

UNIVERSITY OF TARTU

Faculty of Social Sciences

School of Economics and Business Administration

Maryna Pashchynska

**The Role of Work Experience in The New Business Success in Estonia:
the Skype Effect and Beyond**

Master's thesis

Supervisors: Senior Research Fellow Priit Vahter (PhD)

Senior Research Fellow Jaan Masso (PhD)

Tartu 2018

Name and signature of supervisor.....

Allowed for defence on.....

(date)

I have written this master's thesis independently. All viewpoints of other authors,
literary

sources and data from elsewhere used for writing this paper have been referenced.

.....

(signature of author)

Acknowledgements

I am immensely grateful to Priit Vahter for helping me research the topic I was genuinely interested in, for his numerous suggestions, feedback and support. This work would not be possible without Jaan Masso not only as a supervisor, but also as an outstanding program manager, who gave me a wonderful opportunity to come to Tartu. Many thanks to Gaýgysyz Aşyr for his useful comments and encouragement. Additional thanks for the Statistics Estonia in Tartu for providing the dataset, booking countless appointments, handling outputs and Stefan Kozak for sharing this experience.

I would like to express my gratitude to Mikk Vainik, my supervisor for the internship at the Ministry of Economic Affairs and Communications of Estonia, for inspiring the topic of this paper. I heartily thank Martin Villig, who was kind to share the questionnaire within the network of ex-Skype employees for the case study to have more respondents and interviews than it could have otherwise. I am also grateful to the members of the Skype mafia network, who found the time to contribute to the case study and the insightful conversations that we had.

My special thanks to William Dudley for the unspeakable encouragement, support and help he gave me. I thank my family for the unconditional love and support. The memory of my grandfathers, Serhiy Kulikovskiy and Valentyn Pashchynskiy, who would also have loved to see my graduation, will always live with me. I am grateful to my friends, especially the fellow Quantitative Economics students with whom I had the pleasure to study during this Master's program.

Abstract

Earlier researchers have argued that prior working experience of the founding team should positively affect new venture performance. Meanwhile the empirical support for the effect of the experience at the productive firm has been lacking. This paper examines the role of knowledge spillovers in a newly-established firm's survival and growth through labor mobility. Using the matched Estonian Business Registry and Tax Office data, I show that previous employment experience at a high-productivity firm benefits a new firm's survival and growth. There is evidence to suggest that the effect is significant if the new firm is operating in the same industry as the previous employer. Also, the data suggest that a newly founded firm benefits especially from the experience of a highly qualified employee. The case study investigates the question further. Fourteen previous Skype employees who have created their own businesses have shared their views on the question and provided accounts of what their experience at Skype has given them. The results of the case study supported the notion that prior employment at a productive firm can be beneficial for a new business. Provided that it allowed the employee to gain first-hand experience of what is required of the business to grow, they can replicate it in the new firm.

JEL Classification: C33, J24, M20

Key words: working experience, new business, newly founded firm, firm survival, Cox, logistic regression, firm growth, Skype, case study, entrepreneurship, productive firm

Introduction

A large literature explores the effects of knowledge spillovers whereby firms improve their performance through the transfer of knowledge from one firm to another. Labor mobility has been recognized as an important channel for knowledge spillovers both by theoretical models (Fosfuri, Motta, & Rönnde, 2001; Glass & Saggi, 2002) and the empirical literature (Görg & Greenaway, 2004; Smarzynska, 2004; Demena ,2018).

Employees transfer knowledge and skills that they gained from prior employment experiences to their new employers. Knowledge spillovers can benefit a firm's performance and the economy in general. Researchers are expanding our understanding of the types of experience that result in spillovers and their effects (Griliches, 1991; Stoyanov, Zubanov, 2012).

This research investigates whether prior working experience at a highly productive firm benefits a newly founded firm in its survival on the market and growth. The economic development and evolution of industries are led by the new firms entering the market Bartelsman (2004), Haltiwanger (2013). New competitors lead to the introduction of new products and innovation in sectors close to the technology frontier (Aghion et al. (2009), but discourages innovation in laggard sectors. For that reason, it is important to investigate the factors playing a role in the survival of the new firms on the market in different sectors, considering the riskiness of creating a new business. Survival and growth are often researched together as the performance indicators for newly founded firms (Siepel et al. (2017). Entrepreneurship is beneficial for the economy, but as creating a business is very risky, it is important to know the factors that contribute to the potential success of the new business and which new business will succeed on the market. This study is designed as an attempt to make another step forward towards answering that question.

Intuitively, it might be supposed that newly founded firms which have been set up by people with a previous employment experience at a company that has performed well on the market, should be expected to have higher chances of success. New firm survival is still a topic under discussion. Acs, Zoltan et al. (2009), Habersetzer et al (2017) argue that industry experience raises the chances of the newly-founded firms' survival. Huggins et al (2017) show that locational conditions at least partly explain firm survival. However, there is still a gap in the research on how the highly-productive firm employment experience represented in the newly founded firm influences its

performance. In this research, I will use econometric analysis in order to investigate whether the working experience at the productive firm represented in a newly founded venture plays a role in its survival and growth. The topic is highly important, as the factors impacting the survival and growth of newly-founded firms are still widely discussed. The importance of previous experience in general and previous employment experience in particular has been studied before. Delmar and Shane (2006) have found evidence that effect of experience is non-linear and varies with venture age. Research has proven the effect to hold, but the benefits of being employed at the highly productive firm are not yet investigated enough.

There is also a research gap in specifying the mechanism behind the effect. It is not clear what knowledge is it exactly that employees are transmitting to benefit newly founded firms. In addition to finding evidence to support the effect of knowledge spillover, it is also important to understand why does the effect hold and what are the conditions for it. This research makes a step to answer that question by conducting a case study of Estonia's most prominent example of such effect.

On the international level, Estonia is widely known for its technological innovation in the ICT sector (Walt, 2017). The country has become associated with rapid entrepreneurial development (A.A.K, 2013). Nevertheless, while the number of newly founded firms in Estonia is growing rapidly, the majority do not manage to survive on the market. Laitinen (1992) shows that over 50% of newly founded firms fail during the first five years, while contemporary conventional business articles (Patel, 2015) tend to refer to a share of around 90% of startups to fail, depending on the definition of a startup. The network of the entrepreneurs that emerged from Skype is referred to as a "Skype mafia", similarly to the way such networks are named at Silicon Valley e.g. "PayPal mafia". The success of those entrepreneurs is commonly associated with their prior experience at Skype. Skype is the most prominent example of a highly productive Estonian firm which is one of the category leaders on the international market. The success of firms founded by previous Skype employees is often referred to as "Skype effect". The assumption is that their experience at this world-known company played a role in their ability to create businesses. The opinions of some of these entrepreneurs as expressed in their replies to the questionnaire and in personal interviews make a valuable contribution to the research. This case study allows us to expand the understanding of the specific knowledge and skills gained at Skype or other factors behind the spillover effects. It provides a deeper understanding of the type of spillovers.

In this research, I will predict the role of the working experience at the productive company, present in the new firm on the likelihood of firm survival by estimating a logistic model. I then use the Cox proportion hazard model to investigate whether that particular experience affects the duration of the firm's economic activities. I am using a merged dataset that consists of Estonian Business Registry data and individual level data for tracking the labor mobility. Following that is the case study that explains the mechanism behind the quantitative results. It includes the results of the questionnaire and individual interviews, given by the business founders, who have experience working at Skype.

There is evidence to support the claim that experience at the highly productive firm benefits firm survival and growth, even though the effects slightly differ throughout economic sectors. The results of the case study suggest that the experience at the successful firm is only beneficial if it involved learning the skills, needed to go through stages of the business lifecycle.

1. Literature Review

Spillovers occur if an innovation or any advancement that occurs at one enterprise also increases the performance of another without the latter enterprise having to pay (at least not full) compensation. (Acs et al. 2009) Spillovers have been increasingly recognized as making a substantial contribution to economic growth. According to the new growth theory (Lucas, 1990; Romer, 1994), spillovers are the engine of growth.

The economic background covering the transfer of skills and knowledge through worker mobility is found in the spillover theory. It is based on the work of Marshall (1890), Arrow (1962) and Romer (1986) (often referred to as MAR) explaining the effect of the ideas and knowledge exchange among individuals within close proximity. According to the MAR spillover theory, knowledge and ideas can be spread among employees of different firms and industries due to their geographical proximity. This theory explains the macroeconomic benefits of knowledge spillovers as it results in performance improvements of other companies in the industry, between industries and in the geographical region (city, a country or any other economic region). Griliches (1991) presents R&D spillovers as a major source of endogenous growth through a variety of channels.

On a microeconomic level knowledge spillovers benefit individual companies, as they perform better through learning from each other. Labor mobility as a channel for this knowledge transfer has been studied from various angles. It has been found that firms hiring workers from productive firms experience productivity gains one year after the hiring (Stoyanov, Zubanov 2012). There has also been evidence that workers through their employment mobility transmit knowledge that can be readily copied and implemented without much additional R&D effort (Maliranta, Mohnen, Rouvinen, 2009) Most of the research regarding spillovers focuses on worker mobility from R&D firms (Kaiser, Kongsted, and Rønde, 2008), exporting firms, MNEs (Poole 2013), (Jaffe, Trajtenberg, and Henderson 1993), rival firms (Rao and Drazin, 2002). Görg, Strobl (2005) found that the labor mobility from foreign-owned firms to domestic firms benefits the survival and productivity of the receiving firm. Fosfuri, Motta and Rønde (2001) have analyzed the technological spillover effects from multinational firms through labor mobility, as the firm has to train the local worker and hence transmit the technology. In such cases the technology owned by the multinational company, is the valuable knowledge that creates a spillover. Balsvik (2011) found that workers with MNE experience contribute 20% more to the productivity of the plant

than workers without such experience. Whilst the type of knowledge that is transmitted differs, the main assumption connecting each of these accounts of knowledge spillovers is that knowledge acquired from previous employment experience benefits the new employer.

This research focuses on the spillovers that arise from highly productive firms. Productivity is commonly used to measure firm performance. Griliches (1991), Griliches (1992), Syverson (2011), Balsvik (2011), Poole (2013), Masso, Rõigas, Vahter (2015), Masso and Vahter (2016) use firm productivity as a firm performance improvement measure in their empirical studies of the effects of labor mobility. To associate productivity with various production inputs, (such as the costs of labor, plant, property and equipment, and materials) economists have developed and applied a measure to study technological change and productivity growth; this measure is known as the TFP (Total Factor Productivity) index. The TFP is the ratio of outputs to inputs and is therefore often used for measuring productivity. Productivity is the measure of production efficiency. According to Syverson (2011), productivity should be measured so that it is invariant to the intensity of use of observable factor inputs. TFP meets this criteria, as “output is the product of a function of observable inputs and a factor-neutral (alternatively, Hicks-neutral) shifter” (Syverson, 2011 p. 330).

To measure the impact of the spillover effect one has to choose the performance indicator that presents the effect in the best way. Previous research has mainly focused on the spillover effect in terms of its impact on the receiving firm’s productivity. As has been often discussed by recent research (Crescenzi, Gagliardi, Iammarino, 2015) the performance of the service sector, which is of the major importance for developed economies, including Estonia, should be defined by more indicators than productivity, e.g. ability to innovate. In this research the impact of the spillover effect is studied from the perspective of firm survival, which makes the research relevant to various economic sectors.

Survival is argued to be a good performance measure as survival predominantly means success. However, exit does not necessarily mean failure. Firms might have a strategy to be acquired by bigger firms as a result of high growth during the first years. Alternatively, Habersetzer, et. al (2017) argued that measuring employment growth might serve as a better measurement from the macroeconomic aspect of economic impact. Growth is an important aspect of performance measurement, while a successful exit would require the confirmation of finding the market-fit by

having survived on the market during some time. From the microeconomic perspective, the ability of the founders to create a sustainable business can be measured with its survival. As one alternative to capturing the full portrait of firm performance, rather than a part of the picture, Siepel et al. (2017) have adopted an analysis method by splitting the firms into four categories based on their survival in a combination with growth data: ‘Failure’ (low performance, inactive); ‘Persistence’ (low performance, active); ‘Exit’ (high performance, inactive) and ‘Survival’ (high performance, active). The fact that there are various approaches to this measurement only confirms the argument by Miller et al. (2013) that performance is an abstract concept and the proxies can differ, depending on the interest angle of the research. Agarwal, et al. 2016 found that technology-intensive industries have higher hazard rates due to the faster obsolescence of initial endowments in such industries.

