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Byeongwoo Kang
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How a laid-off employee becomes an entrepreneur: The case of Nokia's Bridge program

Byeongwoo Kang (corresponding author)[*], Heikki Rannikko[**], and Erno T. Tornikoski[***]

[*] Hitotsubashi University, Japan

[**] Metropolia University of Applied Sciences, Finland

[***] Grenoble Ecole de Management, France

Abstract: This paper investigates how to support employees to become entrepreneurs. Using original survey data by Nokia, we show two main findings. First, some contents of entrepreneurship were effective commonly to employees with an R&D background and to those with a non-R&D background while other contents were effective to either employees with an R&D background or those with a non-R&D background. The former contents are general knowledge on management, and the later contents are further development of their own specialties. Second, providing a such program to employees had merits to the program provider. Our findings have implications for how a firm to design entrepreneurial programs for employees and to form a business ecosystem around it.

Keywords: Entrepreneurship, Entrepreneur education, Layoffs, Nokia, Spinoff

JEL classification: J63, L26, M13

1. Introduction

The industrial transition can happen at any moment and anywhere because, today, such transitions are speedier and more dynamic than ever before. As a result, large corporations downsize and de-invest parts of their businesses, which is accompanied by employee layoffs. At the same time, a country loses an engine for economic growth. This phenomenon raises two policy issues. One issue is to guide labor to find new opportunities in a new industrial environment. The other issue is to find a nation's new growth engine. One of the known actions for addressing these two issues is to support entrepreneurial activities because new businesses, especially those with growth potential, are believed to create dynamics in economic activity and affect economic growth and vitalization (Audretsch, 2004; Shane, 2009).

This paper explores two research questions. The first question is what kind of training is effective for entrepreneurship of employees with R&D and those without R&D. The second question is whether any merit exists if a firm funds entrepreneurial activities of employees.

To answers these questions, this study focuses on Nokia's Bridge program. The Bridge program was implemented from 2011 to 2014 after Nokia decided on a wide-scale workforce reduction (Nokia, 2011). Among the five tracks that the Bridge program provided, we focus on the entrepreneurship track. On the entrepreneurship track, Nokia provided an entrepreneurship education program to laid-off employees and funded grants for their entrepreneurial activities. For the entrepreneurship program and grant, we conclude that the Bridge program is the best case for answering our research questions.

This study provides two insights to further develop theory and practice. The first insight is about entrepreneurial education. This study shows in detail that certain educational content is effective for employees to become entrepreneurs, whereas other content is not. This insight will assist in designing effective entrepreneurial programs. The second insight is about the strategy of a company that would like to encourage corporate spin-offs and to invest startups. Our finding shows that merits exist for firms that provide entrepreneurial grants.

The remainder of this paper is organized as follows. In the next section, we review prior studies on which this study is based and develop hypotheses to test in this study. Next, we describe our methodological choices, data, and analysis. Then, we show and discuss the findings. Finally, we conclude by discussing implications for further research and for designing and practicing entrepreneurship programs.

2. Literature Review and Hypotheses

This section reviews prior studies on which this study is based. The literature review allows for identification of what we consider the relevant remaining gap in these studies. Then, we develop the hypotheses on the basis of the literature review.

2.1. Entrepreneurial capability and entrepreneurial education

A question in entrepreneurship research exists as to whether generalist characteristics can be taught through education and training.

Subsequent studies investigated this issue. One stream of research provided evidence that entrepreneurs are not innately determined. Studies indicated that entrepreneurial experience affects entrepreneurial activities (Gompers et al., 2010; Eesley & Roberts, 2012; Chen, 2013). That finding implies that entrepreneurial capability is not innately determined and can be developed. Another stream of research reported on the effectiveness of entrepreneurial courses and programs for entrepreneur activity. However, the effectiveness is different for each case. Some empirical studies provided evidence that entrepreneur courses and programs positively affect the entrepreneurial intentions and skills of university students (Peterman & Kennedy, 2003; Souitaris et al., 2007; von Graevenitz et al., 2010), whereas other studies denied the effects of entrepreneur education (van der Sluis et al., 2008; Oosterbeek et al., 2010). In short, contradictory results exist on entrepreneurial education and programs.

In this paper, we assume that both results can be derived. Sometimes entrepreneurial programs have a positive effect on someone who seeks to become an entrepreneur. At other times, such programs have no or a negative effect. However, we insist that background of trainees matters. Both positive and no or negative results can be derived depending on the background of trainees. Accordingly, we develop the first hypothesis as follows.

H1: The effectiveness of entrepreneurial education varies depending on background of trainees.

By testing hypothesis 1, we investigate the factors of an entrepreneurial program provided by a firm to employees that made the program effective. However, because we lack knowledge on the preferred content and content type varies in each case, we do not develop a hypothesis related to each type of content of an entrepreneurial program.

2.2. Corporate spin-off firms

Prior studies indicated that two strategic merits exist for a parent firm to have corporate spin-off firms (Parhankangas & Arenius, 2003). First, a company can hope to expand its business through the uncertain business opportunities of corporate spin-off firms. Firms often adopt an ambidextrous strategy: setting a short-term strategy for its current market and a long-term strategy for its future market. Setting a long-term strategy is difficult because the future market does not exist at the current moment and sometimes may exist in a domain beyond the prediction based on current knowledge. Accordingly, a parent firm utilizes corporate spin-off firms to fumble into the future. Corporate spin-off firms conduct R&D to develop new

technology seeds for breakthroughs and to explore new applications for both new and conventional technology seeds.

Second, another merit of a corporate spin-off strategy is that firms can construct an ecosystem around themselves. When employees start their own businesses, it is difficult to imagine that they do so in fields with which they are not familiar or in which their capabilities and experience cannot be utilized. Accordingly, employees may start companies in the business fields of the previous company, enabling a parent firm to form an ecosystem around itself. Providing entrepreneurial education to employees enables capable employees to become entrepreneurs around the parent firm.

We assume that a downsizing corporate can achieve those merits Even if the first goal of a corporate spin-off strategy is to lay off its employees, some spin-offs may be critical for businesses of the corporate. Some spin-offs are a key to stop downsizing and survive, and other spin-offs are important for future growth. However, spin-offs are startups who faces a lot of challenges. Accordingly, the corporate must sufficiently support the important spin-offs, so that those spin-offs are willing to have business relationship with the corporate. Accordingly, we develop the second hypothesis as follows.

H2: The more a company invest spin-offs, the more the spin-offs keep business relationship with the inventing company.

3. Data

3.1. Data Source: Nokia's Bridge Program (Vanksa, 2013)

In 2011, Nokia announced a broad strategic partnership with Microsoft for an emerging smartphone market. However, the launch of the joint Nokia–Microsoft strategy entailed difficult decisions regarding wide-scale workforce reductions. Several months before the implementation of these decisions, Nokia's leadership resolved to adopt a proactive role in diminishing the negative impacts of the workforce reduction on its employees. To accomplish this goal, the Bridge program was established (Nokia, 2011). There were 18,000 employees eligible for support and approximately 5,000 employees were in Finland. The summary of Nokia's Bridge program is shown in Table 1.

Table 1. Summary of Nokia's Bridge program

Background	- Launch of the joint Nokia–Microsoft strategy failed in 2011. - Nokia decided on a wide-scale workforce reduction. - Nokia wanted to diminish the negative effects of the reduction.
When	2011–2014

Where	- Finland (Oulu, Tampere, Salo, Capital regions) - Denmark (Copenhagen), India (Bangalore), Romania (Cluj), the United Kingdom, the United States
Aims	- Assist individuals and teams in utilizing their capabilities to the fullest - Continue to develop the local economies in which Nokia plays a driving role - Support Nokia's new strategy and ecosystem
Tracks	- Find a new job within Nokia - Find a new job outside Nokia **- Start a new business** ←(The interest of the current study) - Learn something new - Create your own path

Our interest is in the entrepreneurial track (the third track in Table 1). Approximately 10 percent of the eligible employees chose the entrepreneur track. More than 1,000 new companies were established globally.

