad (2)$$

To avoid overfitting the model, we initially test H2–H4 using two separate models with fewer control variables covering only the founder characteristics in a sample of FinTechs founded by an individual. We focus on founder characteristics separately to test H2 and H3:

$$Perf_i = f(f\_age; f\_male; f\_edu\_o; f\_edu\_ec; f\_bank; lnta) \quad (3)$$

$$Perf_i = f(f\_age; f\_male; f\_bank\_ec; f\_bank\_o; f\_nobank\_it; lnta) \quad (4)$$

We consider founder education in combination with previous experience to test H4:

In order to control for other FinTech and business model characteristics, we test H2–H4 by including additional control variables in the models:

$$Perf_i \begin{pmatrix} f\_age; f\_male; f\_edu\_o; f\_edu\_ec; f\_bank; lnta;\ c\_Moscow; c\_age; c\_act\_dlt; \\ c\_act\_binfra; c\_act\_anal; c\_act\_deplend; c\_act\_invest; b\_market; b\_b2b;\ b\_b2c; \\ b\_cust\_p; b\_cust\_is; b\_r\_app; b\_r\_data; b\_r\_interst; b\_r\_license; b\_r\_trading \end{pmatrix} \quad (5)$$

$$Perf_i = f\begin{pmatrix} f\_age; f\_male; f\_bank\_ec; f\_bank\_o; f\_nobank\_it; lnta; c\_Moscow;\ c\_age; c\_act\_dlt; \\ c\_act\_binfra; c\_act\_anal; c\_act\_deplend; c\_act\_invest; b\_market; b\_b2b; b\_b2c; \\ b\_cust\_p; b\_cust\_is; b\_r\_app; b\_r\_data; b\_r\_interest; b\_r\_license; b\_r\_trading \end{pmatrix} \quad (6)$$

As we have many explanatory variables and are more interested in the variables that would explain the greatest portion of the variance in FinTech performance, we do a backward elimination. Specifically, in each equation, we eliminate the variable or set of dummies step-by-step with the lowest p-value until all the explanatory variables in the model become statistically significant at $p < 0.1$. In Section 4, the results presented in the columns marked with 'a' represent the initial estimates from the equations; those marked with 'b' refer to the results of the

backward elimination exercise. In all the estimations, we control for heteroscedasticity and report robust standard errors for each coefficient estimate.

4. Results

4.1 Results from the univariate tests

The results of the univariate tests are presented in Table 2.

In line with our expectations (H1), if the founder is an individual, the FinTech has lower growth in revenue and assets and experiences a lower ROA in 2017. The differences in the performance of FinTechs founded by individuals versus companies are also statistically significant. The economic significance of the differences is also rather compelling, as the median revenue growth in FinTechs established by companies in 2017 is over 10 times higher than in FinTechs established by individuals; asset growth in the former is over 30 times higher than the latter. This indicates that FinTechs established by companies tend to perform better than FinTechs founded by individuals.

In terms of the founder's age (H2), the results remain inconclusive. The mean and median performance indicators in 2017 for founders below and above 40 years remain rather similar (especially for revenue and asset growth indicators). The lack of significant differences in the performance of FinTechs by founder age might be due to the responsiveness, adaptability and entrepreneurial skills required of a founder. Some of these skills are more natural for younger founders, and others are more natural for older founders – therefore, age may not matter as much as one may expect.

A founder's education also plays a less significant role than we expected, with inconclusive results regarding H3. Still, the descriptive statistics reveal that, surprisingly, we observe the highest mean and median performance indicators for the FinTechs founded by people with no education in IT or economics.

In line with H4, if the founder has previous experience in banking, the FinTech has higher performance. The differences in the median and mean revenue and asset growth are especially striking. In FinTechs with founders lacking prior banking experience, the growth in 2017 was negative, whereas the same indicator was positive for FinTechs with founders who possess such experience. This indicates that prior exposure to the financial sector may provide significant skills needed for setting up and managing a FinTech.