The research question also benefits and contributes to the findings of business research that have been investigating factors impacting on the survival of newly founded firms. The most relevant to this research are articles which consider the impact of management and the background of managers on the survival of the newly founded firm. Geroski et al. (2010) found that the effect of the initial human capital is permanent. The role of the entrepreneurial team's characteristics in the performance of the new venture has been found (Madison, Kellermanns, Crook, Xi, J, 2017) to be significant. Baptista et al. (2007) found that certain specific features of the background of managers, for instance spin-off background, play a key role in enhancing the survival chances of the newly founded firm. Almus (1999) found strong correlations between the firm's growth rate and founder-specific factors. Block and Wagner, (2010) and Baptista et al. (2014) also showed that entrepreneurial motivation impacts survival, proving the importance of personal characteristics in firm survival. Adomasko et.al (2018) found that entrepreneurial alertness and social and business networking capabilities play a role in a new venture performance.

The background of the founder has been analyzed from different perspectives. Having close ties with other entrepreneurs can have either a positive or negative effect on the performance of the new venture depending on the context (de Jong Marsili, 2015). The experience of founders (referred to as “team”) in the industry or in other entrepreneurial ventures enhances both new venture survival and sales, having non-linear effects, varying with firm's age (Delmar, Shane, 2006). Elfenbein et al. (2010) show that there are more entrepreneurs that used to work for small

firms than large firms, and that they earn more at the initial stage of entrepreneurship than those from large firms. Gompers et al. (2005) explain the positive effect of small firm experience through flat hierarchies, as employees can build valuable networks with founders, suppliers, customers and even competitors. Dyer (2000) draws on a case study from Toyota to support this notion, showing that such a network can be one of the main channels for generation, transfer, and recombination of knowledge.

Lazear (2005) proposed that small firm employees are more likely than large firm employees to develop a broad and balanced set of business skills as they are usually assigned multifaceted and multidimensional tasks (Hyytinen and Maliranta, 2008). Xi, Block (2017) found that small firm experience matters more for new venture start-ups versus business takeovers. They explain it by pointing to the entrepreneurial nature of newly-founded firms, which require the managerial team to have balanced set of skills to be able to match market demand by creating a sustainable business model and being able to execute it. One of the aims of this research, therefore, will be to check whether having been employed at highly-productive firms creates similar outcomes.

Kato et. al (2015) find that innovation outcomes, often being key to the survival of newly founded firms (Cefis, Marcili, 2015), strongly depend on the prior innovation experience of the founders. The timing of the effects is important to consider. Siepel et al. (2017) found that firm's access to managerial skills plays a significant role early on in the life cycle of the firm, while access to specialized skills becomes essential later on.

The study relates to the R&D-related spillover effects (Griliches, 1992). The Toyota case study (Dyer, Nobeoka, 2000) explains the dynamics of knowledge transmission within one of the highest-performing firms in the world by means of the network-level learning and the creation of the social community. This suggests that the case of interest for this study (Skype) might have witnessed similar methods of spreading knowledge across the firm.

Tracking similar effects has been done combining the data about employers and employees and this would be a fitting approach for this study considering its focus on capturing the impact of employment experience. To capture the mechanism of knowledge spillovers the game-theoretical approach (Fosfuri et al., 2001) has proven to be relevant and important for theoretical understanding, but mostly this goal has been achieved through survey data or case studies. The

case study, conducted in this research, expands the understanding of the mechanisms behind knowledge spillovers, introduced by the game-theoretical approach.

All in all, even though the existence of knowledge spillovers and their benefits has already been proven, the mechanisms behind them and the measurements of their effects are still an ongoing question. This research offers an insight into one of the aspects, considering the growing impact of entrepreneurship and the importance of managerial input into the performance of the newly founded firm.

2. Data

I am using a merged dataset that consists of the following datasets:

- i) Estonia's Commercial Registry dataset of firms' annual reports;
- ii) employee-level data from the Tax and Customs Office on employee payroll taxes.

The final merged dataset includes yearly data for the period 2006–2011 and enables to track the mobility of employees between firms and to investigate its role in newly founded firm's survival.

Using registry numbers of firms, the employee-level data have been merged with Estonia's Commercial Registry information from annual reports (balance sheets, profit and loss statements). These data are available for the full population of Estonian firms. Observing all active firms in Estonia gives an advantage to the study.

The central explanatory variable in the empirical analysis is the role of knowledge and experience attained at the employee's previous workplaces. To be able to measure it, I create experience variables, with the analogy to the experience variables estimated by Masso and Vahter (2016). The person is considered to have an experience at the highly productive firm if they have ever worked before at the company, that belongs to the highest quartile of the productivity distribution at the 2-digit level industry sector, calculated based on the firm's Total Factor Productivity (TFP).

High-performance firms are defined using TFP, as it is widely used even in the latest literature, which also covers the ICT sector (Edquist 2017). Levinsohn and Petrin (2003) have suggested an estimation method for TFP (1) and it has been used widely in empirical papers (e.g. in Estonia's context in Masso, Vahter, 2016), as it has a number of benefits over other methods. It solves the simultaneity problem, where a part of TFP is observed by the firm early enough for it to change decisions, that causes the correlation of regressors with the error term. Compared to other

approaches that also solve this problem using intermediate input proxies for unobserved productivity shocks instead of e.g. investments avoids the problem of truncating the part of the sample that would report zero investment (Arnold, 2005). It also provides a link between the estimation strategy and the economic theory.

In order to investigate the skill and knowledge spillover across firms through labor mobility I observe the employment history of individuals over time, based on the Tax and Customs Office of Estonia employees' dataset. The total number of employees is, on average, around 600 thousand. The dataset provides information on social contributions by the taxpayers for the years 2006-2012. All other information, including employment history, is derived from it.

Based on the tax paid it is possible to identify the wage of an employee, given the tax rate is 33 per cent of the gross wage. Not being able to observe an occupation of an employee, this information enables to differentiate skill-intensity of the position based on the salary level. This differentiation might be important, as according to Mion and Oromolla (2014), the mobility experience has a stronger effect when it is related to the mobility of people holding positions as on "Top management" and "Middle management" level compared to other workers. In this econometric analysis to investigate the impact of the employment experience I am considering the employees whose wages belong to the top 20 per cent of the wage distribution in a three-digit NACE industry in a given year as *top specialists*, similarly to the approach by Masso, Vahter (2016). The company, where an individual is employed at a specific time (month and year), is also identifiable within the dataset.

As mentioned above, the individual is considered to have the high-productivity firm experience if he or she has worked at the firm that belongs to the highest quartile of productivity distribution in a respective economic sector based on the two-digit industry level in Estonia at some point in the past. The experience variables can be calculated from 2007 onwards, as general information at the individual level starts from 2006. The firm-level experience dummy is then calculated if there is at least one person at the firm with such experience.

The data suggests (Table 1) that companies without productive firm experienced members have a negative growth, while companies that engage people with productive firm experience observe a positive growth, where the ones with industry specific knowledge and top specialists have higher growth. The companies in the analysis are considered to have a productivity experience if there is

at least one engaged person with a specific experience in the firm, but the Type 2 and Type 4 companies have, on average, a larger share of experienced at the productive firm members.

*Table 1 Descriptive statistics by groups of firms: mean characteristics of firms with and without highly productive firm experienced members*¹

Variable	Type 0	Type 1	Type 2	Type 3	Type 4
Share of members with experience from productive firms	0	0.419	0.432	0.404	0.433
Growth in the number of employees	-0.009	0.007	0.015	0.016	0.026
Exporting company dummy	0.038	0.131	0.165	0.173	0.190
Foreign-owned dummy	0.047	0.104	0.130	0.113	0.131
Return on equity	-0.217	8.326	15.494	0.718	1.824
Unit labor cost	8824	12217	14022	12722	14062
Number of employees	2.876	19.799	29.039	33.158	42.420
Lerner index	0.131	0.121	0.119	0.123	0.121
Share of top-specialists	0.708	0.458	0.448	0.409	0.424
Cash to total assets	0.312	0.237	0.222	0.211	0.204
Intangible assets to total assets ratio	7.582	7.049	6.612	6.857	9.334

Note: Type 0 –with no experience at the highly-productive firm; Type 1 - any experience at the highly-productive firm; Type 2 - with experience at the highly-productive firm as top specialist; Type 3 – with experience at the highly-productive firm of the same industry; Type 4 – with experience at the highly-productive firm of the same industry as top specialist

As expected, more Type 1-4 companies are foreign owned and are exporting. Type 0 companies have a higher cash to total assets ratio. The return on equity is negative for the companies without productive firm experienced members, while it is highest in the Type 1 and Type 2, where the productive firm experience is not narrowed down to industry-specific knowledge. Type 0 companies, on average, have significantly fewer employees. This might be explained by a high number of small companies. This finding is expected to be mirrored in the growth analysis. All types of companies, on average, have a similar market share (Lerner index). The share of top specialists at the Type 0 companies is high, although considering the previous finding of a high number of small firms within this type it is not unexpected. Cash to total assets ratio is a measure of a firm's liquidity. This measure is slightly higher at the Type 0 companies, which might mean

¹ The analogical descriptive statistics by economic sectors are provided at the Appendix 2.

either slightly lower efficiency in cash utilization or a slightly higher financial stability. The intangible to total assets ratio does not differ significantly either.

3. Methodology

3.1 Econometric analysis

The combination of quantitative and qualitative approaches, also known as data triangulation, allows to both trace the evidence of the role of the high-productivity experience in the newly founded firm survival and to explain the mechanism behind it. Creating a new firm that survives the market is challenging. The combination of personal experiences presented in the qualitative part of the study and quantitative evidence enables to make a step forward in understanding and recognizing potentially sustainable business ventures.

The goal of the quantitative part is to investigate the presence of the effect and its character based on Estonian data. Firstly, I use the logistic regression model to investigate the role of the experience in question in the probability of leaving the market. This model gives an answer to the question whether the new venture with the productive firm experience is more likely to survive the market. To receive a better understanding of the effect specific experience gives in terms of survival I am using the Cox proportional hazard function. It allows us to investigate whether the factor of interest affects the duration of economic activities on the market. Its consideration of the time to event (where the event is failing) is more insightful as the company goes through various stages in the life cycle. The model answers the question of whether experience at a highly productive firm allows to survive longer on the market. Then I estimate an OLS employment growth model to investigate whether the experience helps the new ventures grow.

To estimate the firm's TFP I am using the Business Registry panel data from 2006–2011, accounting for differences in production functions in different economic sectors at the two-digit industry level. The log of TFP is calculated from the production functions estimated for each 2-digit industry j with the log of value added ($\ln Y_{ijt}$) as the dependent variable, the log of physical capital ($\ln K_{ijt}$) and the log of number of employees ($\ln L_{ijt}$) as inputs:

$$\ln TFP_{ijt} = \ln Y_{ijt} - \alpha_j \ln K_{ijt} - \beta_j \ln L_{ijt} , \quad (1)$$

where subscript i denotes the firm, j the sector and t the year; α and β denote parameters of capital and labor in the production function for sector j .

For the performance measurement the length of firm survival on the market is used. This is defined as the duration from the start of the firm's activity on the market to its departure. The limitations are that we cannot observe the duration of the companies' activities after the study period and that the company might be registered after some time of the team working on the product. It can be argued, though, that in order for the company to start its economic activities and the hiring process the company should be registered, so the registration year can be accounted as a start of the observation period of the newly founded firm.

The term startup, which is often used in business articles discussing the survival of new firms, is not straightforward. Its definition varies depending on the source, often relying on innovation and R&D. Crowne (2002), for instance, defines a "startup" as a company in the period between product conception and the first sale, while according to Sutton (2000) a startup is an organization that is characterized by youth and immaturity, extremely limited resources, multiple influences and dynamic technologies and markets. To overcome the difficulties concerning the definition of a startup, we have decided to focus the study on newly founded firms. For that the survival model includes only companies that were not older than 1 year before the observation period started.