In Finland, an estimated 500 individuals, approximately one out of ten employees dismissed from Nokia in Finland during 2011–2013, chose the entrepreneurship track and became entrepreneurs. The Program's entrepreneurship track has contributed to the start of approximately 400 companies set up by those 500 individuals. Through the Bridge Program, Nokia supported the re-employment of dismissed employees in many ways. The most comprehensive, detailed, and individual support and advice may have been provided for those who chose the entrepreneurship track, which aimed to mobilize as much of Nokia's internal expertise as possible and to direct employees to use the best national and regional business services. New entrepreneurs could also receive a financial grant for starting their business (up to €25,000). Approximately half the new startups were in ICT and mobile applications.

3.2. Data

As an empirical study, we utilize an original data set that was collected on Nokia Corporation's Bridge Program (Nokia, 2011). The data set utilized in this study consists of survey responses from individuals who participated the Bridge program and from financial data on startup firms. The survey was designed in close co-operation with high-ranking Nokia representatives.

Information on how the survey was conducted is described in Table 2. The survey was carried out in May 2013 by the Small Business Center of Aalto University. The target group included all employees in Finland that had participated in the Bridge program. The survey was

sent to 427 individuals, of which 413 were reached. From these, we received 196 answers, resulting in a response rate of 47 percent. Similarly, 361 newly founded firms were approached, of which 361 were reached. From these, we received 187 answers, resulting in a response rate of 54 percent. Further restricting the sample to those with available business ids, we used 153 responses.

Table 2 Description of survey data

Survey date	May 2013
Target respondent	All Bridge program participants in Finland
No. of target respondents	427 employees / 361 firms
No. of target respondents reached	413 employees / 361 firms
No. of respondents	196 employees / 187 firms
Response rate	47% (employee perspective) / 54% (firm perspective)
No. of responses used in analysis	153 responses

3.3. Profile of respondents

This section shows a descriptive analysis of the survey respondents. this subsection is added to give a sense of the Bridge program to readers. The results are shown in Figures 1, 2, 3, 4, 5, and 6. The total number of observations is different between figures because of one to two missing answers hereafter. Nevertheless, because only one or two observations out of 153 were missing, the missing observation did not significantly affect the results. We can see the backgrounds of the Bridge program participants are diverse in any measure. Having trainees with diverse backgrounds assists collaboration opportunities between the trainees.

Figure 1. Age

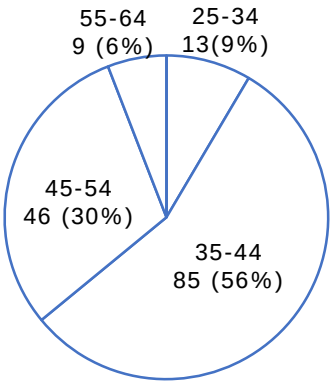


Figure 2. Gender

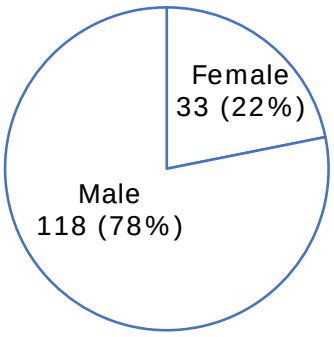


Figure 3. Highest education background

Figure 4. Entrepreneurial experience before

working at Nokia

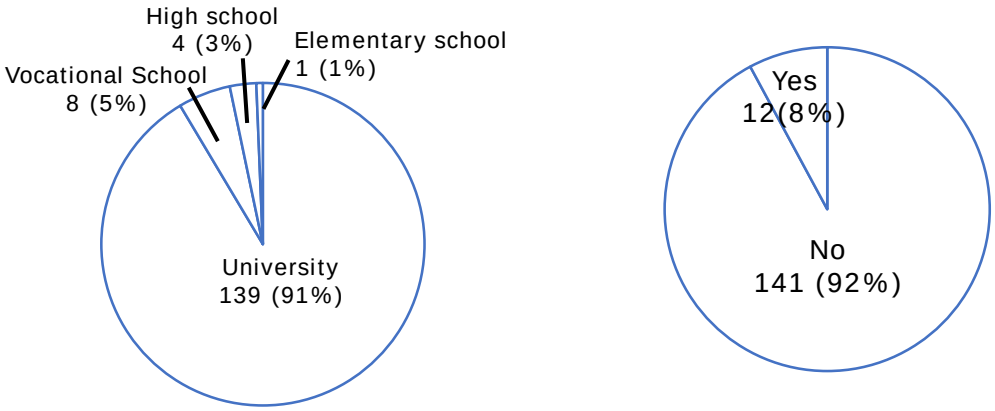


Figure 5. Position at Nokia

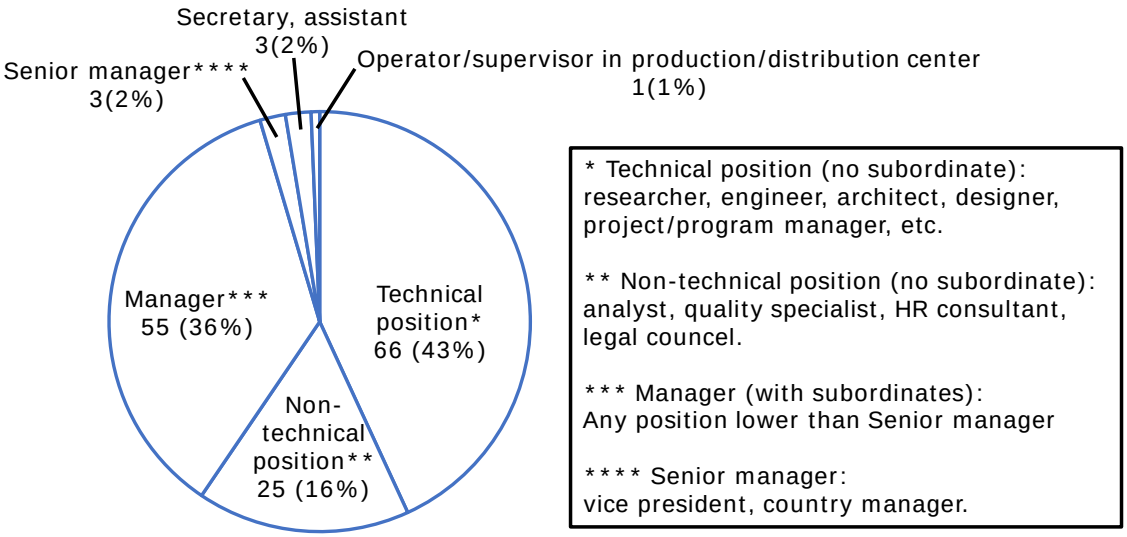
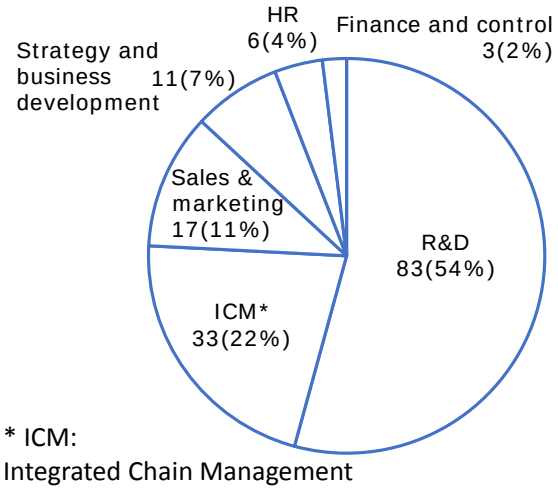


Figure 6. Role at Nokia



4. Findings and discussion

In the following section, we begin with an analysis of the survey data that focuses on four aspects: 1) motivation and preparation (Section 4.1), 2) effectiveness of the Bridge program as recognized by participants (Section 4.2), and 3) participants' performance after the Bridge program (Section 4.3). Lastly, in Section 4.4, we test our hypotheses by employing two statistical analyses.

4.1. Motivation and preparation

This subsection discusses reasons for becoming an entrepreneur and preparations before joining the Bridge program.

Table 3 shows the primary reason that each participant in the Bridge program decided to become an entrepreneur and seek a Nokia startup grant. The most common reason was that participants had the opportunity to become an entrepreneur. This reason indicates that participants had longings to become entrepreneurs and the Bridge program functioned as a trigger for them to take action. Figure 7 and Table 4 provide support for how they were willing to become an entrepreneur. As Figure 7 shows, employees had taken various actions before joining the program by preparing a business plan, investing their own money, organizing a team, making preparations, and others. Some even took actions, such as developing products and prototypes and seeking financial support. Figure 7 indicates that Bridge program participants had a business idea but did not know how realize the idea. Table 4 shows the business planning period prepared by Bridge program participants, and that 97 percent of the participants prepared their business plans up to six months before presenting them to the grant board.