Table 2: Univariate tests of founder characteristics and FinTech performance

	Revenue growth			*Asset growth*			*Return on assets*		
	Mean	Median	No. of obs.	Mean	Median	No. of obs.	Mean	Median	No. of obs.
Founder individual									
Yes	-7.16	3.86	88	4.99	5.50	88	1.25	4.61	88
No	82.29	41.24	44	285.32	177.01	44	44.10	9.39	44
Difference	p-value	0.000	***	p-value	0.000	***	p-value	0.068	*
Founder age below 40 years									
Yes	-6.18	4.00	49	5.27	5.59	49	2.21	7.08	49
No	-8.39	3.70	39	4.64	5.26	39	0.04	2.85	39
Difference	p-value	0.923		p-value	0.923		p-value	0.174	
Founder previous education									
IT	-13.58	1.79	23	-0.84	3.85	23	-11.75	4.91	23
Economics	-7.44	4.16	44	4.54	5.73	44	2.74	3.55	44
Other	0.47	4.42	21	12.32	6.43	21	12.35	6.04	21
Difference	p-value	0.383		p-value	0.377		p-value	0.726	
Founder with experience in banking									
Yes	7.66	7.39	45	23.56	19.05	45	-2.31	9.29	45
No	-22.66	-6.31	43	-14.44	-7.46	43	4.97	2.81	43
Difference	p-value	0.000	***	p-value	0.000	***	p-value	0.061	*
Founder previous education & experience in banking									

	Revenue growth			*Asset growth*			*Return on assets*		
	Mean	Median	No. of obs.	Mean	Median	No. of obs.	Mean	Median	No. of obs.
Economics & experience in banking	-7.44	4.16	44	4.54	5.73	44	2.74	3.55	44
Other & experience in banking	0.47	4.42	21	12.32	6.43	21	12.35	6.04	21
IT & no previous experience in banking	-30.55	-21.06	13	-21.31	-14.41	13	3.91	4.91	13
IT & experience in banking	8.48	8.84	10	25.79	27.57	10	-32.10	3.98	10
Difference	p-value	0.000	***	p-value	0.000	***	p-value	0.840	
Founder male									
Yes	-7.99	3.70	71	4.41	5.26	71	-4.24	4.08	71
No	-3.66	4.00	17	7.40	5.59	17	24.15	10.10	17
Difference	p-value	0.739		p-value	0.735		p-value	0.120	

Notes: We tested the differences in performance indicators across the categories of founder characteristics using either the Kruskal–Wallis test or the Mann–Whitney U test. Statistical significance: ***p < 0.01, **p < 0.5, *p < 0.1.

However, if we combine experience in banking with prior education, education begins to matter in terms of the asset and revenue growth indicators. The greatest average and median asset and revenue growth pertained FinTechs founded by an individual with prior experience in banking and with IT education. This result can be explained by the fact that individuals with IT education can master the technology more easily than their peers; further, if they simultaneously have prior exposure to banking, they can perform better overall.

We observe no significant differences in the performance of FinTechs established by men or women, especially in the context of growth indicators. In terms of ROA, the differences are very close to being significant (p-value = 0.12), with the median ROA in FinTechs founded by men being two times higher than in FinTechs founded by women. As only 17 of the FinTechs we studied (19 % of the total sample) were founded by women, failure to detect very significant gender differences is not too surprising.

4.2 Results of the multivariate regression analysis

4.2.1 Results for the founding entity

The results of Equations 1 and 2 are presented in Tables 3 and 4, respectively. The models' explanatory power is the highest in the models based on asset growth and the lowest in the models that use ROA.

Table 3 illustrates a robust negative association between the type of founder (*f_individ*) and all the dependent variables. FinTechs founded by individuals have nearly 112 % lower revenue growth, nearly 278 % lower asset growth and up to 41 % lower ROA than FinTechs founded by companies.