In order to observe the potential differences in the effects on different economic sectors, services and manufacturing sectors were defined as the main economic sectors. For specifying those two sectors the EMTAK 2-digit code was used, where companies, with EMTAK sector code ranging between 10 and 33 defined as the manufacturing sector and companies with the code ranging between 50 and 74 – services sector. 46% of all companies in the Estonian database belong to the services sector and 8% belong to the manufacturing sector.

Firm size and age are important controls. As pointed out by Geroski et al. (2010), virtually every study undertaken, independent of the country, time period and methodology employed has found positive relationships between the likelihood of survival, firm age and size. As Audretsch, Klomp and Thurik (1997) conclude that firm size growth also predicts the likelihood of survival, it is also included as a control variable. To observe the non-linear effects, the firm age squared is added.

The economic environment is important for firm performance (Acs et al. 2004, Shevlin 2014). Tax regulation and other indicators of economic freedom, economic situation of the state affect business performance within the economic or political borders. Fluctuations on the market also play a role in industry performance. Industry effects can be more important for firm performance

than firm-specific factors (Hawawini et al., 2002) Thus, industry effects (on the 2-digit level) and year effects are also controlled for by including the respective sets of dummy variables.

As the presence of top specialists at the firm is expected to play a role in firm survival (Mion and Opromolla, 2014), the share of such people at the firm is included. Variables, included in the model that are related to firm performance are chosen based on the choices of prior empirical studies, investigating firm performance: unit-labor cost (Agarwal 2002), cash to assets, the rate of intangible assets to total assets (Sinani, 2004), dummies whether the firm is exporting (Masso, Vahter 2016) and foreign-owned (Habersetzer et al., 2017, Masso, Vahter 2016). Geroski et al. (2010) suggest that the market concentration has a strong effect on survival at the time of entry, but it vanishes after the entry. I control for the concentration using the Lerner index.

For the logistic model (2) the dependent variable is firm exit (stopping economic activities), where x is an experience variable and \mathbf{b} as a vector of firm-related variables, $F = \frac{e^z}{(1+e^z)}$, where z is a function of x and \mathbf{b} . Leaving the market is a negative outcome, so the interpretation for the probability of survival should include the negative sign.

$$\ln L = \sum \ln F(x, \mathbf{b}) + \sum \ln \{1 - F(x, \mathbf{b})\} \quad (2)$$

In the Cox model (3) the dummy for firm exit has been set as the failure variable. It was calculated based on the available data of the firm having employees and any turnover. Survival time is calculated starting from the point of the firm having any employees or turnover. To specify the analysis around newly founded firms the survival analysis takes into account only those companies that were registered less than 1 year starting before the observed period starts.

$$h(t) = h_0(t) \exp(\beta_1 x + \varphi \mathbf{b}) \quad (3)$$

To analyze the role of the experience in the new firm's growth I estimate the following regression model (5), where the dependent variable is the logarithmic employment growth:

$$\Delta n_{i,t} = \log N_{i,t} - \log N_{i,t-1} , \quad (4)$$

where $N_{i,t}$ is the natural log of the number of employees in firm i at the time t . The model of a firm's growth from Jovanovic (1982) and Evans (1987) implies that a firm's growth at time t is a function of its size and age at time $t - \tau$. I regress the firm-level employment growth on firm

characteristics, where the function of firm age (a) and size is lagged by two periods (i.e., $\tau = 2$). According to Faggio and Konings (2003), this specification is more robust to possible measurement errors in the firm's size. Thus, the estimated regression equation takes a form:

$$\Delta n_{i,t} = \alpha_0 + \alpha_1 n_{i,t-2} + \alpha_2 n^2_{i,t-2} + \alpha_3 a_{i,t-2} + \alpha_4 a^2_{i,t-2} + \alpha_5 n_{i,t-2} a_{i,t-2} + \alpha_6 x + \phi b. \quad (5)$$

The limitation of the quantitative approach is the potential endogeneity due to the number of other personal individual level characteristics or firm characteristics that could not be observed. Another limitation is the potential reverse causality due to the intuition that the fast-growing and well-performing firms can be more likely to attract the specialists, previously employed at high-productive firms; the better performing firms have more capabilities in engaging more qualified employees.

3.2 Case study

The goal of the qualitative part of the analysis is to explain the mechanism behind spillover effects, to provide some insight into what kind of knowledge is transmitted as part of the process, and how. Fourteen former employees of Skype (mainly during the first stages of Skype's lifecycle (see Table 2.) who later went on to create their own businesses have filled in the questionnaire, where they have evaluated the role of various aspects of their Skype employment experience in their businesses. The questionnaire method (as compared to semi-structured interviews) was suitable in order to have a larger sample and, thus, a wider variety of answers. The questions (see Appendix 1) were designed based on the effects of the experience as these had been discussed in the previous studies. The limitation of the case study is that the responses were given only by those who were willing to share their opinion which, in combination with a meager number of respondents, potentially could result in a bias of the results.

Five of the abovementioned respondents have agreed for a personal interview for a more in-depth outlook on the question. The personal interviews were less structured and were concentrated on individual experiences of the interviewees before Skype, as Skype employees and after leaving Skype and joining or founding new businesses. All respondents had been working at the mid-management or management level at Skype and all of their businesses are growing rapidly. The network of Skype alumni has also helped this case study to take place, as it allowed to reach for more respondents, who were eager to share their opinion on the question of their Skype experience playing a role in the performance of the businesses they further created.

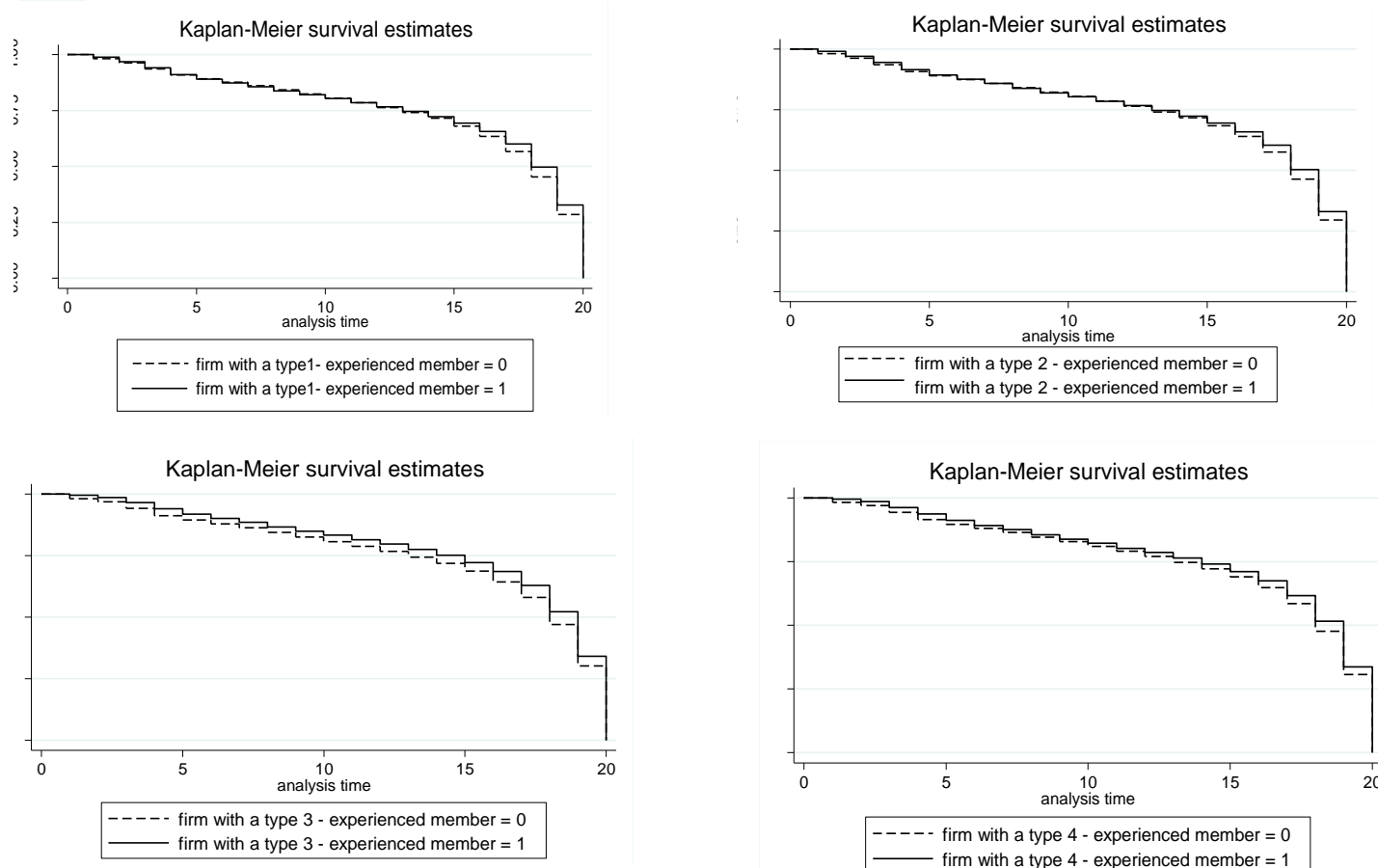
Table 2 Questionnaire respondents (see descriptions of the companies in the Appendix 4)

Name	Current company	Previous position at Skype	Gave a personal interview
Martin Villig	Taxify	Head of web backend team	-
Dan Neary	Facebook	Vice President of Market Development	-
Merje Shaw	Scandiscapes and Path59	Senior UX specialist (4 years)	+
Silver Keskküla	MOVEGuides/Teleport	First research engineer of core team (9 years)	-
Faisal Galaria	gocompare.com	Global Biz Dev Director and European Director	+
Karlheinz Wurm	Autonomous Intelligent Driving GmbH	Engineering manager (2005-2017)	-
Fred Becker	Symphony	Director, Corporate Development (3.5 years)	-
Sten Tamkivi	Move Guides	General manager, Skype Estonia (2005-2012) + various product engineering roles	-
André Karpištšenko	Taxify	Built 3 teams 2007-2012	-
Andrew Sinclair	Motorola solutions	GM skype consumer 2010-2017	+
Tiit Paananen	Pipedrive, Põhjala	Head of QE 2005-2011, head of Skype Estonia 2011-2013	-
Mart Kelder	Sixfold	Principal product manager (12 y at various roles at skype)	-
Paul Munday	RentProfile	Product Manager (2006-2011)	+
Priit Kaasik	Katana MRP	Started as a Release Manager, 6 years total	-
Asko Seeba	Mooncascade	Engineering Manager, Skype for Mobile (2005-2007)	+

4. Results of the econometric analysis

The performance of the business relies on the variety of factors. The character of the skills and knowledge gained at the high productivity firm that might be influential for new businesses can vary based on whether the company the founder used to work for was operating in the same industry or not (Delmar, 2006, suggests that it should have an effect). I investigate the difference in survival estimates with and without industry experience. Figure 1 depicts the effect in survival estimates for having an employment experience at any high-productivity firm (top left), at the high-productivity firm that operates in the same industry on a 2-digit EMTAK level (top right), as the top-skilled employee (bottom left), as the top-skilled employee at the firm in the same industry (bottom right). On the Y axis the Kaplan-Meier survival estimates show the probability of survival at the particular point of life of the company.