The second common reason was that participants could start a business using the achievements and capabilities obtained at Nokia, although the gap between the first and the

second common reasons is large. This gap represents a positive signal for a company to support entrepreneur programs for its employees because the company may be able to develop an eco-system on the basis of its employees' startups. The last reason, "I was able to leverage Nokia's technology for new business opportunities not exploited by Nokia," is in a similar context although the second and the last common reasons were defined separately.

Moreover, the third common reason was that participants wanted to avoid unemployment. Scholars have indicated that the correlation between unemployment and entrepreneurship can be either positive or negative depending on the condition (Verheul et al., 2002). Sometimes a high unemployment rate is considered a reflection of a few business opportunities and is negatively correlated with entrepreneurship. However, for an individual, (the threat of) unemployment makes him or her consider self-employment because of the shortage of alternative job opportunities. Finland is no exception. Our study also shows that the threat of unemployment made employees decide to become an entrepreneur, as is shown through other evidence on Finland (Ritsilä & Tervo, 2002).

Table 3. Primary reason for becoming an entrepreneur and seeking the Nokia startup grant

Reason	Count (Share)
I have for a long time wanted to be an entrepreneur and now have the chance.	62 (41%)
I was able to start a business around an innovation/capability that I developed at Nokia.	21 (14%)
This was the only way out of unemployment for me.	19 (12%)
I found an attractive business opportunity through the Nokia Bridge program.	13 (9%)
I did not want to continue in a salaried job.	9 (6%)
I was able to leverage Nokia's technology into a new business opportunity not exploited by Nokia.	5 (3%)
Others	24 (15%)

Figure 7. Startup activity engagement before joining the Bridge Program (multiple choice)

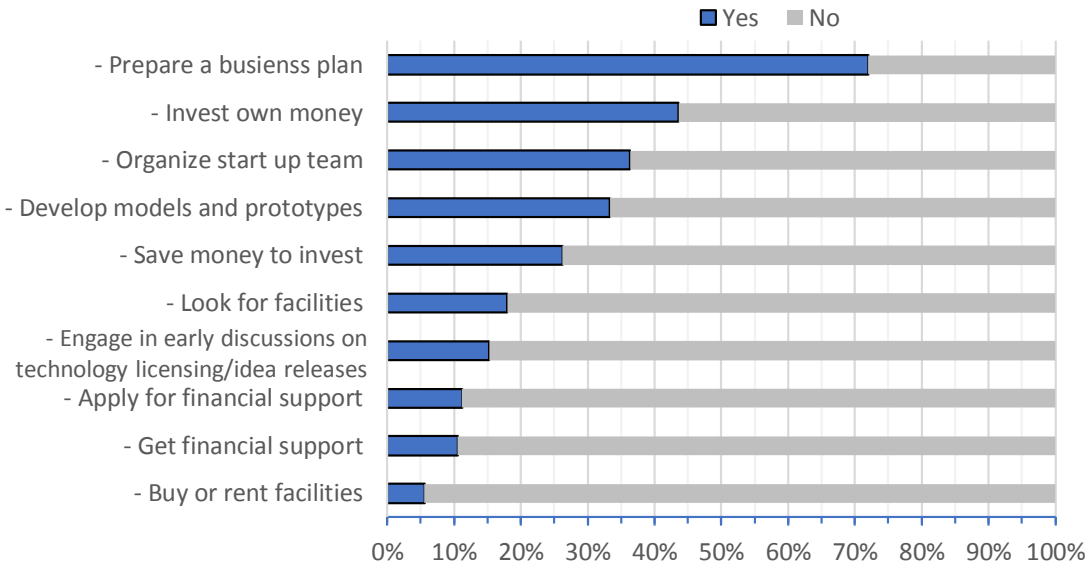


Table 4. Business planning period

Period	Count (Share)
< 1 month	18 (12%)
1–2 months	90 (59%)
3–6 months	41 (27%)
> 6 months	4 (3%)

4.2. Nokia's contribution to startups recognized by participants

This subsection describes Nokia's contributions that participants recognized. As was noted in subsection 4.2, the total number of observations is slightly different between figures.

The first measurement is whether Bridge program participants received a technology license from Nokia (Figure 7). Although most (84 percent) participants did not receive a technology license from Nokia, a few did. However, the survey does not provide information on the type of technologies that they licensed from Nokia.

The second measurement is the relationship of a startup from the Bridge program with Nokia (Figure 8). No startup was a competitor to Nokia. Moreover, approximately half (45 percent) of the startups from the Bridge program have a relationship with Nokia. In this sense, Nokia may have formed an eco-system with some of the spin-offs around itself through the Bridge program.

The third measurement is the importance of the relationship with Nokia that is recognized by Bridge program participants as affecting their startup's performance (Figure 9). Many respondents considered the relationship with Nokia as not important even if approximately half

of the startups have some kind of business relationship (in Figure 8). We think there are two reasons for this contradictory result. First, one of the important goals in the Bridge program is for Nokia to restructure. Accordingly, supporting employees to find new opportunities outside of Nokia was also important for Nokia. Second, it is important to not intervene too much startups. Since a corporate spin-off strategy is to find new opportunities, spin-offs need to be creative and the corporate must let the spin-offs do whatever they want to do.

Figure 7. Tech license from Nokia

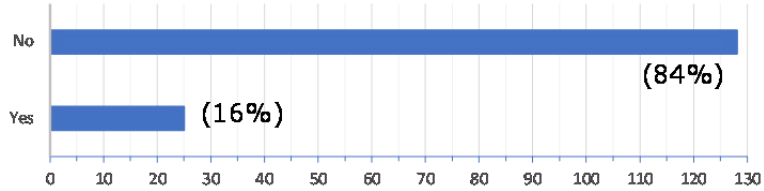


Figure 8. Relationship with Nokia

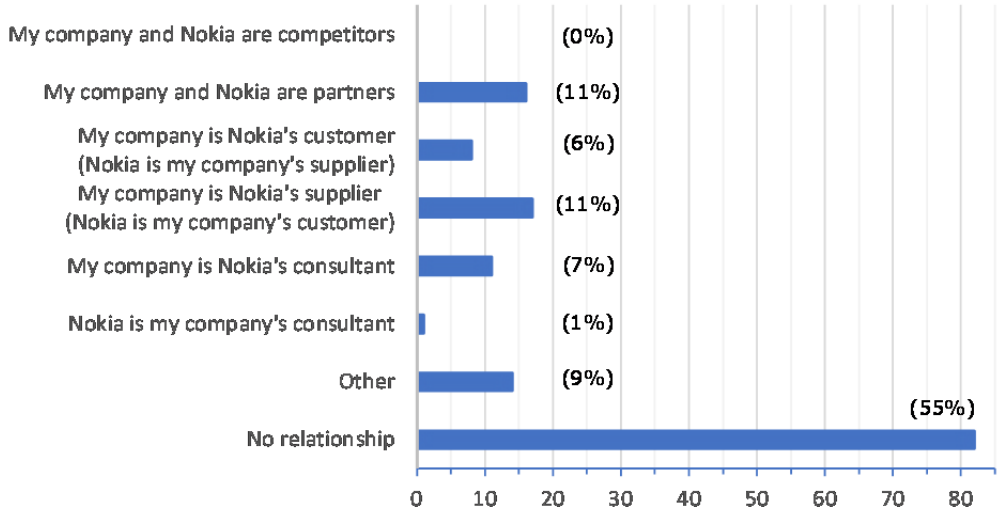


Figure 9. Importance of relationship with Nokia for a startup's performance

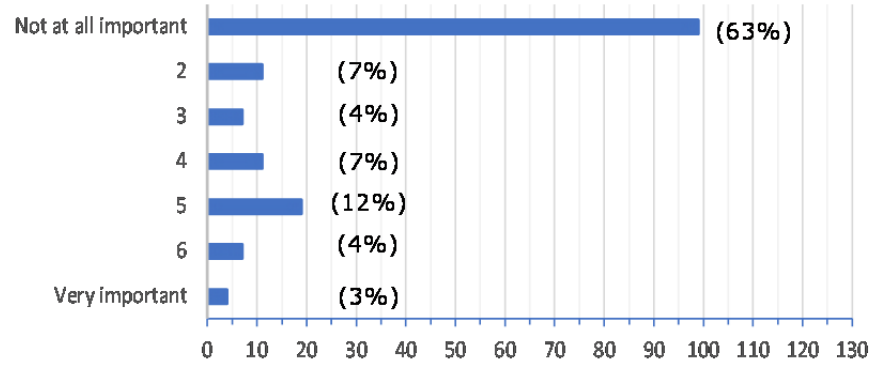


Figure 10

Figure 10 indicates participants' assessment of the benefit from the support provided by the Bridge program to their business development, for which nine items were on the survey, and respondents were asked to respond with between "1: Totally unbeneficial" and "7: Greatly beneficial." As the average score (5.009) indicates, Bridge program participants in general considered the support from the program as beneficial for their business development. The direct financial support ((9) in Figure 10) shows the most positive result relative to any other support. The presentation of overall services and of entrepreneurship information, and the Bridge entrepreneurship program process ((1), (2), and (7) in Figure 10) also show positive results.