Table 3: FinTech performance and FinTech characteristics

Dependent variable,	*Revenue growth*				*Asset growth*				*Return on assets*			
Model	1a		1b		1a		1b		1a		1b	
Constant	83.31		105.00	***	412.20	***	428.80	***	-49.54		50.97	***
	(56.46)		(26.15)		(82.55)		(78.70)		(52.64)		(17.78)	
f_individ	-113.20	***	-112.10	***	-277.10	***	-278.50	***	-37.21	**	-41.28	**
	(25.30)		(26.30)		(36.97)		(37.89)		(16.68)		(17.45)	
lnta	2.81				-7.62	**	-8.28	**	3.33			
	(5.61)				(3.81)		(3.69)		(2.52)			
c_Moscow	-45.95				-16.49				19.82			
	(33.74)				(29.65)				(13.81)			
c_age	-4.76				12.60				30.23			
	(18.02)				(24.03)				(19.14)			
c_act_dlt	30.20				2.45				-5.93		-22.43	
	(29.32)				(39.81)				(21.47)		(17.54)	
c_act_binfra	21.07				60.06				42.10		34.10	
	(18.30)				(46.36)				(31.02)		(28.39)	
c_act_anal	11.13				9.74				-49.81	**	-46.73	**
	(21.15)				(49.98)				(23.55)		(23.48)	
c_act_deplend	3.63				-0.60				-19.06		-20.47	
	(13.95)				(25.34)				(17.82)		(17.25)	
c_act_invest	-13.75				-40.93				11.70		1.03	
	(16.71)				(33.75)				(18.75)		(16.24)	
No. of obs.	132		132		132		132		132		132	

Dependent variable,	*Revenue growth*				*Asset growth*				*Return on assets*			
Model	1a		1b		1a		1b		1a		1b	
Adj. R2	0.206		0.202		0.431		0.438		0.110		0.098	
F stat.	5.44	***	18.17	***	7.17	***	27.91	***	1.34		1.71	

Notes: Specifications marked with 'b' present the results after we ran the backward elimination (see Table 2 for a description of the explanatory variables). Robust standard errors are in parentheses. Statistical significance: ***p < 0.01, **p < 0.5, *p < 0.1.

Table 4: FinTech performance and FinTech business model

Dependent variable,	*Revenue growth*				*Asset growth*				*Return on assets*			
Model	2a		2b		2a		2b		2a		2b	
Constant	-21.43		105.00	***	421.80	***	442.00	***	48.92		95.20	***
	(121.30)		(26.15)		(80.53)		(80.80)		(53.26)		(32.41)	
f_individ	-100.70	***	-112.10	***	-282.10	***	-280.10	***	-46.17	**	-50.17	**
	(17.64)		(26.30)		(38.84)		(38.37)		(18.76)		(19.75)	
lnta	5.67				-8.55	**	-8.58	**	2.11			
	(6.63)				(3.93)		(3.74)		(2.83)			
b_market	16.58				13.97				-35.89	**	-28.36	*
	(20.96)				(35.23)				(17.98)		(17.06)	
b_b2bc	-27.85				1.94				-22.52			
	(26.87)				(29.69)				(18.89)			
b_b2c	-25.40	*			-23.38				9.82			

Dependent variable,	*Revenue growth*				*Asset growth*				*Return on assets*			
Model	2a		2b		2a		2b		2a		2b	
	(15.24)				(27.70)				(18.44)			
b_cust_p	261.30				-92.23	**	-87.21	**	33.25			
	(216.40)				(42.26)		(38.42)		(37.58)			
b_cust_isp	-6.62				-4.43		-8.77		19.98			
	(13.68)				(29.34)		(26.99)		(16.50)			
b_r_app	28.48				16.29				-42.72	**	-49.19	**
	(26.33)				(31.61)				(19.09)		(20.35)	
b_r_data	14.86				-2.20				-28.85		-38.08	*
	(26.59)				(52.36)				(22.39)		(20.97)	
b_r_interest	19.25				40.81				-10.39		-11.04	
	(17.62)				(31.20)				(21.03)		(18.41)	
b_r_license	11.20				-12.82				-65.71	*	-70.68	*
	(19.34)				(40.20)				(37.87)		(40.52)	
b_r_trading	100.30				121.50				-14.11		-30.63	
	(66.07)				(127.30)				(34.17)		(26.59)	
No. of obs.	132		132		132		132		132		132	
Adj. R2	0.333		0.202		0.419		0.435		0.099		0.098	
F stat.	3.24	***	18.17	***	6.65	***	15.23	***	1.24		1.87	***