Figure 1 Kaplan-Meier survival estimates depending on the type of experience, represented at firms



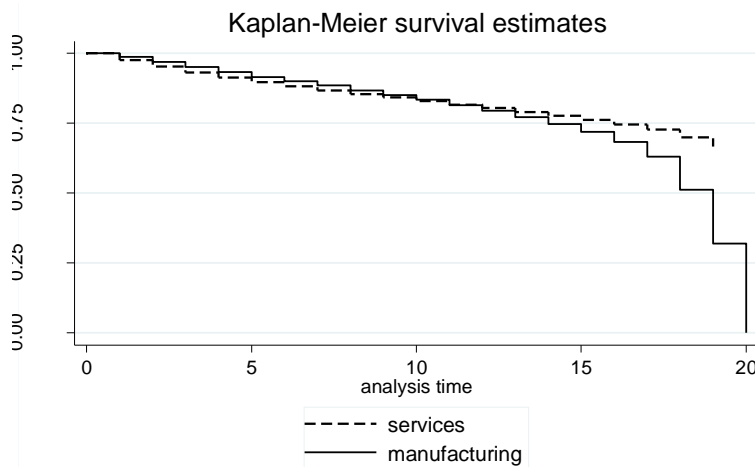
Note: type 1 experience = prior employment experience at the highly productive firm; type 2 experience = prior employment experience as a top-specialist at the highly productive firm; type 3 experience = prior employment experience at the highly productive firm in the same industry; type 4 experience = prior employment experience at the highly productive firm in the same industry as a top-specialist

Firstly, it is eminently noticeable that having a person in a newly founded firm who has experience in a highly productive firm is positively associated with the survival time of the firm on the market. Comparing the effect on the wider group of such firms and the narrower group restricted to the firms operating in the same industry as the highly productive firm (top left and top right on the Figure 1 respectively), there is a noticeable difference depending on whether the industry-specific knowledge of the movers is taken into account. The effect is most visible after 17 years of the company on the market and prior industry-specific does not make a difference. However, during the first years on the market the effect is much stronger in companies with industry-specific knowledge and it stays consistent throughout these years. Sometimes, however, the effect becomes more significant around the fourth year of the company's existence and after a decade of economic activities, contrary to the expected effect; that is, that it would be most significant in the first years of the firm's activity.

When we compare those companies that engage top-specialists with high-productivity firm experience with those companies that do not, one can see that the difference in effects is insignificant, if exists at all. Despite a slight difference in the survival rate during the first few years, the effect starts taking place on the twelfth year (in case of top specialists) and fifteenth year (in case of any high-productivity firm employment experience).

To check for all differences in effects, I singled out a narrower group whose experience was at the high-productive firm operating in the same industry as a top-specialist. Visual comparison of the results allows us to conclude that the industry specific knowledge is influential for the survival rate.

Figure 2 Kaplan-Meier survival estimates in different economic sectors



It is also worth comparing the survival pattern differences in manufacturing and services sectors. Audretsch et al. (1997) found that the likelihood of new-firm survival is systematically lower in industries where scale economies are important and higher in industries with no significant economies of scale. The services sector is, thus, expected to have a higher likelihood of survival. Based on available data (Figure 2), companies that belong to the services sector have lower chances of surviving than manufacturing sector companies for the first 13 years. Afterwards, the services companies that have survived have a higher chance of survival than manufacturing companies.

The next step is to investigate whether the newly founded firm would have a different likelihood of surviving the market if it has a person with a specified previous working experience. We shall compare four models to trace the effects depending on the type of experience. As mentioned previously, I am also comparing the effects that hold in manufacturing and services sectors.

For the companies that belong to the services sector (Table 2) the experience becomes statistically significant on the 5% level only when it was gained at the company, that operates in the same sector. It reduces the likelihood of leaving the market (i.e. increases the likelihood of survival) by 1 percentage point. However, if they were top specialists at that company within the industry, the likelihood of survival increases by 1.5 percentage points.

Table 2. Marginal effects of the Logit model for the firm's likelihood to leave the market in services sector

Independent variables	With any high productivity experience	With high productivity experience as top specialist	With high productivity experience in the same industry	With high productivity experience in the same industry as top specialist
Experience dummy	-0.005 (0.004)	-0.004 (0.004)	-0.010** (0.004)	-0.015*** (0.005)
Firm size	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Firm size growth	-0.021*** (0.003)	-0.021*** (0.003)	-0.021*** (0.003)	-0.021*** (0.003)
Firm age	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
Firm age squared	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Foreign-owned (dummy)	0.006 (0.005)	0.005 (0.005)	0.006 (0.005)	0.006 (0.005)
Exporting (dummy)	-0.008 (0.006)	-0.009 (0.006)	-0.008 (0.006)	-0.008 (0.006)
Share of top specialists	0.007 (0.005)	0.009* (0.005)	0.007 (0.005)	0.008* (0.005)
Intangible to tangible assets ratio	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Cash to assets	-0.034 (0.022)	-0.034 (0.022)	-0.034 (0.022)	-0.034 (0.022)
Unit labour cost	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Industry controls	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Number of observations	20348	20348	20348	20348
Log pseudolikelihood	-4001.1354	-4001.6892	-3999.1964	-3998.12
Wald chi2(80)	449.35	450.88	452.73	456.41

* p<0.1, ** p<0.05, *** p<0.01 Robust standard errors in parentheses. Source: merged dataset from Estonia's Commercial Registry dataset of firms' annual reports and employee-level data from the Tax and Customs Office for the period 2006–2011

There is no statistically significant evidence that firm size matters for the likelihood of firm survival, while every additional percentage point of the firm's size growth improves the chances of surviving on the market (reduces the risk to leave the market) by 2.1 percentage points regardless of the type of high-productivity experience represented in the company. This finding supports the notion that survival and growth should be studied together. The relationship of firm survival with age is linear, where every additional year of economic activities improves the survival chances by 0.5 p.p. Companies that engage top specialists from productive firms with or without industry-specific knowledge increase their survival chances by 0.9 percentage points. Contrary to expectations, there is not enough evidence to show whether exporting companies have higher or lower chances of survival.

For the companies that belong to the manufacturing sector (Table 3), surprisingly, the experience variables appear to be insignificant. Unlike the companies operating in the services industry, foreign-owned manufacturing firms are 2.3 percentage points more likely to survive than domestic ones. Firm size has the same relationship with the likelihood of firm survival in manufacturing firms as in the those that belong to services: there is not enough evidence for it to play a role in the survival likelihood, but the firm size growth does. Every percentage point of growth makes for a 2.8 p.p smaller likelihood of leaving the market (2.9 if the company engaged the person with the high-productivity experience in the same industry and/or top specialists). The data also suggests that the firm's cash to total assets ratio is statistically significant, where every additional percentage point in a share of cash increases the likelihood to of survival by around 10.3 p.p.

Table 3. Marginal effects of the Logit mode for the firm's likelihood of leaving the market in manufacturing sector

Independent variables	With any high productivity experience	With high productivity experience as top specialist	With high productivity experience in the same industry	With high productivity experience in the same industry as top specialist
Experience dummy	-0.009 (0.008)	0.001 (0.008)	-0.005 (0.009)	-0.015 (0.012)
Foreign-owned (dummy)	-0.023** (0.011)	-0.023** (0.011)	-0.023** (0.011)	-0.023** (0.011)
Firm size	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Firm size growth	-0.028*** (0.009)	-0.028*** (0.009)	-0.029*** (0.009)	-0.029*** (0.009)
Exporting (dummy)	-0.010 (0.009)	-0.012 (0.009)	-0.011 (0.009)	-0.010 (0.009)
Cash to assets	-0.103*** (0.029)	-0.102*** (0.029)	-0.103*** (0.029)	-0.103*** (0.029)
Intangible to tangible assets ratio	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Firm age	-0.002 (0.003)	-0.002 (0.003)	-0.002 (0.003)	-0.002 (0.003)
Firm age squared	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Unit labour cost	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Share of top specialists	0.010 (0.013)	0.014 (0.012)	0.013 (0.012)	0.013 (0.012)
Log pseudolikelihood	-897.87214	-898.46435	-898.32965	-897.49422
Wald chi2(39)	132.54	128.02	128.20	129.55
Industry controls	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
No. of observations	4509	4509	4509	4509

*p<0.1, **p<0.05, ***p<0.01 Robust standard errors in parentheses. Source: merged dataset from Estonia's Commercial Registry dataset of firms' annual reports and employee-level data from the Tax and Customs Office for the period 2006–2011

All in all, experience itself appears to impact the likelihood of surviving only in the services sector if it also includes industry-specific knowledge. This finding shows that when all control factors are accounted for, experience at the high-productivity firm by itself isn't a predictor of manufacturing firms' survival. Further investigations making use of more complete data might still be able to find the evidence of such linkage. Foreign ownership increases the likelihood of the manufacturing firm to survive, additional years on the market make a bigger difference for services firms, while firm growth and cash to assets ratio are important factors in all economic sectors.

The next step is to analyze the effects of the experience on the duration of economic activity until leaving the market. Again, firstly, I take a look at the services sector (Table 4). Firm age, firm age squared and firm size are time-dependent. Therefore, in the Cox model they are stratified. The economic environment is included through year and industry dummies.

Consistently with the logistic results, experience variables are statistically significant for the survival of the company, if the industry specific knowledge is taken into account. Having a high-productivity firm experienced person at the company in the same industry, while holding all other variables constant, decreases the rate of market exit by $(100\% - \exp(-0.187) * 100\%) = (100\% - 82.944\%) = 17.05$ percentage points. When he or she was a top-specialist in the same industry the rate of market exit decreases by $(100\% - 75.7\%) = 24.3$ p.p. Hence, being a top specialist in a high-productivity firm makes only a significant effect when combined with the industry specific knowledge, but then it improves the effect. Also every additional percentage point of the share of top specialists at the firm decreases the rate of market exit by 26.9 p.p., 26.51 p.p., 26.51 p.p., 25.77p.p. in the firms that engage 4 different types of high-productivity experience respectively (Table 4). Cash to total assets ratio, other variables held constant, reduces the rate of market exit by 24.6 p.p. Lerner index gives unexpected coefficients even after excluding outliers (top and bottom 1%) and not being strongly correlated to any other variables in the model. As excluding the variable doesn't impact the results significantly, the model includes this variable to control for the market share.

Table 4 Hazard rates of the Cox proportional hazards model for services sector²

Independent variables	With any high productivity experience	With high productivity experience as top specialist	With high productivity experience in the same industry	With high productivity experience in the same industry as top specialist
Experience dummy	0.958 (0.046)	0.914 (0.055)	0.829*** (0.071)	0.757*** (0.093)
Foreign-owned dummy	0.964 (0.091)	0.968 (0.091)	0.964 (0.091)	0.966 (0.091)
Unit labor cost	0 (0.000)	0 (0.000)	0 (0.000)	0 (0.000)
Exporting company dummy	0.906 (0.104)	0.908 (0.104)	0.910 (0.104)	0.908 (0.104)
Share of members with experience from productive firms	0.730*** (0.121)	0.735** (0.120)	0.735** (0.120)	0.742** (0.120)
Cash to total assets	0.753*** (0.054)	0.753*** (0.054)	0.755*** (0.054)	0.755*** (0.054)
Intangible assets to total assets ratio	0 (0.000)	0 (0.000)	0 (0.000)	0 (0.000)
Lerner index	21.650*** (1.032)	21.846*** (1.032)	21.911*** (1.031)	-22.109*** (1.030)
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
No. of observations	28,349	28,349	28,349	28,349
Chi squared	72756.344	97255.270	83254.997	67712.998
Log of likelihood	-10727.676	-10726.862	-10724.682	-10723.659

*p<0.1, **p<0.05, ***p<0.01 Note: failure – exit the market. Robust standard errors in parentheses. Source: merged dataset from Estonia's Commercial Registry dataset of firms' annual reports and employee-level data from the Tax and Customs Office for the period 2006–2011

For manufacturing companies (Table 5) engaging top specialists with high-productivity experience has a statistically significant effect of the lower hazard rate of 57.46 p.p. if he or she also had an industry-specific experience. Interestingly, for manufacturing firms the experience is very important for the survival rate if it also includes industry-specific knowledge and the moved individual is a top specialist, but there is not enough evidence to present any change in the hazard rate if any other type of experience at the productive company is present at the new firm. One of the explanations might be a smaller number of observations for manufacturing sector. Another option is that the mechanism behind knowledge spillovers in manufacturing companies in Estonia transmits only that particular type of knowledge. Every additional share of cash in total assets, all other variables held constant, decreases the hazard by 18.6 percentage points. Other controls including dummies for the foreign-owned firms and exporting firms appear to be insignificant.