Figure 11

Figure 11 indicates participants' overall assessment of the Bridge program, for which eight items were on the survey. Respondents were asked to respond with between "1: Totally disagree" and "7: Totally agree." As was the case in Figure 2, this survey also shows that, in general, Bridge program participants enjoyed the program. One point to note in this figure is the comparison between entrepreneurial coaching and financial support ((7) in Figure 11). Participants considered that financial support was more important than entrepreneurial coaching. The significance of direct financial support in the entrepreneurial program is also supported by the fact that Bridge program participants assessed as important the value of direct financial support from the program ((5) in Figure 11). Although the current focus is on the effects of entrepreneurial education on entrepreneurial activity, the significant role of financial support of entrepreneurial activity is not negligible.

4.3. Participants' performance after the Bridge program

This subsection describes performance of the Bridge program participants.

Figure 12 shows the Bridge program participants' establishment type. During the Bridge program, 127 participants established a company. In addition, eight participants acquired a company (or share of a company) during the program. In contrast, 17 participants already had a company when they joined the Bridge program. Given that 12 participants were entrepreneurs before working at Nokia (Table 8), we assume that some participants established a company when working at Nokia.

Figure 13 shows the number of founding members. Many participants founded a startup alone. As previously mentioned, approximately half of the new startups were in ICT and mobile applications. In such business fields, many startups do not need numerous staff members and many of them can run their business alone. The largest number of founding members in a startup was 10. Considering the condition that the Bridge program restricted founding members to a maximum of four of its program participants, that some firms had more than four founding members implies that individuals outside the Bridge program were invited by program participants to start a company.

Figure 14 shows the amount of direct financial support from the Bridge program. As previously mentioned, new entrepreneurs could receive a financial grant of up to €25,000 for starting their business. Because the Bridge program restricted the number of founding members from Bridge program participants to four, a startup could obtain grants up to €100,000. However, each startup did not receive equal financing. Figure 14 shows that the financed amount varies between less than €10,000 and more than €50,000. We assume that Nokia preferred some startups more than others and that the financed amount correlates to its support. Bridge program participants spent the direct financial support for various purposes: operations costs (energy, rents, phones, others), investments in fixed assets, subcontracts, own and others' salaries, and investments in inventory.

Figure 15 shows the activeness of the companies of the Bridge program participants. More than 90 percent had survived as of the survey period (May 2013). This survival rate is higher than that shown in other evidence on survival rates of new firms. For example, OECD (2003) reported that approximately 70 percent survive more than two years after establishment. Hence, this measurement supports the concept that the Bridge program might be successful, although not all firms in the survey operated for more than two years as of the survey date.

Figure 12. Establishment type

Figure 13. Number of founding members

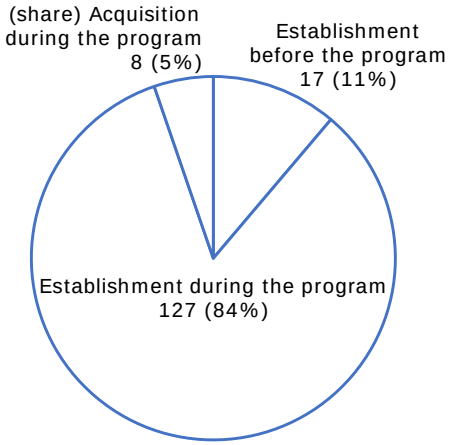


Figure 14. Financial support (total amount before tax)

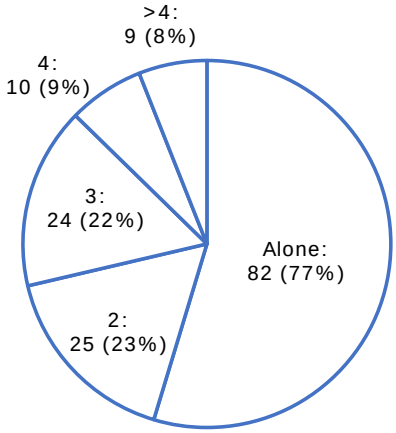
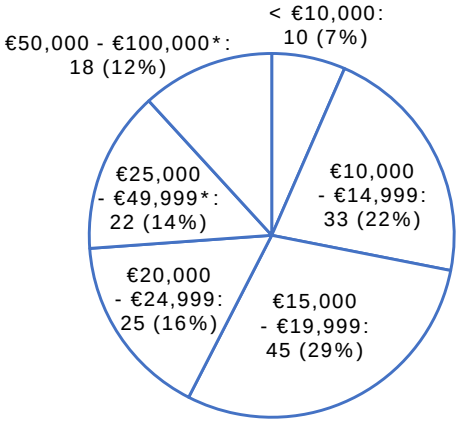
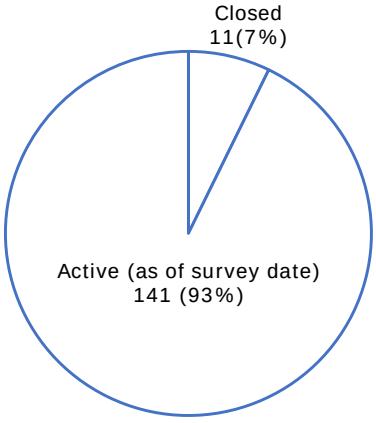


Figure 15. Company activeness (as of the survey date: May 2013)



* Total amount when several participants



cf. Survival rate after 2 years in Fi: 70% (OECD, 2003)

4.4. Testing hypotheses

4.4.1. Testing H1

Before testing H1, the case of all staffs is analyzed as a first look. Figure 16 indicates the importance of the resources obtained during the Bridge program or during employment at Nokia for a startup's performance, for which the survey contained 14 items. Respondents were asked to respond by scoring between "1: Not important" and "7: very important."

Figure 16

The one sample t-test in the current study tests whether each item in the survey was significantly different from a hypothesized value. The first model (m1) defines "4" as a hypothesized value and the second model (m2) defines the average score (3.916) of all items as

a hypothesized value. One reason for adding the second model is to reflect the respondents' scoring tendency.

The two models in Table 5 show slightly different statistical significance for each item. Table 5 shows that there are what Bridge program participants considered important and what they considered not important.

First, we observe the items that participants considered to be important. Six items—technological knowledge, functional knowledge, knowledge of customer needs, knowledge of industry conditions, R&D, and strategy—were significantly higher than the hypothesized values in the two models. In other words, the six items were considered important. In subsequent tables, we analyze the results in detail accordingly their roles and positions at Nokia.

Second, we observe the items that participants considered unimportant. Five items—knowledge of country or regional conditions, operations, human resources, relationships with buyers and suppliers, and patents and trademarks—were significantly lower than the test value of "4." In other words, the five items were considered unimportant. The primary reason that these items were considered unimportant was that a number of startups from the Bridge programs were in ICT and mobile applications. Because such startups have the Internet as their market, they do not require supply chains, operations, knowledge of specific country or regional conditions, and patents and trademarks. In the beginning stage of a startup, founders were enough of a resource to run a company and human resource knowledge was not needed to hire employees.