Notes: Specifications marked with 'b' present the results after we ran the backward elimination (see Table 2 for a description of the explanatory variables). Robust standard errors are in parentheses. Statistical significance: ***p < 0.01, **p < 0.5, *p < 0.1.

A rather similar result appears in Table 4. While the coefficients for *f_individ* in the revenue and asset growth models do not change much, the FinTechs established by individuals experience 46–50 % lower ROA than those established by companies. These are significant differences in economic terms and provide strong support for H1.

In terms of other explanatory variables, Tables 3 and 4 convey a significant negative association between FinTech size and asset growth. This result reflects the fact that it is more difficult for a bigger company to exhibit larger asset growth rates. The coefficient *c_act_anal* is also significant and negative; it shows that FinTechs involved in analytics have a 46–50 % lower ROA than FinTechs focused on payments. In addition, the business model characteristics reveal that if the FinTech's main market is Russia (*b_market*), then it has a 28–36 % lower ROA than a FinTech focusing on a broader market. If the main contact with the customer is personal (*b_cust_p*), then compared to a FinTech that contact customers via an information system, its asset growth is 87–92 % lower. In terms of revenue sources, several significant differences occur in terms of commission fees. The ROAs for FinTechs relying on centralised hosting of business applications (*b_r_app*), data (*b_r_data*) and license fees (*b_r_license*) are lower than for the FinTechs depending on commission fees.

4.2.2 Results for founder characteristics

As founder characteristics are only relevant for FinTechs established by individuals, the following analysis concentrates on 88 FinTechs. Tables 5 and 6 present the results of Regression Models 3 and 4, which include FinTech size and different founder characteristics. The estimations in Table 7 are based on Equations 5 and 6.

Table 5: FinTech performance and founder characteristics

Dependent variable,	*Revenue growth*				*Asset growth*				*Return on assets*			
Model	3a		3b		3a		3b		3a		3b	
Constant	-5.10		-3.59		6.74		10.07		-44.46		24.15	***
	(14.72)		(12.62)		(13.03)		(11.17)		(53.03)		(8.34)	
f_age	3.22				1.70				1.13			
	(4.67)				(4.49)				(14.82)			
f_male	-0.14				1.53				-25.86	**	-28.39	**
	(5.20)				(5.36)				(12.91)		(11.93)	
f_edu_o	11.21	*	10.79	*	9.41	*			19.59			
	(6.34)		(6.21)		(5.57)				(17.61)			
f_edu_ec	3.73		3.60		2.29				13.95			
	(6.47)		(6.40)		(5.65)				(18.79)			
f_bank	27.92	***	27.97	***	35.61	***	36.25	***	-6.02			
	(4.70)		(4.67)		(4.33)		(4.38)		(12.93)			
Inta	-1.29	**	-1.27	**	-1.46	**	-1.35	**	3.27			
	(0.62)		(0.62)		(0.57)		(0.58)		(2.73)			
No. of obs.	88		88		88		88		88		88	
Adj. R2	0.328		0.340		0.468		0.477		-0.004		0.017	
F stat.	7.96	***	12.12	***	14.87	***	41.90	***	0.90		5.66	***

Notes: Specifications marked with 'b' present the results after we ran the backward elimination (see Table 2 for a description of the explanatory variables). Robust standard errors are in parentheses. Statistical significance: ***p < 0.01, **p < 0.5, *p < 0.1.

