Business incubators: the impact of their support

Samaeemofrad, N.

Chapter 7

Research Answers and Recommendations

This chapter provides answers to the three research questions (RQs) and to the problem statement (PS) that were formulated in Chapter 1. Chapters 3 to 6 have integrated the three RQs and produced answers to each of them. In this chapter, we summarize the answers to the three RQs. The chapter proceeds as follows. Section 7.1 summarizes the answers to these RQs. Then, Section 7.2 provides an answer to the PS which is also based on the research results of Chapter 6. Subsequently, theoretical and practical contributions are presented in Section 7.3. Finally, research limitations and further research recommendations are given in Section 7.4.

7.1 Answers to the Three Research Questions

This section provides answers to three research questions. First, we identify the supportive activities by UBIs (RQ1-Chapter 3). Second, we operationalize the identified supportive activities of the UBIs (RQ2-Chapter 4). Third, we evaluate the validity and reliability our proposed measurement tool (RQ2-Chapter 5). Fourth, we investigate the extent of the impact of the supports by the UBIs on the performances of the NTBFs (RQ3-Chapter 6). Sections 7.1.1 to 7.1.3 summarize the answers to each RQ.

7.1.1 Supportive Activities by UBIs

The extant literature presented in Chapter 2 showed that new technology-based firms (NTBFs) positively impact job creation, innovation, and economy (cf. Colombo and Delmastro, 2002; van Praag and Versloot, 2008). However, due to the liabilities of smallness and newness and a lack of sufficient resources to grow, the NTBFs face more significant obstacles than medium-sized or large firms (cf. Bøllingtoft and Ulhøi, 2005; van Weele et al., 2017; Lukeš et al., 2019). Therefore, policymakers

attempt to support them via different forms of tools. A business incubator is one of the public policy tools to help NTBFs to overcome their liabilities and to access required resources such as financial capital, social capital, and knowledge (McAdam and McAdam, 2008; Bøllingtoft, 2012).

Prior studies (see, e.g., Mian et al., 2016) reported that there are more than 7000 business incubator programs in the world, but so far there is no reliable evidence on the effectiveness of their supports on the performances of NTBFs (Autio and Rannikko, 2016; Eveleens et al., 2017; van Weele et al., 2017; Lukeš et al., 2019). Our literature review (Chapter 2) shows that one possible explanation for the existence of this black box, is the absence of sufficient theoretical insights into evaluating the impact of a supportive environment as given by incubators. To shed light upon this issue, we formulated three research questions (see Chapter 1). First, we formulated RQ1 to identify the supportive activities by UBIs.

RQ1: *What are the main supportive activities offered by UBIs that influence the performance of an NTBF?*

Chapter 3 provided an answer to this research question. To arrive at this answer, we conducted eleven in-depth semi-structured interviews with entrepreneurs who have received supports from UBIs. Below we provide a summary of the results. Consistent with the literature, we found that UBIs support their NTBFs through (1) access to their networks; (2) knowledge development and dissemination; (3) finance and administrative mobilization; (4) growth control; and (5) creation of exposure. The identified supportive activities will be summarized below.

Ad (1) Access to their networks refers to the sort of support that the UBIs facilitate, viz. the access to their internal and external networks via organizing formal or informal events, and connect their NTBFs with potential partners, investors or customers.

Ad (2) Knowledge development and dissemination of supportive activities are provided by UBIs to help NTBFs overcome their lack of business and technical

knowledge resources. This can be met through organizing business sessions and workshops, sessions for coaching and mentoring with experienced entrepreneurs and business experts. Some training sessions are developing sales and marketing skills, negotiation, communication, and pitching skills. The proximity of a university provides access for the NTBFs to their laboratories and also technical advices.

Ad (3) Finance and administrative mobilization supportive activities refer to the provision of basic infrastructures, sharing meeting rooms, office spaces, administrative services, and access to different financial resources. As NTBFs face difficulties to find an affordable office space, this type of support is beneficial for them in their early stages. Clearly, one of the main reasons for NTBFs to join UBIs is fundraising (see van Weele et al., 2017).