Table 5. Result for hypothesis 1 (One sample t-test setting)

m1: "4" as a hypothesized value, m2: average (3.916) of all items as a hypothesized value

Items	Mean ± Std. Dev. (n)	m1	m2
Technological knowledge (i.e., knowledge required to create product or service)	4.599 ± 2.439 (152)	***	***
Functional knowledge	4.250 ± 2.214 (152)	*	**
Knowledge of customer needs	5.092 ± 1.988 (153)	***	***
Knowledge of industry conditions	4.588 ± 2.095 (153)	***	***
Knowledge of country or regional conditions	3.250 ± 1.981 (152)	***	***
Marketing and sales	4.072 ± 2.072 (152)		
R&D	4.392 ± 2.257 (153)	**	***
Operations (e.g., logistics)	3.020 ± 2.018 (152)	***	***
Strategy	4.464 ± 2.045 (151)	***	***
Human resources	3.265 ± 2.141 (151)	***	***

Relationships with buyers, suppliers	3.322 ± 2.224 (152)	***	***
Brand name	3.739 ± 2.13 (153)	*	
Patents and trademarks	2.836 ± 2.054 (152)	***	***
Other	1.539 ± 1.446 (76)	***	***

* p < 0.1, ** p < 0.05, *** p < 0.01

We test the first hypothesis as the following manner. We separate trainees into those with R&D experience and those without R&D experience and employ the one sample t-test to each type of trainees. Then, we compare the case of those with R&D experience and that of those without R&D experience. The results are shown in Tables 6-1 and 6-2. Table 6-1 shows the case of R&D staff members and Table 6-2 shows the case of non-R&D staff members.[1]

First, we focus on the case of R&D staff members. In Table 6-1, four items—technological knowledge, knowledge of customer needs, knowledge of industry conditions, and R&D—were significantly higher than the two hypothesized values in the two models. We reason that knowledge of customer needs and knowledge of industry conditions had positive effects on participants with R&D backgrounds to gain business sense. Meanwhile, five items—knowledge of country or regional conditions, operations, relationships with buyers and suppliers, human resources, and patents and trademarks—were significantly lower than the two hypothesized values in the two models. We attribute this result to the characteristics of the startups from the Bridge program. More than half of the startups were in ICT standard service sectors. Their products and services are not tangible products but are, instead, digital products. Accordingly, they have no suppliers and buyers, and their intangible (digital) products and services are provided online and are not limited to specific regions or countries. Because their products and services are not limited to specific regions or countries, they did not have to protect them through patents and trademarks. Participants recognized human resources as unimportant because more than half of all startups were founded by one founder and they were in very early phases with respect to hiring and managing employees.

Table 6-1. Result for hypothesis 1 (One sample t-test setting) – R&D staffs

m1: “4” as a hypothesized value, m2: average (3.847) of all items as a hypothesized value

Items	Mean ± Std. Dev. (n)	m1	m2
Technological knowledge (i.e., knowledge required to create product or service)	5.159 ± 2.252 (82)	***	***

[1] Non-R&D staff members are those whose roles were ICM and operations, sales and marketing, strategy and business development, HR, and finance and control.

Functional knowledge	4.181 ± 2.102 (83)		*
Knowledge of customer needs	5.108 ± 1.951 (83)	***	***
Knowledge of industry conditions	4.482 ± 2.126 (83)	**	***
Knowledge of country or regional conditions	2.976 ± 1.879 (82)	***	***
Marketing and sales	3.819 ± 2.096 (83)		
R&D	5.133 ± 2.117 (83)	***	***
Operations (e.g., logistics)	3.145 ± 1.964 (83)	***	***
Strategy	4.28 ± 2.116 (82)		*
Human resources	3.325 ± 2.142 (83)	***	**
Relationships with buyers, suppliers	3.133 ± 2.111 (83)	***	***
Brand name	3.566 ± 2.085 (83)	**	
Patents and trademarks	3.024 ± 2.124 (83)	***	***
Other	1.422 ± 1.215 (45)	***	***

* p < 0.1, ** p < 0.05, *** p < 0.01

In Table 6-2, four items—knowledge of customer needs, knowledge of industry conditions, marketing and sales, and strategy—were significantly higher than the two hypothesized values in the two models. The result was different from that in Table 19-1. Participants from non-R&D backgrounds did not show positive scores with statistical significance in technology-relevant items, e.g., technological knowledge, functional knowledge, or R&D. We assume that even if participants from non-R&D backgrounds were taught such knowledge, the effect was minimal without a technical background. Instead, capabilities that they used at Nokia seemed important, e.g., marketing and sales and strategies. In contrast, three items—operations, human resources, and patents and trademarks—were significantly lower than the two hypothesized values in the two models. This result is almost the same as the case of participants with an R&D background (Table 6-1). The difference is that two items—knowledge of country or regional conditions and relationships with buyers and suppliers—had no statistical significance in Table 6-2.

Table 6-2. Result for hypothesis 1 (One sample t-test setting) – Non-R&D staff
m1: “4” as a hypothesized value, m2: average (3.805) of all items as a hypothesized value

Items	Mean ± Std. Dev. (n)	m1	m2
Technological knowledge (i.e., knowledge required to create product or service)	3.943 ± 2.502 (70)		
Functional knowledge	4.333 ± 2.356 (69)		**
Knowledge of customer needs	5.071 ± 2.045 (70)	***	***

Knowledge of industry conditions	4.714 ± 2.065 (70)	***	***
Knowledge of country or regional conditions	3.571 ± 2.061 (70)	**	
Marketing and sales	4.377 ± 2.015 (69)	*	**
R&D	3.514 ± 2.111 (70)	**	
Operations (e.g., logistics)	2.87 ± 2.086 (69)	***	***
Strategy	4.681 ± 1.952 (69)	***	***
Human resources	3.191 ± 2.153 (68)	***	**
Relationships with buyers, suppliers	3.551 ± 2.349 (69)	*	
Brand name	3.943 ± 2.18 (70)		
Patents and trademarks	2.609 ± 1.957 (69)	***	***
Other	1.71 ± 1.736 (31)	***	***

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

In summary, certain content in entrepreneurial education have a positive impact on entrepreneurship. R&D staffs assessed “technological knowledge,” “knowledge of customer needs,” “knowledge of industry conditions,” and “R&D” positively while non-R&D staffs assessed “knowledge of customer needs,” “knowledge of industry conditions,” “marketing and sales,” and “operations” positively. Accordingly, we conclude that H1 is supported (effectiveness of entrepreneurial education varies depending on background of trainees). We will discuss more on the result in the following section.

4.4.2. Testing H2

For the second hypothesis, we employ an ordered logit regression. The dependent variable is the importance of the relationship with Nokia (Figure 9). The dependent variable ranges from 1 to 7. The independent variable is financial support (Figure 14), which is employed as a proxy for Nokia’s support of a startup. The values for this variable ranges from 1 to 6. We also add two groups of control variables. The first control variable group (control group 1) is a startup`s relationship with Nokia (Figure 8). Business relationship types between two companies naturally decide the importance of the relationship. For example, buyers are important for all suppliers, especially when the bargaining power of buyers is significant. We control such a matter by adding the relationship with Nokia. The second control variable group (control group 2) is the background of Bridge program participants (Figures 1, 2, 3, 5, and 6). These control variables control personal characteristics and are often added in prior studies (Wagner, 2006; Silva, 2007). A full description of the variables is shown in Table 7 and the correlation between variables is shown in Appendix.

Table 7. Overview of regression variables

Independent variable	Financial support (proxy of Nokia's support to a startup) - < €10,000 - €10,000–€14,999 - €15,000–€19,999 - €20,000–€24,999 - €25,000–€49,999 - €50,000–€100,000	 - 1 - 2 - 3 - 4 - 5 - 6
Control variables	Business relationship with Nokia (Figure 8) - Partners - My company is Nokia's customer (Nokia is my company's supplier) - My company is Nokia's supplier (Nokia is my company's customer) - My company is Nokia's consultant - Nokia is my company's consultant *Note:* The baseline values are "Others" and "No relationship"	 - Dummy - Dummy - Dummy - Dummy - Dummy
	Age (Figure 1) - 25–34 years old - 35–44 years old - 45–54 years old - 55–64 years old	 - 1 - 2 - 3 - 4
	Gender (Figure 2) - Male	 - Dummy
	Highest educational background (Figure 3) - Elementary school - High school - Vocational school *Note*: The baseline value is "University (including univ. of applied science)"	 - Dummy - Dummy - Dummy
	Position at Nokia (Figure 5): - Senior manager - Manager - Non-technical position - Others *Note*: The baseline value is "Technical position"	 - Dummy - Dummy - Dummy - Dummy
	Role at Nokia (Figure 6) - ICM	 - Dummy

	- Sales and marketing - Strategy and business development - HR - Finance and control *Note*: The baseline value is “R&D”	- Dummy - Dummy - Dummy - Dummy

The regression result is shown in Table 8 for the coefficient and t statistics of the independent and control variables. The independent variable, Financial Support, has statistical significance (model 1). The coefficient of the independent variable was statistically significant even when control variables for the business relationship with Nokia were added (models 3, 4, and 6). This result indicates that Bridge program participants recognized that Nokia’s support for the program has a positive effect and that their relationship with Nokia was important to their startup’s performance. Therefore, we conclude that hypothesis 2 is supported.