² The coefficients are presented in the Appendix 3

Table 5. Hazard rates of the Cox proportional hazards model for manufacturing sector³

Variable\model	With any high productivity experience	With high productivity experience as top specialist	With high productivity experience in the same industry	With high productivity experience in the same industry as top specialist
Experience dummy	0.838 (0.163)	0.856 (0.186)	0.793 (0.207)	0.575* (0.292)
Foreign-owned dummy	0.7505 (0.273)	0.7505 (0.271)	0.753 (0.273)	0.782 (0.270)
Unit labor cost	0 (0.000)	0 (0.000)	0 (0.000)	0 (0.000)
Exporting company dummy	0.809 (0.192)	0.802 (0.192)	0.797 (0.192)	0.786 (0.192)
Share of members with experience from productive firms	0.949 (0.341)	0.999 (0.339)	0.973 (0.340)	1.032 (0.335)
Cash to total assets	0.186*** (0.450)	0.188*** (0.446)	0.188*** (0.445)	0.189*** (0.446)
Intangible assets to total assets ratio	0.998 (0.002)	0.998 (0.002)	0.998 (0.002)	0.998 (0.002)
Lerner index	0.126 (4.316)	0.110 (4.377)	0.121 (4.355)	0.116 (4.385)
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
No. of observations	5,698	5,698	5,698	5,698
Chi squared	7874.157	8082.012	7301.012	7343.509
Log of likelihood	-536.147	-536.373	-536.172	-535.138

*p<0.1, **p<0.05, ***p<0.01 Note: failure – exit the market. Robust standard errors in parentheses. Source: merged dataset from Estonia's Commercial Registry dataset of firms' annual reports and employee-level data from the Tax and Customs Office for the period 2006–2011

The last step in the econometric part of the analysis is to investigate the effect of the experience at the productive firm on the firm's growth in size (number of employees). Again, firstly I analyze the companies that belong to the services sector (Table 6). The data suggests that the experience has a significant effect on firm growth, where the company grows 0.153 percentage points faster if, other factors held constant, it is a Type 1 company, 0.7 if it is a Type 2 company, 0.157 for the Type 3 and 0.16 for Type 4. That shows a stronger effect of the experience of top specialists. Foreign-owned firms grow faster and this effect is slightly stronger in the models where the high-productivity experience was gained at the company operating in the same industry. Exporting firms have slightly higher growth rate (by around 0.07). The share of top specialists on the firm, unexpectedly, decreases the firm growth by 0.458 to 0.503 percentage points, depending on the type of experience (Table 6). Unit labor cost has no effect on firm growth; the cash ratio increases

³ The coefficients are presented in the Appendix 3

the growth slightly if the experience also included industry-specific knowledge; intangible to total assets ratio has no effect. The R squared is low, as expected for the panel data.

Table 6. Coefficients of the firm size growth models for services sector

Variable\model	With any high productivity experience	With high productivity experience as top specialist	With high productivity experience in the same industry	With high productivity experience in the same industry as top specialist
Experience Variable	0.153*** (0.007)	0.170*** (0.008)	0.157*** (0.008)	0.160*** (0.010)
Foreign-owned (dummy)	0.108*** (0.011)	0.106*** (0.011)	0.116*** (0.011)	0.116*** (0.011)
Exporting (dummy)	0.070*** (0.010)	0.069*** (0.010)	0.070*** (0.010)	0.075*** (0.010)
Share of top specialists	-0.458*** (0.016)	-0.488*** (0.016)	-0.492*** (0.016)	-0.503*** (0.016)
Unit labor cost	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Cash to total assets	0.038*** (0.013)	0.040*** (0.013)	0.032** (0.013)	0.032** (0.013)
Intangible to total assets	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Log(firm size) 2 lags	-0.232*** (0.012)	-0.229*** (0.012)	-0.221*** (0.012)	-0.221*** (0.012)
Log(firm size) 2 lags squared	0.027*** (0.002)	0.024*** (0.002)	0.024*** (0.002)	0.023*** (0.002)
Log (firm age) 2 lags	0.007 (0.011)	0.006 (0.011)	0.001 (0.011)	-0.001 (0.011)
Log (firm age) squared	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Log (firm age*size) 2 lags	-0.006 (0.004)	-0.003 (0.004)	-0.002 (0.004)	0.000 (0.004)
Lerner index	-0.022 (0.166)	-0.017 (0.166)	-0.076 (0.167)	-0.063 (0.168)
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Constant	0.570*** (0.027)	0.609*** (0.027)	0.624*** (0.028)	0.640*** (0.028)
No. of observations	19743	19743	19743	19743
R-squared	0.170	0.172	0.165	0.160

*p<0.1, **p<0.05, ***p<0.01 Note: dependent variable: employment growth. Robust standard errors in parentheses. Source: merged dataset from Estonia's Commercial Registry dataset of firms' annual reports and employee-level data from the Tax and Customs Office for the period 2006–2011

Manufacturing companies (Table 7) also grow faster if they engage the person, experienced at the highly productive firm, where engaging any experienced at the highly productive firm individual increases the growth rate by 0.153 percentage points and if the highly productive company operates in the same industry – by 0.157 p.p. Specifying for that the engaged individual was a top specialist has a stronger effect, where the growth rate rises by 0.17 p.p. and 0.16 p.p. including industry-specific knowledge. Similarly to the services companies, the share of top specialists decreases the

growth rate by 0.485 to 0.545 depending on the type of the experience. Foreign owned manufacturing firms also grow faster by 0.049 to 0.055. Exporting companies have a higher growth rate by 0.099 to 0.119 depending of the type of experience. Additionally, the constant term in both manufacturing and services appears to be significant, suggesting another factors, not included in the model, also play a role in increasing firm growth.

Table 7. Coefficients of the firm size growth models for manufacturing sector

Variable\model	With any high productivity experience	With high productivity experience as top specialist	With high productivity experience in the same industry	With high productivity experience in the same industry as top specialist
Experience Variable	0.207*** (0.017)	0.193*** (0.017)	0.157*** (0.019)	0.159*** (0.023)
Foreign-owned (dummy)	0.049*** (0.018)	0.047*** (0.018)	0.052*** (0.019)	0.055*** (0.019)
Exporting (dummy)	0.099*** (0.018)	0.103*** (0.018)	0.116*** (0.018)	0.119*** (0.018)
Share of top specialists	-0.485*** (0.037)	-0.539*** (0.038)	-0.533*** (0.039)	-0.545*** (0.039)
Unit labor cost	-0.000*** (0.000)	-0.000*** (0.000)	-0.000** (0.000)	-0.000*** (0.000)
Cash to total assets	-0.012 (0.031)	-0.006 (0.031)	-0.026 (0.032)	-0.027 (0.032)
Intangible to total assets	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Log(firm size) 2 lags	-0.268*** (0.027)	-0.252*** (0.026)	-0.241*** (0.026)	-0.245*** (0.027)
Log(firm size) 2 lags squared	0.025*** (0.004)	0.021*** (0.004)	0.020*** (0.004)	0.021*** (0.004)
Log (firm age) 2 lags	0.056** (0.027)	0.050* (0.027)	0.040 (0.027)	0.041 (0.028)
Log (firm age) squared	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Log (firm age*size) 2 lags	-0.001 (0.009)	0.001 (0.009)	0.003 (0.009)	0.005 (0.009)
Lerner index	0.577 (0.539)	0.448 (0.538)	0.623 (0.536)	0.535 (0.538)
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Constant	0.389***	0.471***	0.460***	0.485***
No. of observations	4464	4464	4464	4464
R-squared	0.184	0.182	0.171	0.166

*p<0.1, **p<0.05, ***p<0.01 Note: dependent variable: employment growth. Robust standard errors in parentheses. Source: merged dataset from Estonia's Commercial Registry dataset of firms' annual reports and employee-level data from the Tax and Customs Office for the period 2006–2011

All in all, the data suggests that services and manufacturing sectors do have experience different effects as a result of engaging people with high-productivity firm experience. It doesn't affect the probability of manufacturing firms surviving the market, while if that experience also offered

industry-specific knowledge, the services firms are more likely to survive, especially if the moved person is a top specialist. New firms in services also have a lower risk of leaving the market if they engage a productive firm-experienced person with the effect being even more pronounced if the new employee is a top specialist. Meanwhile, the hazard rate of not surviving is lower for manufacturing firms if they engage a top specialist from a productive firm. Experience is important for the growth of both manufacturing and services companies.

5. Case Study of ex-Skype employees (“Skype mafia”)

The case study suggests a complex mechanism behind the role employment experience at a successful company plays in the performance of a new business.

A) The Questionnaire. In this section I summarize the findings based on the questionnaire responses.

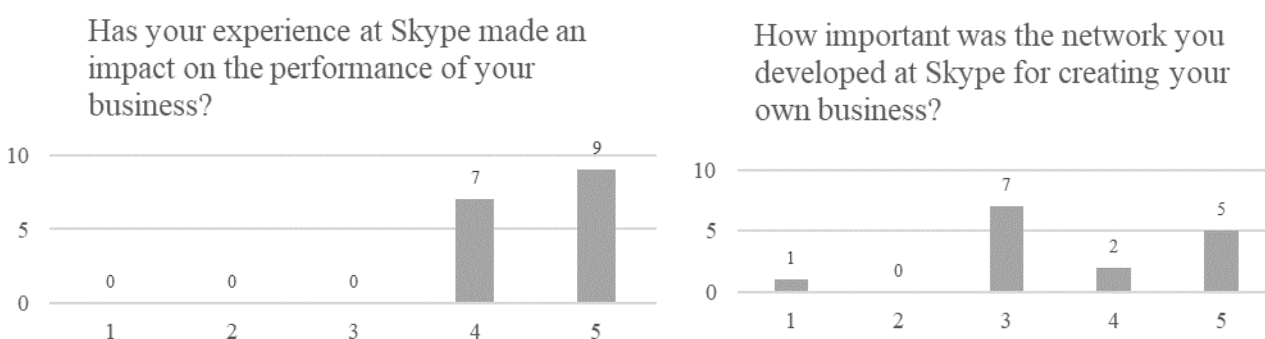


Figure 3 Questionnaire for ex-Skype employees. Q1, Q2

Note: The exact wording of the answer options was as follows: It hasn't at all/ Didn't play a role in my business =1, Most likely wouldn't be where I am now without it=5; y axes: number of respondents

All respondents see their experience at Skype to be either defining or at least very important for the direction in which their own business has led them (see Figure 3). The specification of the influence varies quite strongly.

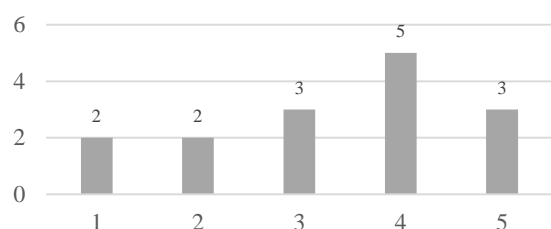
The respondents explain the impact by a wide variety of factors. At Skype they have gained experience of building global products from Estonia with a global team. The fact that it had a global scale appears in many answers as important. This aspect also relates to answers which suggested that the experience taught them how to scale businesses (including how to deal with distributed work and inter-firm mobility).

During the time most of them worked there it was a very fast growing company and the team was very ambitious. The experience of working at a company of rapid growth, especially managing it, was pointed out multiple times as important for growing their own business. This aspect delivers results during the scaling phase of the company.

Some were using Skype connections for hiring, raising funding or business development. For some it meant that they would later be trusted to develop a solution for another company (e.g. Facebook, Audi, Motorola). One of the respondents co-founded a new company with another Skype employee, received investment from Skype founders and other connections made at Skype and found both their first personnel and their first clients through Skype. The impact that Skype employees have on each other was been strong during time spent working at Skype; the environment of highly skilled intelligent people, driven to make a change was mentioned as a motivational factor.

The motivation of respondents was often attributed through gained confidence they acquired at Skype. As creating a business is risky, one has to have an innate confidence to be risk-seeking. Some respondents say that they don't believe that would start their own business without the experience at Skype.

How important was the industry-specific knowledge you gained at Skype at your own business?



How important were the skills that you gained at Skype for the creation of your own business?