We observe the strongest support for the positive association between the founder's banking experience and FinTech performance (H4). FinTechs founded by persons with banking experience demonstrate revenue growth 28 % and asset growth 36 % higher than that of founders with no such experience. The founder's age drops out of the backward eliminations, meaning that we have inconclusive results with respect to H2. The founder's gender is only statistically significant in the models that use ROA as a dependent variable. Interestingly, we find that FinTechs founded by men have a 26–28 % lower ROA than FinTechs founded by women. Considering that the latter estimations have very low explanatory power, this result should be interpreted with caution – still, it deserves further investigation in future studies if more data becomes available. In terms of the founder's previous education, we fail to observe any superiority of previous IT education (H3). Further, we observed that FinTechs established by persons with education other than IT and economics have slightly greater revenue growth than those established by persons with IT education.

Table 6 combines each founder's previous experience and education indicators.

Table 6: FinTech performance and combined founder characteristics

Dependent variable,	*Revenue growth*				*Asset growth*				*Return on assets*			
Model	4a		4b		4a		4b		4a		4b	
Constant	46.62	***	45.23	***	71.45	***	70.09	***	-66.74		24.15	***
	(14.30)		(12.10)		(16.24)		(13.69)		(66.50)		(8.34)	
f_age	3.43				1.96				1.06			
	(5.16)				(5.50)				(14.73)			
f_male	-3.35				-2.51				-24.66	*	-28.39	**
	(5.55)				(6.34)				(12.45)		(11.93)	
f_bank_ec	-15.19	***	-15.03	***	-20.32	***	-20.18	***	31.50			
	(4.17)		(4.23)		(6.35)		(6.42)		(33.95)			
f_bank_o	-6.19		-6.02		-11.27	*	-11.06	*	36.94			
	(3.78)		(3.81)		(6.75)		(6.63)		(32.45)			
f_nobank_it	-37.42	***	-37.21	***	-45.06	***	-44.91	***	31.88			
	(9.87)		(9.63)		(8.92)		(8.79)		(33.78)			
lnta	-2.19	***	-2.16	***	-2.62	***	-2.61	***	3.31			
	(0.72)		(0.71)		(0.78)		(0.76)		(3.00)			
No. of obs.	88		88		88		88		88		88	
Adj. R2	0.184		0.196		0.236		0.251		0.009		0.017	
F stat.	6.05	***	8.88	***	6.66	***	10.18	***	0.88		5.66	***

Notes: Specifications marked with 'b' present the results after we ran the backward elimination (see Table 2 for a description of the explanatory variables). Robust standard errors are in parentheses. Statistical significance: ***p < 0.01, **p < 0.5, *p < 0.1.

FinTechs having founders with previous banking experience and education in economics have 15 % lower revenue growth and 20 % lower asset growth than FinTechs established by persons with banking experience and IT education. Even more remarkable, FinTechs with founders with IT education and no previous banking experience have 37 % lower revenue growth and 45 % lower asset growth than FinTechs with founders who possess IT education combined with banking experience. This indicates that a key success factor in the field of FinTech is IT education, which helps founders to identify the most promising technologies and handle their implementation. However, without previous banking experience, it does not provide a competitive advantage. We also continue to observe a negative association between FinTech size and their revenue and asset growth.

When we added additional control variables (see Table 7), all the results concerning founder characteristics remain the same as in Tables 5 and 6.