Additionally, an analysis of the control variables provides an interesting finding. Table 8 shows the coefficients of the control variables regarding the types of business relationship with Nokia (control group 1). The regression result indicates that the coefficient of “a startup is Nokia’s supplier (i.e., Nokia is the startup’s customer)” was positive and statistically significant in all regression models. Accordingly, we confirm that we properly control for the impact of business relation type on the significance recognition of the business relationship. Meanwhile, the coefficients for “a startup and Nokia are business partners” and “a startup is Nokia’s consultant” were negative and statistically significant in all regression models. We interpret this result as indicating that business partner and consultant relationships are weaker than supply chain relationships.

Table 8. Result for hypothesis 2 (ordered logit regression)

DV: importance of relationship with Nokia for their startup's performance

	m1	m2	m3	m4	m5	m6
(1) Financial support	0.3391		0.4141	0.2794		0.3591
	[2.75] ***		[3.04] ***	[1.99] **		[2.31] **
(2) Business relationship with Nokia: Partners		-1.9424	-1.7309		-1.6166	-1.5553
		[-3.25] ***	[-2.80] ***		[-2.50] **	[-2.33] **
(3) Business relationship with Nokia:		-1.3467	-1.3402		-1.5436	-1.4148
My company is Nokia's customer		[-1.26]	[-1.23]		[-1.03]	[-0.99]
(4) Business relationship with Nokia:		7.7834	8.4745		6.442	7.246
My company is Nokia's supplier		[3.77] ***	[4.03] ***		[2.41] **	[2.70] ***
(5) Business relationship with Nokia:		-2.3003	-2.5334		-2.3131	-2.476
My company is Nokia's consultant		[-3.62] ***	[-3.84] ***		[-3.15] ***	[-3.27] ***
(6) Business relationship with Nokia:		-3.1851	-3.9286		-1.8002	-2.8345
Nokia is my company's consultant		[-2.13] **	[-2.57] **		[-0.97]	[-1.48]
(7) Age				-0.2054	-0.4575	-0.6748
				[-0.60]	[-1.48]	[-2.27] **
(8) Gender (Female dummy)				0.1287	-0.0556	-0.2419
				[0.22]	[-0.10]	[-0.45]
(9) Highest education: Elementary school				-0.5508	-0.6559	0.0278
				[-0.00]	[-0.00]	[0.00]
(10) Highest education: High school				-14.9866	-14.4753	-15.0336

				[-0.01]	[-0.02]	[-0.01]
(11) Highest education: Vocational school				-0.0787	-0.3248	0.1263
				[-0.06]	[-0.25]	[0.11]
(12) Position at Nokia: Senior manager				1.7702	2.4579	3.1353
				[1.36]	[1.95] *	[2.74] ***
(13) Position at Nokia: Manager				0.9894	1.1188	1.6354
				[2.00]**	[2.28] **	[3.50] ***
(14) Position at Nokia: Non-technical position				-0.5349	-0.262	-0.2288
				[-0.55]	[-0.28]	[-0.24]
(15) Position at Nokia: Others				-12.8066	-12.8446	-13.8937
				[-0.01]	[-0.01]	[-0.01]
(16) Role at Nokia: ICM				-0.9023	-1.0607	-1.2913
				[-1.40]	[-1.65] *	[-2.18] **
(17) Role at Nokia: Sales and marketing				-0.2008	-0.3545	-0.7263
				[-0.28]	[-0.50]	[-1.05]
(18) Role at Nokia: Strategy and business development				0.9332	0.8103	0.3273
				[1.25]	[1.10]	[0.46]
(19) Role at Nokia: HR				1.6776	1.2533	1.9069
				[1.33]	[1.03]	[1.72] *
(20) Role at Nokia: Finance and control				-1.3515	-1.9645	-0.0984
				[-0.94]	[-1.34]	[-0.10]
N	149	149	149	147	147	147

* p < 0.1, ** p < 0.05, *** p < 0.01

4.5. Discussion

Several findings from Nokia's Bridge program are worth further discussion.

First, from the descriptive analysis of the Bridge program, the program's characteristics can be summarized as follows. Participants longed to become entrepreneurs, and the Bridge program was provided to satisfy that longing. Bridge program participants were diverse in terms of their backgrounds. Some startups from the Bridge program had a technology license from and a business relationship with Nokia, the provider of the Bridge program. However, more than half the startups had no relationship with Nokia, implying that there were no requirements to be a participant and no conditions on participants' outputs. In this sense, Bridge program participants enjoyed the freedom to develop ideas into businesses without being restricted. Because an innovation economy is one driven by new ideas, it is important to provide an environment in which any business idea is not limited.

Second, a corporate spin-off strategy is useful when the corporate downsizes to moderate negative impressions. Because markets mature at some point and business circumstances change continuously, restructuring is inevitable. When a firm restructures its business and lays off employees, it sends a strong negative impression to the outside world. Such a negative impression is critical because new job seekers may not be willing to join the firm. Historical evidence indicates that this strategic spinning-off activity is effective in moderating negative impressions (Chesbrough, 2002). In 1983, Xerox attempted to redirect projects at its Palo Alto Research Center (PARC) to be more closely aligned to its copier and printer business. As Xerox retreated from the computer business, some employees in the computer business had to leave Xerox PARC. Instead, of firing them, Xerox PARC helped these employees spin off projects using the company's equipment, which allowed Xerox PARC to restructure itself without sending a negative message through the firing. The case of Nokia also shows that providing a corporate spin-off program was merit. As Figure 11, Nokia received positive responses from the participants in general.

Third, by testing the first hypothesis, we showed that participants in the Bridge program considered certain content of the entrepreneurial programs to be effective for their entrepreneurial activity. The effectiveness of each content was different between participants with an R&D background and those with a non-R&D background. The content that both participants—with R&D and with non-R&D backgrounds—commonly scored as "important" was knowledge of customer needs and industry conditions (Tables 6-1 and 6-2). Such content is knowledge on business. While participants with an R&D background scored technological knowledge and R&D as important, those with non-R&D backgrounds scored marketing and sales and operations as important. Such content is in-depth training of their own specialty. Accordingly, when a corporate prepares entrepreneurial programs to their employees, the

programs should be two tracks: teaching knowledge on business and strengthening specialty of employees.

Fourth, by testing the second hypothesis, we showed that higher investments by Nokia indicated that recipients considered the relationship with Nokia to be more important. Not all spin-offs from the Bridge program may not be evenly important as approximately half of the startups had no business relationship with the firm. We assume that it was not an easy decision for the Bridge program participants to enter into business relationships with Nokia because they must have known well the situation of Nokia. Relying on a downsizing conglomerate is risky for startups. However, Nokia could make those spin-offs be willing to have a business relationship with Nokia by supporting those spin-offs well by strategically investing. As seen in Table 2, Bridge program participants considered direct financial support to be the most significant benefit for their business development. In the Bridge program, recipients of financial support spent such funds as they pleased. Accordingly, a strategic investment is important in a corporate spin-off strategy.