Ad (4) Growth control concentrates on monitoring the growth process of NTBFs to explore their requirements and ensure the quality of their supports. In addition, UBIs provide some psychological support to enrich the self-identity of the entrepreneurs to overcome their challenges.

Ad (5) Creation of exposure by UBIs helps entrepreneurs to be seen by potential customers, investors, and partners. Indeed, due to the liability of newness, NTBFs suffer from reputation. Thus, appearing on media via UBIs' channels helps them overcome this liability and obtain more credibility.

7.1.2 Operationalizing the UBIs' Supportive Activities Construct

In Chapter 4, we proposed a measurement instrument (construct) to evaluate the impact of supportive activities by UBIs on the performances of the NTBFs. For our construct, we selected two types of supports identified in Chapter 3 to assess their impacts, viz. (1) knowledge development and dissemination, and (2) finance mobilization. Depending on the literature, we developed a theoretical model that demonstrates the relations between two selected supports, viz. innovation strategy and the performance of the NTBFs. In our model, we introduced a novel contribution to the literature by including the moderating impact of two NTBFs' capabilities (i.e.,

finance capability and absorptive capacity) on the relations between the supports by UBIs and the performances of the NTBFs (see Figure 4-5). The research question that we attempted to answer in Chapter 4 was as follows.

RQ2: *How can the supportive activities be operationalized in a construct that enables us to measure their impact on the performance of an NTBF?*

To provide an answer to RQ2, Chapter 4 explained the measurement scales for the main four variables:

(1) performances of the NTBFs (dependent variable),

(2) innovation strategy,

(3) supportive activities by UBIs (independent variables),

(4) NTBFs' capabilities (moderators),

and three control variables:

(1) size of the NTBFs,

(2) age of the NTBFs, and

(3) the level of innovativeness of the NTBFs as implemented in our model.

Following the operationalization of the construct in Chapter 4, Chapter 5 evaluated statistically the validity and reliability of the measurement instrument. In this regard, we applied variable reduction techniques to check the validity and reliability. The procedure to evaluate the construct validity and reliability was conducted in four steps. We adopted this procedure from the work developed by Sarstedt and Mooi (2019).

In the *first* step, we tested the data to check whether it is adequate for the application of variable reduction techniques (e.g., Principal Component Analysis or Principal Factor Analysis). Through the conduction of the correlation matrix, KMO index, and Bartlett's test, we confirmed that our data is suitable for variable reduction

techniques. In the *second* step, we determined one technique which is adequate for our data set. Based on the correlations between variables, we concluded that Principal Component Analysis is adequate to be applied. In the *third* step, we determined the number of factors to extract for the next steps in data analysis for independent and moderating variables. After the implementation of Kaiser's criterion, the Scree Plot, and Parallel Analysis, the number of factors to extract for further analysis (a) associated with Independent Variables is four and (b) associated with Moderators is two. In the *fourth* step, we conducted component rotation to investigate the variables that should be remained for regression analysis. The correlation between variables showed which component rotation method is suitable for determining the variables to be retained. The results of our analysis (see Table 5-10, Chapter 5) revealed that for independent variables, the Promax rotation technique, and for moderators, the Varimax rotation technique was appropriate.

All in all, the outcome of the Varimax rotation technique (see Table 5-14, Chapter 5) demonstrated that the item measures associated with finance capability were excluded, whereas three-item measures related to absorptive capacity remained. The remained items associated with both independent variables and moderators confirmed the satisfying validity of the construct.

To ensure the construct reliability, we conducted Cronbach's Alpha and Composite Reliability. The results of these two criteria (see Table 5-15, Chapter 5) showed the satisfying reliability values of the innovation strategy, the knowledge development cs, and the finance mobilization. All constructs exhibited satisfying values, and they revealed loadings of more than the threshold criteria (0.7). Thus, our proposed construct suggested satisfying and sufficient validity and reliability.