Table 7: FinTech performance, founder characteristics and other FinTech characteristics

Dependent variable,	*Revenue growth*				*Asset growth*				*Return on assets*	
Model	5b		6b		5b		6b		5b	6b
Constant	-2.69		45.74	***	16.12		79.42	***	-4.52	-4.52
	(14.75)		(11.89)		(13.43)		(16.93)		(10.79)	(10.79)
f_edu_o	12.73	*								
	(6.57)									
f_edu_ec	4.07									
	(6.44)									
f_bank	26.21	***			34.97	***				
	(4.82)				(4.44)					
f_bank_ec			-13.07	**			-19.64	**		
			(5.80)				(7.89)			
f_bank_o			-3.99				-9.07			
			(6.43)				(8.57)			
f_nobank_it			-32.81	***			-43.56	***		
			(10.14)				(9.94)			
lnta	-1.37	*	-2.12	***	-1.65	**	-2.79	***		
	(0.74)		(0.74)		(0.68)		(0.79)			
b_market							-10.12	*		
							(5.65)			
b_b2bc			-0.25							
			(5.40)							
b_b2c			-16.23	**						

Dependent variable,	*Revenue growth*				*Asset growth*				*Return on assets*			
Model	5b		6b		5b		6b		5b		6b	
			(7.51)									
b_cust_p					-17.43	***			92.79	**	92.79	**
					(5.65)				(35.66)		(35.66)	
b_cust_isp					0.62				7.15		7.15	
					(4.53)				(14.43)		(14.43)	
b_r_app	-3.23		-7.49		-5.66		-8.66					
	(8.59)		(8.97)		(7.39)		(8.54)					
b_r_data	-7.33		-9.82		-8.96		-10.95					
	(10.28)		(9.42)		(8.44)		(7.57)					
b_r_interest	2.77		8.44		2.53		5.24					
	(5.20)		(6.00)		(5.42)		(6.67)					
b_r_license	14.96	***	13.67	**	10.59	**	14.27	*				
	(5.42)		(6.58)		(5.18)		(7.91)					
b_r_trading	8.05	*	15.01	**	7.31		14.84					
	(4.78)		(5.81)		(6.15)		(12.79)					
No. of obs.	88		88		88		88		88		88	
Adj. R2	0.344		0.278		0.477		0.303		0.020		0.020	
F stat.	6.72	***	5.09	***	12.96	***	6.02	***	3.39	***	3.39	***

Notes: Specifications marked with 'b' present the results after we ran the backward elimination (see Table 2 for a description of the explanatory variables). Robust standard errors are in parentheses. Statistical significance: ***p < 0.01, **p < 0.5, *p < 0.1.

In terms of other explanatory variables, we continue to observe a negative association between growth indicators and FinTech size. We also see that FinTechs focusing more on personal contact with a customer have 17 % lower asset growth compared to those concentrating on contact through an information system. FinTechs relying on license fees and trading fees also tend to exhibit greater growth indicators than FinTechs relying on commission fees.

5. Conclusions and Discussion

Our paper provides additional evidence in support of the RBV of entrepreneurship. We show that, in line with our expectations (H1), Russian FinTechs founded by other firms tend to exhibit superior performance compared to FinTechs founded by individuals. This result confirms and extends the results of previous empirical work on other types of firms (Shahveisi/Khairollahi/Alipour 2017). It supports the view that firms as founders have superior access to various resources (financing, competence, experience, etc.), and that as a result, the company as a founder can serve as a difficult-to-imitate asset. This explains why the company as a founder could be more successful in speeding a FinTech's growth more than an individual could. From the standpoint of FinTech customers and regulators, it implies that the type of FinTech founder may signal the FinTech's sustainability. As our dataset was restricted to two years of financial data, this aspect deserves attention in future studies focusing on Russian FinTechs as well as in the context of other countries. We also note that our dataset lacked information on the specialisation of the companies that founded FinTechs. Finally, it would be interesting to analyse the founding companies' previous interactions with the financial sector, and potentially, with innovative technologies.

In the context of FinTechs founded by individuals, several individual-specific founder characteristics matter for FinTech performance and tend to serve as difficult-to-imitate assets. The strongest support existed for the importance of founders' previous banking experience (H4). Russian FinTechs whose founders have banking experience exhibit significantly greater asset and revenue growth compared to FinTechs without such founders. This supports the results reported by previous studies for other types of firms (Soriano/Castrogiovanni 2012; Protogerou/Caloghirou/Vonortas 2017). As FinTechs operate in a specialised field, previous exposure to banking may help in market positioning, business model development and commercialisation of the business idea. This does not mean that persons with no previous banking experience cannot set up a successful FinTech; however, it suggests that if they do not have the adequate knowledge, they would need a team of experts with such knowledge supporting the FinTech's launch. Creating such a team usually requires resources that a founding individual might lack.