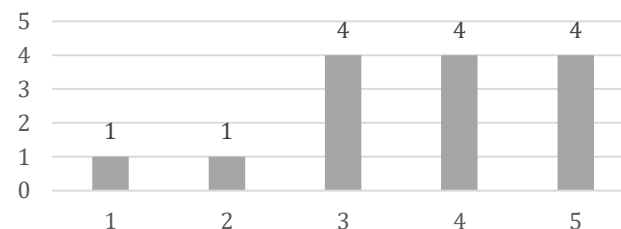


Figure 4 Questionnaire for ex-Skype employees. Q3, Q4

Note The exact wording of the answer options were as follows: Didn't play a role in my business= 1, Was essential for my business at least at one stage=5; y axes: number of respondents

With regard to the network of former Skype employees and its influence on new businesses, the responses were more or less binary; the network appears to either be very significant or not at all. The main ways in which the network can play a role are: fundraising, hiring, expert advising, and introductions to other connections related to the business. However, in cases where the new firm

operates in a different industry, the network plays a smaller role. (see Figure 4) Nevertheless, it plays the role of encouragement and a driving force for many respondents.

The respondents have been creating businesses in a variety of other sectors, many of which are quite different from the area where Skype operates, while many have stayed within software companies, where the industry knowledge is recognized to have a significant impact on business performance. (see Figure 4). Regardless of the industry, business scaling skills are helpful when the business is growing, but not in the early stages. Responders also listed interpersonal skills, managerial skills and the work ethic of efficiency and flexibility gained at Skype as something that contributed to the performance of their current businesses.

B) Personal interviews. In this section I summarize the results of extensive individual interviews.

Asko Seeba, CEO and Co-Founder at Mooncascade

- **Industry experience.** Mooncascade started as a piece of the mobile software at the time when it was relatively new, so a significant amount of technical and industry-specific knowledge gained at Skype was more important at that time on the initial stage than it, possibly, would be now. The hiring process at Skype had a very high quality, and as a result many of Skype's hiring techniques were implemented in his own company.
- **Network.** At first the network was only inspirational, but in the later stages it helped to create a much higher customer engagement than it would have been the case otherwise. Additionally, there was an indirect effect from the Skype network. Skype founders had invited him to their startup incubator program, where he was managing another business idea while the incubator was working. After it was over the program (which later turned into Garage48) helped him to engage his first customers for Mooncascade.
- **The climate at Skype.** At the time when the interviewee had joined Skype, it was growing rapidly. At first, the size was "just right" to be in touch with company developments and to understand them. According to the interviewee, understanding what processes at Skype were working and how was helpful for his own business. This knowledge was especially helpful when it came to making Mooncascade grow much faster (it was growing twice as big every year). Once Skype had become an established and significant company on the market, the climate had changed and that was when the interviewee left the company to start his own firm.

- **Useful skills.** As he was holding mid-manager roles at Skype, he learned a lot about management from the role models at Skype. He acquired a distinctively strong, self-assertive management style. His communication style has changed significantly; interpersonal skills have improved dramatically.
- **The role of the position at Skype.** It was important that the interviewee was holding a mid-management role. He was interested in being an entrepreneur before joining Skype, but the experience there gave him the courage to start due to the managerial position he had held at the firm.
- **The uniqueness of the “Skype-effect”.** The effect exists in other successful companies even in Estonia, but they won’t be as recognized. The timing for Skype was very unique.

Paul Munday, Co-Founder at RentProfile

- **Industry experience.** Prior to Skype the interviewee already had experience at Vodafone, JPMorgan, Rolls-Royce. The hiring process at Skype was very thorough and included many stages, resulting in a strong team. The experience has also helped to gain trust from investors.
- **Network.** The advantages of the network were encouragement, business advice and angel investments. The interviewee was based in London and is geographically more distant from the majority of the network, centered in small Estonia.
- **The climate at Skype.** Everyone at the company was passionate about what they were doing and had a lot of energy. He always had a passport when going to work to the London office, as he never knew if he had to suddenly travel to Tallinn. The cultural fit of employees is very important. They have to be flexible, passionate and fast learners. At his own business the interviewee only hires people who have those characteristics.
- **Useful skills.** The experience gave him the ability to start something new without being scared to fail; this can be more difficult depending on what stage you are at in your career. Skype offered the opportunity to work in a wide variety of roles and in an international team, which are very important skills for creating a business. Working at Skype gave him encouragement and belief in his ability to achieve success.
- **The role of the position at Skype.** The product management job at Skype was very important for his future business. It gave a better understanding and intuition of what is a good idea for a business, gave a better appreciation of the product validation phase and customer support. The

role taught him how to go through the process of taking an idea and carrying it through different stages before it comes to life.

Andrew Sinclair, Corporate Vice President and General Manager, Motorola Solutions

- **Industry experience.** Understanding the sector is important and many businesses that spun off from Skype are in similar areas to Skype. Crucially important are communication, being consumer-orientated and collaboration. Hiring the right people was key at Skype. Skype users can be found all over the planet and hiring people from different countries develops understanding of various markets.
- **Network.** Skype alumni often hire each other or people who have been recommended to them. As hiring the right people is very important, the Skype network is very useful for human resources. They are people one can trust and they are the people of the Skype culture. When the interviewee entered Skype it was very homogenous. Only later did it become more diverse in its hires.
- **The climate at Skype.** Skype had a very distributed development. They had multiple locations, with each of them developing on its own. The directors couldn't control everything in every location and in every department, so people were given a lot more responsibilities. The management was always empowering people and that must have been an important factor in explaining why people were inspired to start their own business. Skype was run by engineers and the management was organized in a way that empowered the lower end. Skype is a mission-driven company (to connect people across the planet). When the company has a culture of people it becomes the culture of product.
- **Useful skills.** It is important to truly commit to customer focus and understand how to scale a business that one have learned at Skype. The Scaling phase is when most businesses fail. The performance of the company, especially one that is growing or entering the market, depends on people and, to a large extent, luck. To establish a culture of "empowerment" in the right way, the company must give power to its employees, and refuse to make decisions for people. People have to be able to keep going, to have grit. Startups need people who preferably have experience scaling a business before. It is important to be mission-driven from the start and in doing so to attract a mission-driven team who truly believe in what they are doing.

- **The role of the position at Skype.** Personality matters most in the firm's performance, even though specific work experience still has its benefits. The specific position itself at the company doesn't matter as much, as long as the person is empowered to do it.

Merje Shaw, Managing Director at Path59, Founder at Scandiscapes Ltd

- **Industry experience.** Not important. Started both new businesses in a completely different industry to Skype (one is business consulting; another is a web-store for green decorations).
- **Network.** Received business advice, mentorship and moral support from like-minded people. It is still difficult to get funding for a new non-tech business led by a woman.
- **The climate at Skype.** Skype made its employees unafraid of trying and failing. The culture gave an opportunity for anyone try out an idea he or she had themselves. If that idea worked, an employee was even more motivated. Instead of hiring an expensive consultant to advise on trends and innovation agencies employees do it themselves. Skype had a culture of people working together instead of against each other, not scared of making mistakes. Also being around talented driven people is inspiring and made her think like them.
- **Useful skills.** Skype gave her the ability to start doing and the belief that you can do it. Later, working at a different company brought her closer to the reality of the market compared to the experience in Skype. The combination of the can-do attitude, not giving up, knowing how to bring the idea to realization and understanding the reality of the market constitutes an important set of skills.
- **The role of the position at Skype.** Not that important. It has more to do with personality. The interviewee started in Skype at customer support and later moved to mid-level positions.

Faisal Galaria, Chief Strategy & Investment Officer at GoCompare

- **Industry experience.** It does not matter much. Ex-Skype employees are opening businesses in various industries, e.g. a tea shop.
- **Network.** Network helps in finding funding and in getting introduced to useful connections for the business. It also can offer mentorship on business and management matters.
- **The climate at Skype.** The interviewee became involved at Skype at a very early stage after advising the government not to regulate Voice over IP technology, a field in which Skype was

one of the competitors. Skype had the most attractive idea. One learns the most from the company that is growing. You learn how the business is created and get involved in every job.

- **Useful skills.** It is important to learn how to build something. The ability to hire the right people also is a skill one has to develop in order to create a successful business. Marketing is essential too. At the first stages of the new business one has to be able to fulfill the roles of the product manager, marketing department, fundraising, etc. It is only during the later stages when the business is growing that one also has to learn how to hire the right people and delegate.
- **The role of the position at Skype.** Business is risky and its success is determined by luck, the combination of correct timing, the right people, the right funding, and effective marketing. Thus, having been involved in a company like Skype provided the financial stability necessary to be able to take more risks. The skills that were important for management positions at the company compared to those important in one's own company are not dissimilar, but in the latter case one has much more emotional attachment and worry.
- **The uniqueness of the Skype effect.** It isn't unique, there are plenty of other examples in Silicon Valley (e.g. PayPal) and around many successful companies.

All in all, the results of the case study support the empirical findings that point to the importance of the experience for new businesses. The main categories of the benefits found to be transmitted to the newly founded firms are entrepreneurial motivation, business scaling skills, strong network, and the variety of skills for different business roles including management skills. These skills and knowledge can be gained if the employee at the successful company was occupying a managerial position or/and employees gain the kind of diverse and multidimensional skills that are required when the company has flat hierarchies or/and is growing. The role of the experience matters most on the later stages of the business life cycle for the firm growth, while an early-stage survival requires a large variety of factors to be executed simultaneously, including contingency.

6. Conclusions and Discussion

Creating a new business, finding a market fit, growing it and surviving market fluctuations is complex and requires a large variety of factors to be executed simultaneously. For that reason, no individual study would be sufficient to explain them all. This paper has made a step in understanding the question by firm survival and growth analyses through the prism of the role of prior employment experience at highly productive firms. The findings are compound, as expected

from a complex question. The current study found that the experience at a highly productive firm can play a significant role for the new firm's performance provided that it offered the skills and knowledge needed for surviving the market and scaling the business.

The empirical part of this dissertation has revealed that Estonian firms in services and manufacturing sectors have experience different results from engaging people with high-productivity firm experience. If that experience offered industry-specific knowledge, the services firms are more likely to survive and have a lower risk of leaving the market. The experience plays an even bigger role for services firms' survival if engaged individual is a top specialist. Meanwhile, there was not enough evidence to comment on how experience affects the likelihood of survival for manufacturing firms. Manufacturing firms' failure hazard is only improved from the mobility of individuals with experience at a high-performing firm if he or she was in the top 20% of the wage distribution and has industry-specific knowledge, but in that case the benefit is relatively high. These results reflect those of Mion and Oromolla (2014), that the knowledge transfer by the mobility of individuals holding managerial positions is more valuable. Evidence suggests that industry-specific knowledge gained at highly-performing firms significantly benefits the survival of newly founded firms, supporting the findings by Delmar, Shane (2006).

Another highly important aspect of a new firm's performance is its growth. This study has found that prior employment experience at a highly productive firm has the strongest effects on the firm's growth. This result was observed at all economic sectors regardless of the industry where it was gained and the position occupied at the previous firm. Thus, it can be concluded that there is enough evidence to suggest that newly founded firms that engage individuals who have experience at a highly performing firm tend to grow at a higher rate. The spillover effect is stronger for firm growth, but depending on the type of the experience, also results in benefits for firm survival.

The case study enabled this thesis to provide a deeper, unique insight into the mechanisms behind this particular aspect of knowledge spillovers. The results of the case study support the empirical findings that imply the importance of the experience for new businesses. The main categories of the benefits found to be transmitted into the newly founded firms are entrepreneurial motivation, business scaling skills, strong network, and the variety of skills required for different business roles, including management skills.

In accordance with the present results, previous studies have demonstrated that new business benefits from entrepreneurial alertness (Adomasko et al., 2018). Baptista et al. (2014) also showed that entrepreneurial motivation impacts survival. This study supports those findings, as respondents have referenced entrepreneurial motivation as an aspect of their experience at Skype which was important for their new businesses. Some would not have even decided to become entrepreneurs were it not for their experience at Skype, while all respondents continue using the motivation and confidence they gained at Skype during the lifecycle of their new business. As starting a company implies taking a risk and in most cases businesses cannot avoid having to go through challenging times, the “can-do attitude”, confidence and motivation of the team play a big role in business performance.

The asset that is closely connected to entrepreneurial motivation is the network that has been inherited from the experience at the previous. Based on the results of the case study, it can be concluded that at Skype there was a considerably flat hierarchy which, in accordance with the findings of Gompers et al. (2005), implies that the created network becomes valuable for the new firm. The findings show that the network formed at Skype, was useful for fundraising, hiring, expert business advising and introductions to other connections related to the business. The abovementioned entrepreneurial motivation is also often, in fact, provided by other members of the network. This finding is consistent with that of de Jong Marsli (2015) regarding the benefits of close ties with other entrepreneurs. Even though the degree of importance of the Skype network for entrepreneurs differs, it can be concluded that overall it is one of the important assets which are transferred from highly-performing firms to new ventures.