7.1.3 The Impact of the Construct on the Performance of the NTBFs

In Chapter 6, we continued our analysis to assess the impact of the identified supportive activities (i.e., knowledge development cs), innovation strategy, and one moderator (i.e., absorptive capacity) on the performances of the NTBFs. Meanwhile,

we considered the influence of innovation strategy on the performances of the NTBFs. We also investigated the moderating impact of absorptive capacity on the relations between supports by UBIs and the performances of the NTBFs. The results of Chapter 6 provided an answer to RQ3.

RQ3: In what way are the identified supportive activities related to (a) the innovation strategy of the NTBFs, and consequently to (b) the performance of an NTBF?

In the first step to answer this question, we examined whether the multiple linear regression technique is *appropriate* to be conducted with our sample data via four examinations. We tested whether our sample is (1) asymmetrically distributed, (2) randomly dispread, (3) homoscedastic and is not constrained by heteroscedasticity effects, (4) not influenced by multicollinearity effects.

Subsection 6.4.3 (see A and B) reported the results of skewness analysis (asymmetrically distributed), and residual analysis (randomly dispread). The results showed that the data analysis is not constrained through outliers. It should be mentioned that the skewness level of one control variable (size of the NTBFs) and a moderator (absorptive capacity) needed to be in control. Following the log transformation technique, we normalized the skewness of these two variables. The final results confirmed that our data is appropriate for multiple linear regression analysis.

Subsection 6.4.3 (see C and D) demonstrated the results of heteroscedasticity and multicollinearity analysis, which confirmed that our data is constrained by heteroscedasticity and not influenced by multicollinearity effects. Therefore, multiple linear analysis was approved as an appropriate technique to test the data.

After evaluating the appropriateness of the data to be applied by multiple linear analysis, we tested in the second step, the impact of supports by UBIs on the performances of the NTFBs (see Section 6.5).

The results revealed that knowledge development and dissemination have a positive impact on the performances of the NTBFs. However, our data could not support the relation between finance mobilization and the performances of the NTBFs (see Model 2, Table 6-4). The reported regression results in Table 6-4 provided answers to RQ3.

7.2 Answer to the Problem statement

This section summarizes the answers to the problem statement (PS). They are based on the results of the regression analysis conducted in Chapter 6. The PS is formulated as follows.

PS: How can business incubators support their NTBFs effectively?

Following the results of the regression analysis (Table 6-4), we may clearly observe (1) which type of support by the UBIs have an impact on the performance of the NTBFs, and (2) how their support can be affected. From the answers to the RQs, we may conclude that the empirical model provides a clear evidence that knowledge development and dissemination are positively associated with the performances of NTBFs. The model also shows that knowledge development and dissemination are amplified with the effect of absorptive capacity.

Accordingly, business incubators can provide their supports more effectively via: (1) providing more tailored and customized services on training, coaching, and mentoring; (2) intervening more strongly through the growth process of their NTBFs and help the NTBFs develop their absorptive capacity to identify and utilize knowledge resources; (3) train their NTBFs to enrichen their absorptive capacity to be more independent from incubators and have stronger ability to utilize external knowledge resources both during their incubation process and post-incubation. Depending on our empirical model, we now answer the problem statement in three ways.

First, how should UBIs offer more tailored and matched knowledge resources to the needs of NTBFs to have a positive impact on their performances? As van Weele et al. (2016) mentioned in their research, one reason for a disappointing performance by the business incubators lies in the unwillingness of the entrepreneurs to participate in the knowledge development and dissemination programs of the UBIs. In line with their finding, our data supports that as NTBFs make more usage from the knowledge resources of the UBIs, they grow in their performances. Thus, our (first) recommendation is that UBIs should even more push their NTBFs to use their training, coaching and mentoring programs that are expected to influence their performance (see also 7.3.2).

Second, how should UBIs trigger the NTBFs (a) to participate in knowledge development and dissemination supportive programs, and (b) to take UBIs seriously? Through the participation in incubation learning programs, NTBFs have an opportunity to fill in their business-related knowledge gap partially. As a result, the NTBFs would then positively influence their performance and create a satisfactory outcome for the business incubators.