Previous studies on non-FinTechs have highlighted the relevance of key persons' education (e.g. Pozen 2010; Wai/Rindermann 2015; Arumona et al. 2019) and experience (e.g. Chen/Chang 2013; Protogerou et al. 2017) on corporate performance. We find that a founder's education does not influence the FinTech's performance. Contrary to our expectations, we fail to observe that FinTechs founded by persons with IT education perform better than others (H3). Instead, in some specifications, we observe that FinTechs founded by persons with education other than IT or economics perform better in terms of revenue growth. However, IT education proves to be valuable in combination with previous experience. We find strong evidence that Russian FinTechs with founders who have education in economics as well as previous banking experience have lower growth indicators than FinTechs created by founders with IT education and previous experience in the banking sector. At the same time, FinTechs with founders who have IT education and no banking experience have lower growth indicators than FinTechs with founders who have IT education and banking experience. This indicates that to reap the benefits of IT education in the field of FinTech, the founder must have some exposure to the banking sector. One potential reason for this is that FinTech lies at the intersection of finance and technology. It also indicates that having a background in economics may not be sufficient in the field of FinTech, even if this is coupled with prior banking experience. In order to boost FinTech development, it may be worth including specialised IT courses (e.g. artificial intelligence, big data) in traditional business and economics programs. Our findings provide additional insight into the RBV, indicating that a specific combination of founder education and experience may form a strong basis for a competitive advantage. The patterns we observe in the FinTechs in our study might also hold for other high-growth, technology-driven sectors.

Regarding the founder's age (H2), our results are inconclusive. This could be due to the very arbitrary 40-year threshold chosen to divide founders into age groups or multifaceted impact of age, which is more clearly observable in the context of previous work experience and educational background. However, this result is in line with Kautonen's (2008) findings concerning small- and medium-sized enterprises in Finland.

The results reported above are subject to several limitations. First, our analysis is limited by the relatively short history of the FinTech sector and the related short period of the dataset. Due to this short timeframe, we were unable to control for survivorship bias, which can only be overcome once more data become available. Second, our dataset could be somewhat biased due to our hand-gathered information on company founders from Facebook and LinkedIn. The data on founder experience and education presented in the social networks are not formally verified and could therefore contain subjective interpretations. Official data on the mentioned characteristics would benefit future studies and could poten-

tially allow researchers to differentiate between levels of education. Third, we overlooked companies created by a group of individuals. As the number of such companies in our dataset was low, this does not have a strong influence on the results reported above. Fourth, due to the limited availability of individual-specific data, we overlook the potential impact of the founder's main source of income on FinTech performance. If such data were available, this founder-specific aspect would merit consideration. Fifth, the results could be impacted by Russia's historical, institutional and cultural background. The first two could affect the results reported for the founding entity and age, and the latter may influence founders' risk-taking behaviours (Illiashenko/Laidroo 2020), all of which correspond to FinTech performance. As our dataset was based only on Russian data, we could not control for such factors. Therefore, our results cannot be generalised to other countries. Still, future similar studies in other countries could shed some light on their potential impact on the reported associations.

Despite the above-mentioned limitations, and due to the increasing role of FinTechs, our results are beneficial to regulators, venture capitalists, customers and other stakeholders interacting with FinTechs and other similar technology-oriented companies. FinTechs founded by other firms or founded by individuals with IT education and previous banking experience have greater chances of succeeding in the Russian context. As this paper is the first to consider the role of founders in FinTech performance, future studies are needed to verify these results over longer periods and in broader sets of countries.

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