Fifth, the timing to provide entrepreneurial programs is also a determinant of the success of the program and outputs. For example, Nokia attempted an entrepreneurial program years before the Bridge program, but that effort failed. In 2005, Nokia and several large corporations (TietoEnator, Elisa, Finnet, and YLE) in Finland founded the Digital Media Service Innovations Finland (DIMES) association[2] to support IT startups in Finland. Nokia's intention for launching DIMES was to form an ecosystem around itself.[3] However, the practice was not successful and the DIMES association stopped operating. When the DIMES association was founded in 2005, Nokia dominated the mobile phone market. Job seekers with an ICT background in Finland primarily considered working at Nokia and had no reason to take risks as an entrepreneur. In contrast, when the Bridge program was launched, Nokia was downsizing its business. Therefore, not only job seekers but also employees of Nokia were motivated to take risks as entrepreneurs. Accordingly, we assume that the timing to provide an entrepreneurial program is effective when a parent firm is downsizing.

5. Conclusion

[2] Because DIMES no longer exists, its webpage (http://www.dimes.fi) no longer exists today. One of the few remaining webpages related to DIMES is at the following links:
https://ec.europa.eu/growth/tools-databases/dem/initiatives/985/digital-media-innovations-finland-dimes (Last access on January 20th, 2017).
https://www.linkedin.com/company/dimes-association-digital-media-service-innovations-finland- (Last access on January 20th, 2017).

[3] Interview with a manager at Nokia and the president of DIMES (May 16, 2016 in Tokyo).

The ultimate goal of this study is to understand how to guide employees to become entrepreneurs. Two research questions are proposed in this study. The first question is what kind of training is effective for entrepreneurship of employees with different backgrounds. The second question is whether any merit exists if a firm provides an entrepreneurial program when it is downsizing. To answer these questions, we used original survey data from the Bridge program—an entrepreneurship program that Nokia designed for their employees. We used two statistical methods to test our hypotheses.

This study has two main findings. First, this paper finds that some entrepreneurial education content is effective commonly to employees with an R&D background and to those with a non-R&D background, but that other contents were effective to either employees with an R&D background or those with a non-R&D background. From our discussion, we conclude that teaching general knowledge on business and deepening one's own specialty were effective entrepreneurial education. Second, benefits are available for a company that provides an entrepreneurial program to its employee. The benefits were to have a positive impression about the company and to keep business relations with important spin-offs. In this sense, Nokia's Bridge program was useful for both ex-employees and Nokia.

Our findings have a number of implications. First, some entrepreneurship education content has a positive impact on employees seeking to become entrepreneurs. When designing entrepreneurship education programs, designers must pay attention the subjects that should be offered in the programs. Understanding the needs of potential entrepreneurs is important. Second, companies that provide such entrepreneurship education programs to their employees also experience positive impacts for themselves. If a company wants to construct an ecosystem around itself, sponsoring entrepreneurship education programs—if unable to offer them—can be considered an ecosystem strategy. Third, supporting entrepreneurship programs is also important for policy makers. Industrial transition is inevitable, is accelerating, and is becoming more dynamic. The most important point is to guide labor to find new opportunities in new industrial environments and to maintain national competitiveness during industrial transitions. Providing incentives for a company to set corporate spin-off programs could be one of the keys for a nation to foster new competitiveness in a new industrial environment.

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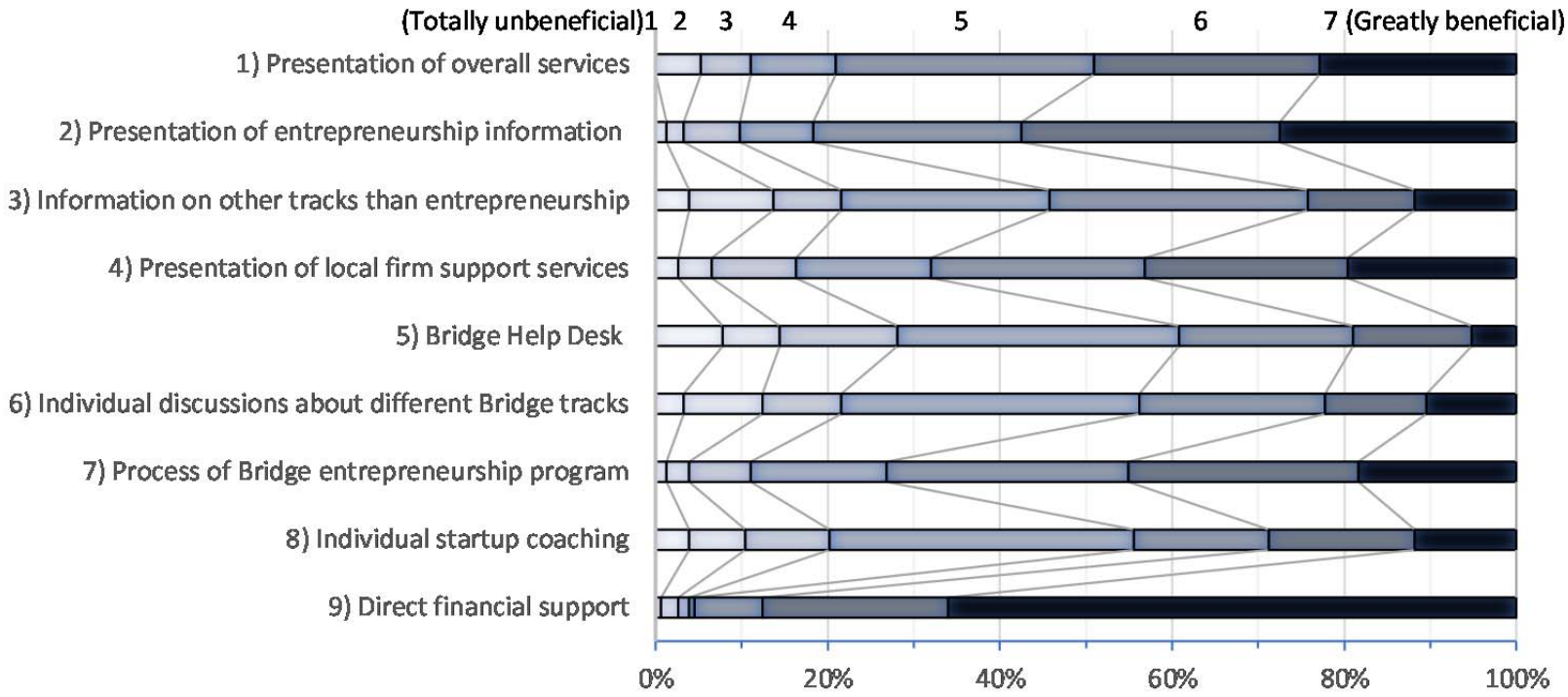

Figure 10. Participants' assessment of the benefit of the support provided by the Bridge program to their business development