An important finding of this paper is that one of the benefits of experience at a successful firm is experiencing its growth. Both the regression results and the case study indicate that this aspect is one of the most significant spillovers to the newly founded firms. As implied by the case study, scaling the business is one of the most challenging aspects of the business lifecycle. The experience of a successful case of business growth provides knowledge which can prove instrumental for being able to replicate the key factors for a successful scaling of the new firm. After being a part of the team when Skype was growing, its then employees could use the knowledge they gained for the growth of the new firms.

In addition to the scaling-related knowledge, being at a firm that is growing allows the employees to gain a large variety of skills. The case study results imply that an early entrepreneur has to be able to execute well a variety the roles (fundraising, product management, marketing, etc.) before he or she can engage a larger team, including experts in those fields. When the company is growing and/or is of a smaller size, an employee is engaged in a variety of tasks, experiencing all aspects that an employee of a large firm that is not growing does not experience, being limited to a particular job description. This finding accords with earlier observations by Hyytinen et al. (2008), Xi and Block (2017), Elfenbein et al. (2010).

Interestingly, the results of the econometric analysis and the case study differ in terms of the role of the industry-specific knowledge gained from the prior experience at the successful company. The econometric results, as mentioned above, indicate that the industry-specific knowledge is significant for firm survival while the case study respondents have different opinions on the matter. It can be argued that the kind of IT-related knowledge acquired at Skype can nowadays be applied in any sector; thus, the industry of the newly founded firm is not important. Additionally, as found in the case study, the customer-orientation at Skype can be applied in other industries if it still belongs to the services sector. Considering the firm's growth, the results of the econometric analysis and case study are aligned, suggesting that for the new firm to grow industry-specific knowledge is not significant.

Another aspect in which respect results are not straightforward was the importance of the role occupied by the entrepreneur at the highly-performing firm. The econometric results suggested that in services firms the effect of the experience at a highly productive firm was enhanced in cases where the engaged individual was a top specialist and the effect of the experience was significant only if the individual was a top specialist from the same 2-digit level industry. The case study implied that occupying a managerial position at Skype allowed entrepreneurs to gain the abovementioned assets such scaling-related knowledge and a broad range of business-related skills. The reason for this was that managers generally have a closer access to those assets. Additionally, at those positions employees gain managerial and hiring-related skills that are important for business and potentially are crucial for achieving greater financial stability. On the other hand, according to the results of the case study, personality traits of individuals might compensate for their lack of managerial experience. It should be noted, however, that the case

study included mainly the opinions of managers, without testing their answers against the opinions of individuals from non-managerial positions.

To conclude, prior experience at a successful firm *per se* does matter for a newly founded firm's performance. It is beneficial for the firm's survival if it is combined with industry-related knowledge and a broad, balanced skillset. If such conditions are met, the experience becomes momentous for the firm's growth. The experience at the successful firm, based on the case study results, is expected to become more valuable if it was gained when the firm was growing. A further study could add to this research an analysis of the role of the experience at the highly performing firm if it is growing rapidly.

Appendices

Appendix 1. The questionnaire

- i. Name
- ii. Current company
- iii. Previous position at Skype (preferably with years)
- iv. Has your experience at Skype made an impact on the performance of your business?

It hasn't at all 1-2-3-4-5 Most likely wouldn't be where I am now without it

- v. Please shortly explain your answer
- vi. How important was the network you developed at Skype for creating your own business?

Didn't play a role in my business 1-2-3-4-5 Was essential for my business at least at one stage

- vii. Please explain your answer
- viii. How important was the industry-specific knowledge you gained at Skype at your own business?

Didn't play a role in my business 1-2-3-4-5 Was essential for my business at least at one stage

- ix. Please explain your answer
- x. How important were the skills that you gained at Skype for the creation of your own business?

Didn't play a role in my business 1-2-3-4-5 Were essential for my business at least at one stage

- xi. Please explain your answer
- xii. Was the Skype experience helpful at any particular stage(s) in your new business development so far?
- xiii. What is it about the company, its management or structure that makes for a strong network like Skype Mafia?
- xiv. How important is experience in the industry for making a successful business?
- xv. How important is the type of role that you had in Skype (e.g. engineer/project manager etc) for the impact of that experience on the success of the business?
- xvi. Are there any different aspect of the role of the Skype experience that made an impact that wasn't mentioned in the questionnaire? If so, please provide some details.
- xvii. Do you think that the effect of the ex-Skypers creating successful businesses can be broadly replicated?
- xviii. What was/were other important factors (either your personal, team-related or the environment besides you having worked at Skype) that were important for the performance of your business?

Appendix 2. Descriptive statistics by groups of firms: mean characteristics of firms with and without highly productive firm experienced members

Services

Variable	Type 0	Type 1	Type 2	Type 3	Type 4
Share of top-specialists	0.714	0.476	0.470	0.429	0.441
Share of members with experience from productive firms	0	0.436	0.451	0.419	0.445
Number of employees	2.606	17.343	25.872	30.173	39.707
Growth in the number of employees	-0.013	0.003	0.012	0.019	0.029
Lerner index	0.159	0.155	0.154	0.148	0.149
Foreign-owned dummy	0.051	0.110	0.140	0.122	0.146
Exporting company dummy	0.042	0.114	0.142	0.150	0.170
Unit labor cost	8570.147	11725.43	13364	12667.91	14244.44
Cash to total assets	0.286	0.224	0.216	0.198	0.193
Intangible assets to total assets ratio	9.847	9.88	9.83	10.083	13.672
Return on equity	-0.268	13.188	24.120	-0.449	-0.313

Manufacturing

Variable	Type 0	Type 1	Type 2	Type 3	Type 4
Share of top-specialists	0.586	0.318	0.313	0.301	0.323
Share of members with experience from productive firms	0	0.277	0.285	0.296	0.335
Number of employees	5.594	39.804	53.895	58.091	65.016
Growth in the number of employees	-0.015	0.016	0.025	0.026	0.039
Lerner index	0.114	0.107	0.104	0.102	0.099
Foreign-owned dummy	0.064	0.174	0.209	0.182	0.189
Exporting company dummy	0.138	0.475	0.548	0.559	0.582
Unit labor cost	9284.703	15974.04	19883.9	13203.88	13990.15
Cash to total assets	0.253	0.168	0.152	0.148	0.143
Intangible assets to total assets ratio	2.35	2.50	3.072	3.568	5.721
Return on equity	-0.083	-0.381	1.071	0.931	1.839

Note: Type 0 –with no experience at the highly-productive firm; Type 1 - any experience at the highly-productive firm; Type 2 - with experience at the highly-productive firm as top specialist; Type 3 – with experience at the highly-productive firm of the same industry; Type 4 – with experience at the highly-productive firm of the same industry as top specialist

Appendix 3. Coefficients of the Cox proportional hazard model

a) Services sector

Independent variables	With any high productivity experience	With high productivity experience as top specialist	With high productivity experience in the same industry	With high productivity experience in the same industry as top specialist
Experience dummy	-0.042 (0.046)	-0.090 (0.055)	-0.187*** (0.071)	-0.278*** (0.093)
Foreign-owned (dummy)	-0.037 (0.091)	-0.032 (0.091)	-0.037 (0.091)	-0.035 (0.091)
Exporting (dummy)	-0.098 (0.104)	-0.096 (0.104)	-0.094 (0.104)	-0.096 (0.104)
Share of top specialists	-0.314*** (0.121)	-0.308** (0.120)	-0.308** (0.120)	-0.298** (0.120)
Cash to total assets	-0.283*** (0.054)	-0.283*** (0.054)	-0.281*** (0.054)	-0.281*** (0.054)
Intangible to total assets	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Unit labor cost	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Lerner index	3.075*** (1.032)	3.084*** (1.032)	3.087*** (1.031)	3.096*** (1.030)
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes

*p<0.1, **p<0.05, ***p<0.01 Source: merged dataset from Estonia's Commercial Registry dataset of firms' annual reports and employee-level data from the Tax and Customs Office for the period 2006–2011

b) Manufacturing sector

Variable\model	With any high productivity experience	With high productivity experience as top specialist	With high productivity experience in the same industry	With high productivity experience in the same industry as top specialist
Experience dummy	-0.176 (0.163)	-0.153 (0.186)	-0.232 (0.207)	-0.554* (0.292)
Foreign-owned (dummy)	-0.287 (0.273)	-0.287 (0.271)	-0.283 (0.273)	-0.246 (0.270)
Exporting (dummy)	-0.212 (0.192)	-0.220 (0.192)	-0.227 (0.192)	-0.241 (0.194)
Cash to total assets	-1.681*** (0.450)	-1.672*** (0.446)	-1.670*** (0.445)	-1.666*** (0.446)
Share of top specialists	-0.052 (0.341)	-0.001 (0.339)	-0.027 (0.340)	0.032 (0.335)
Intangible to total assets	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)
Unit labor cost	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Lerner index	-2.073 (4.316)	-2.207 (4.377)	-2.115 (4.355)	-2.150 (4.385)
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes

*p<0.1, **p<0.05, ***p<0.01 Source: merged dataset from Estonia's Commercial Registry dataset of firms' annual reports and employee-level data from the Tax and Customs Office for the period 2006–2011

Appendix 4.⁴ The descriptions of the companies, represented in the case study

Taxify	<p>Martin Villig joined Skype when it was only a start-up preparing for a huge growth. In 2010 he co-founded Garage48 and in 2013 he added one more company to his list of accomplishments – he co-founded Taxify. In 2014 another ex-Skype Rain Johanson joined Taxify as Head of Engineering.</p> <p>Taxify offers a mobile application which connects users with drivers. Users can choose their car based on arrival time, prices and service level. After requesting users can see their car arriving on the map in real-time and pay for the ride via Taxify app.</p> <p>Taxify is currently operating in 10 countries – Czech Republic, Estonia, Finland, Georgia, Latvia, Lithuania, Serbia, The Netherlands and Mexico, and is planning to expand the territory further.</p>
Mooncascade	<p>Asko Seeba and Ahti Liin built up the Skype mobile team from ground. In 2008, they founded Mooncascade a mobile and web software development service company based in Estonia.</p> <p>Mooncascade offers different software development services such as Concept Development (define goals, users, needs), UX and Visual Design (concept visualization, interactive prototypes, UX design and visual design), Front-end Development (iOS, Android, Windows Phone, and responsive web development), Back-end development (Server-side computing (PHP, Python, C/C++, .NET) and databases (SQL), Integration with social networks and external API's), and Quality Assurance (testing team provides manual and automated testing for all our development services).</p>
Scandiscapes and Path59	<p>Merje Shaw started with the custom support unit at Skype and then spent more than 2 years in the position of Usability Expert. Experienced in the user research area, Merje and her partner started a small agency called The Most Jam in 2012.</p> <p>The Most Jam (<i>Note: currently Path59</i>) is a brand experience agency specializing in developing and ensuring consistency of the entire customer experience, from how brands look, feel and talk, right through to the online experience and purchase journey.</p>
MOVEGuides/ Teleport	<p>Sten Tamkivi and Silver Keskkula were the early birds of Skype. In 2005, Sten joined Skype as a General Manager and Silver became Skype's Senior Research Engineer. Each spent more than 6 years at the company. After leaving Skype their ways parted, but then, in 2014, they jointly founded Teleport.</p> <p>Teleport is created not only to connect people with people as Skype, but also to connect people and places. This platform helps to redistribute world talents to the best places to live and work. Teleport helps to find the place that suits you well, guides you through the moving process and provides you with the necessary information about the documents you may need and possibilities you may have at the chosen place.</p>
gocompare.com	<p>Faisal Galaria is a Chief Strategy and Investments officer at GoCompare. He held senior executive positions with Spotify, Skype and Kayak, and was one of the founders of Jaman.com. He has also been a Venture Partner at Octopus Ventures, one of Europe's leading early stage venture capital firms.⁵</p> <p>GoCompare is a British financial services comparison website, established in Wales in 2006. It provides comparison details for financial products including vehicle insurance,</p>