Third, UBIs should make the NTBFs aware of the learning abilities in making benefit from external knowledge resources. This ability is named absorptive capacity. It refers to the capability to identify and acquire external knowledge to assimilate and exploit it within the business processes. Absorptive capacity provides NTBFs with strategic agility to pivot in the highly uncertain environment and generate innovative outcomes (Saemundsson and Candi, 2017).

7.3 Contributions

The contributions of our thesis are twofold. First, our empirical results contribute by shedding new light on theoretical implications to the existing literature on the NTBFs and UBIs for the scholars. Subsection 7.3.1 explains the theoretical contributions. Second, our results also hold practical implications for both the

entrepreneurs as well as the UBIs' management team. Subsection 7.3.2 summarizes the practical implications.

7.3.1 Theoretical Contributions

Our model and empirical results indicate that the performance of the NTBFs is positively affected by knowledge development and dissemination supportive activity by UBIs. Moreover, this effect is moderated and amplified through the absorptive capacity of the NTBFs. The results of this study increase our understanding about the effect of supports by UBIs on the performance of NTBFs. This research area has still many unknown sides (cf. Mian et al., 2016; Dvouletý et al., 2018; Lukeš et al., 2019). According to our findings, we have been able to contribute by two critical theoretical contributions to the research field of NTBFs and UBIs. Remarkably, the findings are rooted in an empirical evidence.

Contribution 1: We contribute to the literature on incubators and NTBFs, which successfully act in the real world. We do so by providing extensive response to the call for conducting more research on examining the impact of the support by UBIs (cf. Hackett and Dilts, 2004; Mian et al., 2016; Soetanto and Jack, 2016; Dvouletý et al., 2018; Lukeš et al., 2019). Our main contribution is the development of a new model that shows the relations between the supports by UBIs and the performance of the NTBFs. Through our model, we contribute by a new measurement instrument that enables scholars to measure the precise impact of the support.

Further, our study makes a novel contribution by explicitly taking into account the impact of the NTBFs' absorptive capacity in the relation between UBIs' resources and NTBFs' performances. Here we remark (a) our thesis is among the first investigations to examine the absorptive capacity in the incubation literature, and (b) we bring the absorptive capacity in the context of the small tech-based firms, not the medium or established ones. Thus, from our point of view, the current study differs with the related empirical literature.

Contribution 2: Prior investigations (Bruneel et al., 2012; van Weele et al., 2017) stated that three reasons are associated with the low utilization of UBIs' resources: (a) the insufficient quality of the UBIs' resources, (b) a mismatch between NTBFs' demands and UBIs' supplies, and (c) a mismatch between the resources that entrepreneurs need and the resources that they request from business incubators. Our second contribution is associated with the NTBFs' capability to increase the usage and impacts of the UBIs' resources. Our findings indicate that there is an additional reason for the low usage of UBIs' knowledge-based resources: (d) the lower absorptive capacity of the NTBFs in making benefit from the UBIs' resources. This is a delicate point. It might be time to recall the literature review by Escribano et al. (2009) that firms are not able to take advantage of external knowledge resources only by being exposed to them. Hence, technology is invited to bring us new ways to stimulate the knowledge absorption by small enterprises.

Accordingly, we highlight the role of the UBIs' team to create awareness and help entrepreneurs to enhance their absorptive capacity. As far as the NTBFs are not aware of how to acquire external knowledge resources, assimilate, and utilize them, they are not able to make benefits from the UBIs' support. Besides, the UBIs' team should consider that although their NTBFs received the same amount of external knowledge flows, they may not derive equal advantages. It happens this way because NTBFs have a different ability to acquire and utilize the UBIs' knowledge resources (cf. Giuliani and Bell, 2005; Escribanoa et al., 2009).

In summary, our findings differentiate themselves from the previous studies which recognize BIs only as a tool to provide resources for the NTBFs. We emphasize that the NTBFs' ability to make usage from knowledge resources is even more effective on the performances of the NTBFs than the impact of knowledge resource of UBIs. Thus, NTBFs should use new technological tools themselves to stimulate the absorption of knowledge.