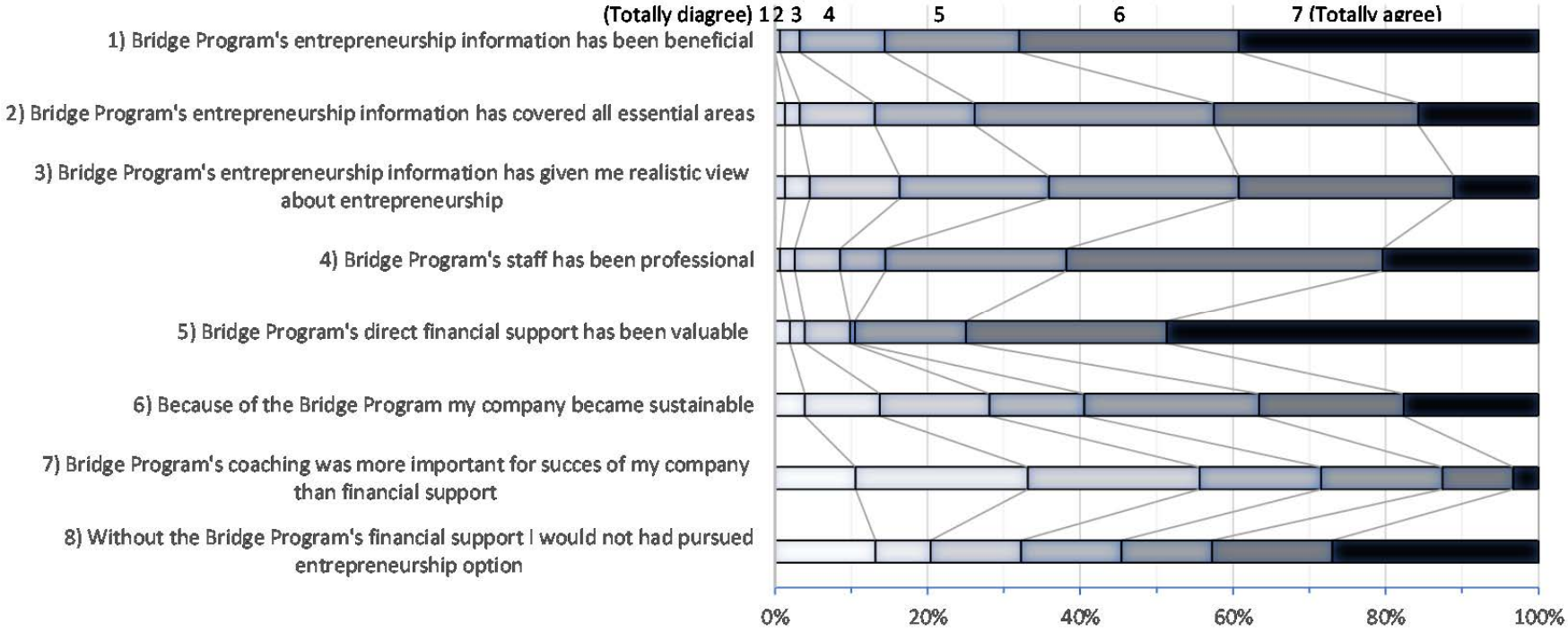

Figure 11. Participants' overall assessment of the Bridge program

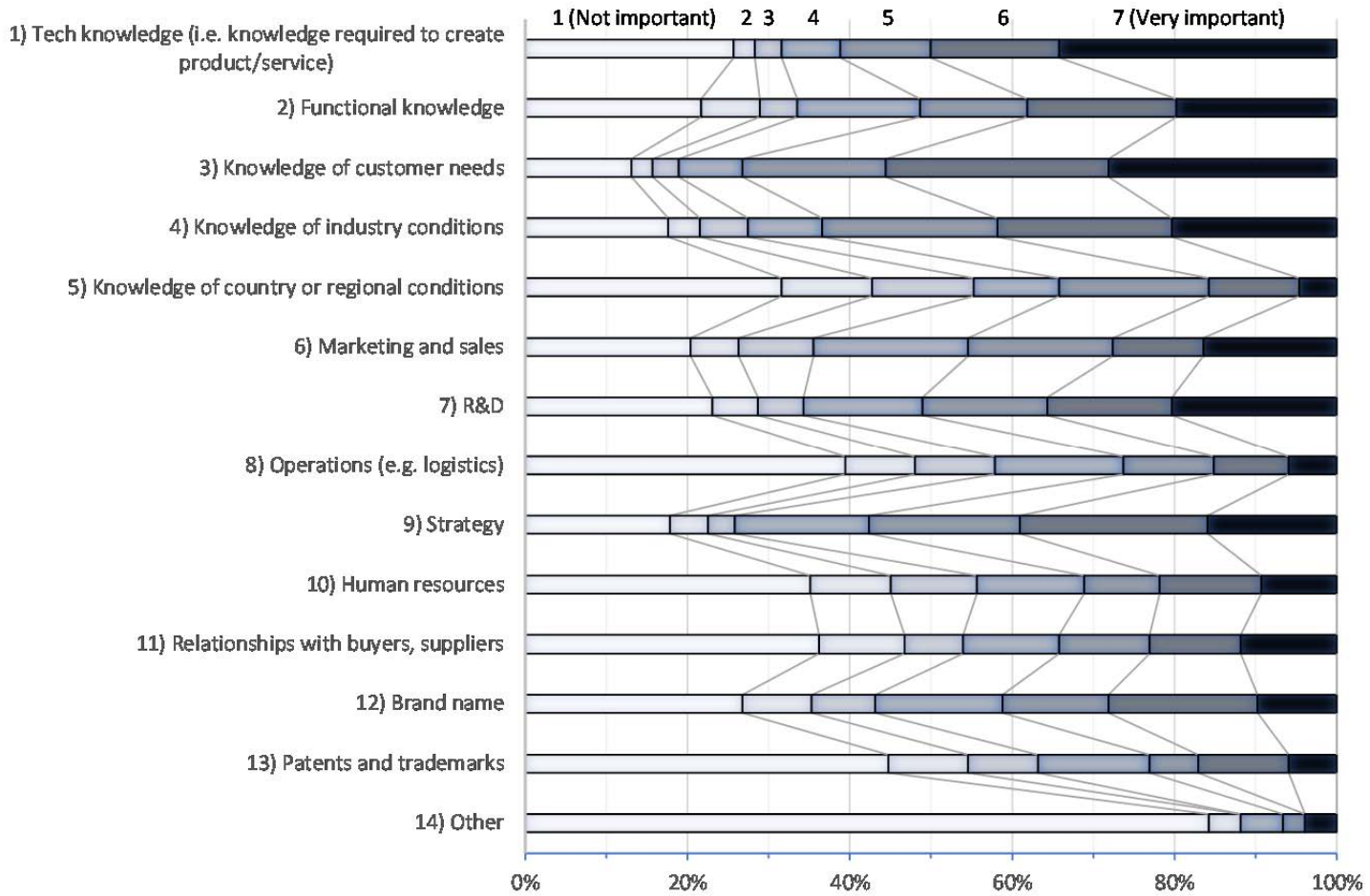

Figure 16. Participants' assessment of the importance of resources obtained during the Bridge program or during employment at Nokia for a startup's performance

Appendix: Overview of correlations between variables in regression

(1)	1																			
(2)	-0.0527	1																		
(3)	0.0172	0.7204	1																	
(4)	0.0333	0.7238	0.9415	1																
(5)	0.0471	0.6856	0.7184	0.7711	1															
(6)	0.0528	0.697	0.9121	0.9697	0.7438	1														
(7)	-0.2193	0.0519	0.0988	0.0845	0.0778	0.0639	1													
(8)	-0.1701	0.0704	0.0175	-0.0033	0.0049	0.0074	-0.0431	1												
(9)	-0.1396	0.0415	0.0319	0.03	0.039	0.031	0.0763	0.1544	1											
(10)	0.0042	-0.0183	-0.0572	-0.0666	-0.0274	-0.0618	-0.0763	-0.0872	-0.0135	1										
(11)	-0.1376	-0.0262	0.0052	-0.0042	0.0368	0.0006	-0.0681	0.0895	-0.0193	-0.039	1									
(12)	-0.0923	0.1894	0.1121	0.0956	0.0874	0.104	-0.0655	0.1469	-0.0432	0.0126	0.1611	1								
(13)	-0.2248	0.0838	0.0645	0.0607	0.0787	0.0626	-0.0187	0.2121	0.495	-0.0272	0.3292	0.2121	1							
(14)	-0.0444	0.1382	0.0689	0.0539	0.0291	0.0615	-0.0318	0.4543	-0.0364	0.0375	0.1333	0.1956	-0.0735	1						
(15)	0.0427	-0.2446	-0.1629	-0.1149	-0.1847	-0.0975	0.1637	-0.1539	-0.06	-0.0349	-0.1739	-0.0531	-0.1213	-0.3276	1					
(16)	0.0201	0.0724	0.0556	0.0524	0.0679	-0.0891	0.1992	-0.0753	-0.0116	-0.0235	-0.0337	-0.0753	-0.0235	-0.0634	-0.1047	1				
(17)	-0.089	0.1034	0.0795	0.0748	-0.0774	0.0772	0.048	0.3026	-0.0166	-0.0336	-0.0481	-0.1076	-0.0336	0.4567	-0.1496	-0.029	1			
(18)	-0.1117	-0.0451	-0.0844	0.0524	-0.0542	0.054	0.0667	0.0395	-0.0116	-0.0235	-0.0337	-0.0753	-0.0235	0.0643	0.0942	-0.0203	-0.029	1		
(19)	0.0017	0.0773	0.0774	0.0664	0.0621	0.0088	0.0401	-0.0363	-0.0291	-0.0588	0.1028	-0.1884	-0.0588	0.1232	0.0893	0.2496	-0.0725	-0.0507	1	
(20)	0.0067	-0.0624	-0.0531	-0.0664	-0.01	-0.0596	0.1	0.0525	-0.0217	-0.0439	-0.063	-0.1408	-0.0439	-0.047	0.1947	0.1529	-0.0542	-0.0379	-0.0949	1

The label number corresponds the variable number in Table 8.