⁴ Skype Mafia. Companies. Retrieved www.skypemafia.com/companies/

⁵ Retrieved www.gocomparegroup.com/about-us/board-and-management/our-senior-team

	<p>home and pet insurance and breakdown cover.⁶ In November 2017, ZPG's offer to buy the company for £460 million was rejected.</p> <p>In December 2017 GoCompare announced the acquisition of MyVoucherCodes, one of the UK's largest online voucher code sites, in a £36.5m deal.</p>
Autonomous Intelligent Driving GmbH	<p>Karlheinz Wurm is the CEO & Engineering at Autonomous Intelligent Driving GmbH. Autonomous Intelligent Driving GmbH is a wholly owned subsidiary of AUDI AG. As a start-up, we're developing solutions for fully autonomous driving in urban environments, that will realize the possibility of on-demand mobility services⁷</p>
Symphony	<p>David Gurle has more than 20 years of experience building and managing consumer and enterprise communication and messaging systems at companies such as Microsoft, Thomson Reuters and Skype. In Skype, he ran Enterprise business division. He is currently CEO of Symphony.</p> <p>Symphony is a safe communication service that is designed to help individuals, teams and organizations of all sizes improve productivity without compromising on organizational compliance. You can easily and quickly create a team, add more people to your chats, emphasize the important information with rich editing, images, tables and files, and even pin your messages on your own dashboard.</p>
Pipedrive, Põhjala	<p>Ott Kaukver, Martin Tajur and Andrus Purde worked in Skype in various positions. In 2010 Martin Tajur co-founded Pipedrive, where now Ott is an advisor and Andrus is Head of Marketing.</p> <p>Pipedrive is a free Sales Pipeline Template to manage your sales pipeline without spending money on a CRM. Pipedrive shows your deals at different sales stages. You can also see the sales pipeline for individual team members, specific products and timelines, such as new deals added this week. Pipedrive also offers Timeline View that is a personal friendly sales manager. With it you can easily discover ongoing deals arranged by their likely close date next to deals you've already closed.</p>
Voog	<p>Märt Kelder was a team lead of video and call quality at Skype. Then he co-founded Voog – a tool for building and managing exceptional websites.</p> <p>Voog claims to be so easy and comfortable to use, that you even don't need any computer skills. It enables hundreds of thousands of websites globally to evolve and grow. Voog is used both by one-man companies and large, listed enterprises with thousands of employees. With Voog you can make beautiful websites as well as completely unique large-scale websites. Voog's unique feature is that it is flexible and fluid. So, your site can be enjoyed in any environment, be it a smartphone, tablet or desktop.</p>
RentProfile	<p>Paul Munday joined Skype just after the Ebay acquisition and spent 5 years based in London as a Product Manager.</p> <p>In 2016 Paul co-founded RentProfile, a trusted network of verified renters and landlords. RentProfile enables landlords and renters to self-background check, create a unique profile and demonstrate credentials/good rental history. This helps set them apart, and in checking others, have confidence in who they're dealing with.</p>
Katana MRP	<p>Katana is an online production and inventory management system for small manufacturers. Founded in 2017, the company is headquartered in Tallinn. Total Funding Amount €600K⁸</p>

⁶ Wikipedia

⁷ Retrieved <http://aid-driving.eu/home/interview-wurm/>

⁸ Retrieved <https://www.crunchbase.com/organization/katana-mrp#section-overview>

References

- A.A.K (Jul 31st 2013), “How did Estonia become a leader in technology?”, Retrieved <https://www.economist.com/blogs/economist-explains/2013/07/economist-explains-21>
- Acs, Z.J., Braunerhjelm, P., Audretsch, D.B et al. (2009), “The knowledge spillover theory of entrepreneurship”, *Small Business Economics*, 32: 15.
- Agarwal, R., Campbell, B.A., Franco, A.M., and Ganco, M., (2016), “What Do I Take With Me? The Mediating Effect of Spin-out Team Size and Tenure on the Founder–Firm Performance Relationship”, *Academy of Management Journal*, 59:3, 1060-1087.
- Alden, S. Bean, (1995), “Why Some R&D Organizations Are More Productive Than Others”, *Research-Technology Management*, 38:1, 25-29.
- Almus, M, Nerlinger, E.A., (1999), “Growth of New Technology-Based Firms: Which Factors Matter?”, *Small Business Economics*, 13: 141.
- Arrow, K. J., (1962), “The Economic Implications of Learning by Doing”, *The Review of Economic Studies*, 29: 3, 155-173.
- Balsvik, R., (2011), “Is labor mobility a channel for spillovers from multinationals? Evidence from Norwegian manufacturing”, *Review of Economics and Statistics*, 93:1, 285–297.
- Baptista, R., Karaöz M., Mendonça, J. (2007), “Entrepreneurial backgrounds, human capital and start-up success”, *Jena economic research papers*, 045.
- Bartelsman, E. J., Haltiwanger, J., Scarpetta, S., (2004), “Microeconomic Evidence of Creative Destruction in Industrial and Developing Countries” IZA Discussion Paper No. 1374.
- Bosma, van Praag, Thurik, de Wit, (2004), “The Value of Human and Social Capital Investments for the Business Performance of Startups”, *Small Business Economics*, 23, 227–236.
- Cefis, E., Marsili, O., (2015), “Crossing the innovation threshold through mergers and acquisitions”, *Research Policy*, 44:3, 698-710.
- Crescenzi, R., Gagliardi, L., Iammarino, S., (2015), “Foreign multinationals and domestic innovation: Intra-industry effects and firm heterogeneity”, *Research Policy*, 44: 3, 596-609.
- de Jong, J. P.J. and Marsili, O., (2015), “Founding a Business Inspired by Close Entrepreneurial Ties: Does It Matter for Survival?”, *Entrepreneurship Theory and Practice*, 39, 1005–1025.
- Delmar, F., Shane, S., (2006), “Does experience matter? The effect of founding team experience on the survival and sales of newly founded ventures”, *Strategic Organization*, 4:3, 215 – 247.

- Demena, B. A. (2018). "Transmission channels matter: Identifying spillovers from FDI", *The Journal of International Trade & Economic Development*
- Dyer, J.H, Nobeoka K., (2000), "Creating and Managing a High-Performance Knowledge-Sharing Network: The Toyota Case", *Strategic Management Journal Special Issue: Strategic Networks*, 21:3, 345-367.
- Edquist, H., Henrekson, M., (2017), "Do R&D and ICT affect total factor productivity growth differently?", *Telecommunications Policy*, 41:2, 106-119.
- Evans, D.S., (1987), "The Relationship Between Firm Growth, Size, and Age: Estimates for Manufacturing Industries", *Journal of Industrial Economics*, 35:4, 567–581.
- Fosfuri, A., Motta, M., Ronde, T., (2001), "Foreign direct investment and spillovers through workers' mobility", *Journal of International Economics*, 53, 205–222.
- Foster, L., Haltiwanger, G., Syverson, C., (2016), "The Slow Growth of New Plants: Learning about Demand", *Economica*, 83, 91–129.
- Geroski, P.A., Mata, J., Portugal, P., (2010), "Founding Conditions and the Survival of New Firms", *Strategic Management Journal*, 31: 510–529.
- Glass, A.J., Saggi, K., (2002), "Multinational Firms and Technology Transfer", *The Scandinavian Journal of Economics*, 104:4, 495-513
- Görg, H., Strobl, E., (2005), "Spillovers from Foreign Firms through Worker Mobility: An Empirical Investigation", *Scandinavian Journal of Economics*, 107:4, 693–709.
- Griliches, Z., (1992), "The Search for R&D Spillovers", *Scandinavian Journal of Economics*, 94:0, 29-47.
- Habersetzer, A., Eriksson, R., Mayer, H., (2017), "Entrepreneurship in the periphery: The role of pre-entry experience and home advantage for newly founded firms", *Center for Regional Economic Development, Research Paper No. 14*.
- Haltiwanger, J., Jarmin, R. S., Miranda J. (2013), "Who Creates Jobs? Small versus Large versus Young", *The Review of Economics and Statistics*, 95:2, 347-361.
- Huggins, R., Prokop, D. and Thompson, P. (2017), "Entrepreneurship and the determinants of firm survival within regions: human capital, growth motivation and locational conditions", *Entrepreneurship & Regional Development*, 29:3-4, 357-389
- Jovanovic B., (1982), "Selection and the Evolution of an Industry", *Econometrica*, 50:3, 649–670.

- Kato, M., Okamuro, H., Honjo, Y., (2015), “Does Founders' Human Capital Matter for Innovation? Evidence from Japanese Start-ups”, *Journal of Small Business Management*, 53, 114–128.
- Klepper, S., (2011), “Employee Startups in High-Tech Industries”, *Industrial and Corporate change*, 10:3, 639–674.
- Lucas, R. E., (1990), “Why Doesn't Capital Flow from Rich to Poor Countries?”, *The American Economic Review*, 80: 2, 92-96.
- Madison, K., Kraiczy, N.D., Kellermanns, F.W., Jin, Crook, T.R., Xi, J. (2017), “Entrepreneurial Team Composition Characteristics and New Venture Performance: A Meta-Analysis”, *Entrepreneurship Theory and Practice*, 41: 743–771.
- Maliranta, M., Mohnen, P., Rouvinen, P., (2009), “Is inter-firm labor mobility a channel of knowledge spillovers. Evidence from a linked employer–employee panel”, *Industrial and Corporate Change*, 18:6, 1161–1191.
- Masso, J. Rõigas, K., Vahter, P. (2015), “Foreign Market Experience, Learning by Hiring and Firm Export Performance”, *Review of World Economics*, 151:4, 659-686.
- Masso, J., Vahter, P., (2016) “Knowledge Transfer from Multinationals through Labour Mobility: Learning from Export Experience”, University of Tartu, Faculty of Economics and Business Administration, W. P. No. 99.
- Patel, N., Jan 16, 2015, “90% Of Startups Fail: Here's What You Need To Know About The 10%”, Retrieved <https://www.forbes.com/sites/neilpatel/2015/01/16/90-of-startups-will-fail-heres-what-you-need-to-know-about-the-10/#11c965536679>
- Poole, J. P. (2013), “Knowledge Transfers from Multinational to Domestic Firms: Evidence from Worker Mobility”, *The Review of Economics and Statistics*, 95:2, 393-406.
- Rao, H., Drazin, R., (2002), “Overcoming Resource Constraints on Product Innovation by Recruiting Talent From Rivals: A Study of the Mutual Fund Industry, 1986–1994”, *Academy of Management Journal*, 45: 3.
- Romer, Paul M. 1994. "The Origins of Endogenous Growth." *Journal of Economic Perspectives*, 8 (1): 3-22.
- Siepel, J. Cowlingb, M., Coad, A., (2017), “Non-founder human capital and the long-run growth and survival of high-tech ventures”, *Technovation*, 59, 34–43.

- Smarzynska J., B., (2004). "Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers Through Backward Linkages", *American Economic Review*, 94:3: 605-627.
- Stoyanov, A., Zubanov, N. (2012), "Productivity spillovers across firms through worker mobility", *American Economic Journal: Applied Economics*, 4:2, 168-198.
- Syversen, C., (2011), "What determines productivity", *Journal of Economic Literature*, 49:2, 326-365.
- Walt, V. (2017), "Is This Tiny European Nation a Preview of Our Tech Future?" Retrieved <http://fortune.com/2017/04/27/estonia-digital-life-tech-startups>

I, Maryna Pashchynska

(author's name)

(date of birth: 06.06.1994),

1. herewith grant the University of Tartu a free permit (non-exclusive licence) to:

1.1. reproduce, for the purpose of preservation and making available to the public, including for addition to the DSpace digital archives until expiry of the term of validity of the copyright, and

1.2. make available to the public via the web environment of the University of Tartu,

including via the DSpace digital archives until expiry of the term of validity of the copyright,

The Role of Work Experience in The New Business Success in Estonia: the Skype Effect and Beyond,

(title of thesis)

Supervised by

Priit Vahter, Jaan Masso,

(supervisor's name)

2. I am aware of the fact that the author retains these rights.

3. I certify that granting the non-exclusive licence does not infringe the intellectual property rights or rights arising from the Personal Data Protection Act.

Tartu, 20.05.2018