7.3.2 Practical Implications

Our research has led us to straight forward recommendations for all UBI management teams. Obviously, participation in intensive training and mentoring programs will create value for NTBFs, especially for inexperienced entrepreneurs. Thus, we recommend the UBIs to create awareness for their early-stage and to teach the inexperienced entrepreneurs about the importance of these programs (see also 7.2). Hence, UBIs should have a stronger intervention approach to push the NTBFs to participate in such programs.

The entrepreneurs should acknowledge that developing their absorptive capacity is vital. In the future, the entrepreneurs will be able to take advantages from (a) the offered UBIs' knowledge-based resources and also from (b) other external resources such as universities and corporates. This would help the entrepreneurs to be independent from any support by UBIs and therefore possibly able to survive.

7.4 Limitations and Recommendations for Further Research

In our study, we attempt to ensure the validity and reliability of our results. However, we are facing five main limitations that somewhat constrain the generalizability of our findings. The constraints so defined are a source of inspiration for the formulation of five recommendation for future research.

First, our survey was conducted at one point in time (limitation 1). The entrepreneurs' evaluation of the effectiveness of the supports by the UBIs might be different from the incubation process to the graduation of UBIs. The impact of the support by UBIs on the performances of the NTBFs compared to the role of NTBFs' capabilities needs more attention. Hence, we will announce a call for further longitudinal studies or a cross-sectional study with respect to the control group to obtain more understandings in this context (Recommendation 1).

Second, the characteristics of our sample need to be considered when generalizing the research results. (a) In this study, we only focused on the university-based

business incubators and the NTBFs that were incubated there. The quality of the resources and supports by UBIs may differ in other types of business incubators. For instance, corporate business incubators may provide their NTBFs with a different quality of the finance mobilization. Thus, the results of our model may not be generalizable in other types of business incubators (limitation 2a). Therefore, we encourage further research to evaluate our findings in other types of business incubators. (b) The business incubators in our sample were located in the Netherlands and Germany. Hence, our sample may contain biases, because the data do not portray the real situation across the whole of these two countries. (limitation 2b) In addition, the regional characteristics and cross-cultural differences may have an impact on the quality of the offered resources and supports by UBIs or the capabilities of the NTBFs. Therefore, further research is required to assess whether our findings are applicable in other regions (Recommendation 2).

Third, we have not taken the other types of support by UBIs in our scope. Our study focused on two categories of support by UBIs: (1) knowledge development and dissemination, and (2) finance mobilization (limitation 3). Thus, further studies are needed to assess other types of support by UBIs, such as access to the networks (Recommendation 3). Furthermore, while in our study, the importance of NTBFs' capabilities is highlighted, we encourage further investigations to take the NTBFs' capabilities and their abilities in resource absorptive into consideration and evaluate the capabilities' direct and moderation impacts on the performances and success of the NTBFs (Recommendation 4).

Fourth, the transferability of our results may be limited (limitation 4) due to the size of the sample (96 NTBFs). However, multiple studies in the context of the study (see Soetanto and Jack, 2016) stated that access to the large dataset of NTBFs is challenging. As discussed in Section 5.1, the small sizes can be acceptable while access to the other resources is limited. In this regard, the following related studies also provide evidence that our sample size is acceptable. Soetanto and van Geenhuizen (2019) had a sample size of n = 100, Soetanto and Jack (2016; 2018) had

a sample size of n =141, van Geenhuizen and Soetanto (2009) had a sample size of n = 78 (see Subsection 5.1.2).

Fifth, limitation 5 is the measurement criteria of the NTBFs' capabilities (i.e., absorptive capacity and finance capability). To measure the financial capabilities of the NTBFs, we used the measurement criteria that venture capitalists employ to evaluate the NTBFs ability in fundraising. To measure knowledge-related capability, we used the absorptive capacity, which measures the learning ability of the NTBFs in general. Both capabilities do not completely represent NTBFs' abilities associated with making benefit support by UBIs. Thus, further studies are required to develop a new AI-based measuring instrument of the NTBFs capabilities related to the support by UBIs (Recommendation 5).