

MASTER

The influence of commercial capabilities and orientations in new technology ventures

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Eindhoven, February 2014

**The influence of commercial
capabilities and orientations in new
technology ventures**

by
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in partial fulfilment of the requirements for the degree of

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in Innovation Management**

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Management summary

Context and problem definition

Entrepreneurs in technology start-ups face the challenge of developing their technology next to the development of customers. This is indicated by entrepreneurs as a problematic process which can be eased by acquiring or developing commercial capabilities in an early stage of the start-up (Onyemah et al., 2013). Literature on the subject included work on commercial capabilities and studies on a Market/ Sales orientation. The problem of these firms is that they do not know whether and how these commercial capabilities can secure success or survival of the firm. The research therefore needs to answer the following questions:

Main research question: *How do commercial capabilities of the founding team affect the commercialization process of technology in a start-up firm?*

Sub questions:

- *What is the role and influence of a customer orientation in the commercialization process of a technology start-up firm?*
- *What is the role and influence of a competitor orientation in the commercialization process of a technology start-up firm?*
- *What is the role and influence of a sales orientation in the commercialization process of a technology start-up firm?*

This research addresses issues raised by The Holst Centre, an independent open-innovation R&D centre, regarding the exploitation of their commercialization via new ventures. We therefore extended the data and model of Witte (2012), a research initiated earlier to address these issues The Holst Centre. With limited studies on entrepreneurship, this research takes both small established firms and small entrepreneurial firms, start-ups, into account who share many of their marketing problems.

Literature background

A literature review was executed with the following keywords: *commercial capabilities, entrepreneurship, small firms, sales, marketing* or combinations thereof. This identified two literature streams:

1. Commercial capabilities in small and start-up firms

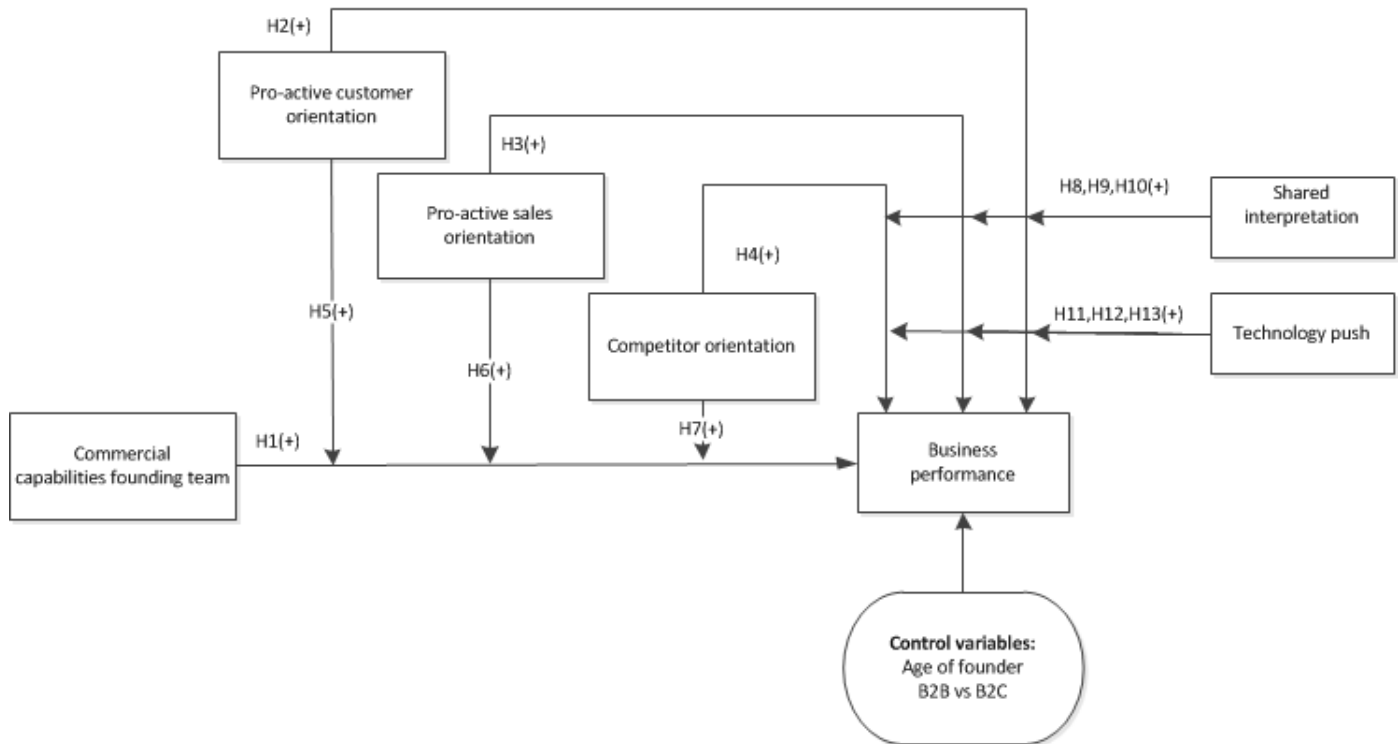
This literature stream on commercial capabilities reasons from the Resource Based Theory (RBT) and suggests that capabilities are needed to recognize unique resources within a firms and transform these resources into customer value (Amit and Schoemaker, 1993; Day, 1994). In small firms and start-ups, these capabilities mainly involve the founding team. Research has mainly focused on marketing capabilities, but recent attention has also focused on the influence of possessing sales capabilities within the founding team. Furthermore, several studies reason according to the RBT that marketing and sales capabilities in itself do not deliver a competitive position in the market place and these capabilities influence the business performance in relation to the culture of an organization, i.e. a market or sales orientation. Ambiguity exists on the type of relation between these commercial capabilities and orientations and especially literature on small and start-up firms regarding this topic is undeveloped.

2. Market/Sales orientation& customer development in small and start-up firms

The second research stream includes publications on the level and benefit of market and sales orientation in small and start-up firms. The results of these studies reveal that these firms mainly rely on their customers for the acquisition of market information (Blankson and Cheng, 2005; Blankson et al., 2006). The vital role of the customer has been highlighted by studies on the importance of having a reference customer as a small or start-up firms, who can refer the firm to other customers on the market . With little experience in customer relationship building, researchers argue that the sales activities of a firm are crucial to connect with these customers. Therefore, recent attention has focused on the benefit of a sales orientation, next to an MO, in small and start-up firms. Focusing on learning from the customer via sales and thus integrating sales in the NPD process is seen by researchers as an important determinant for start-up success. Responding to the feedback of the customer acquired with sales activities is done best by acquiring minimal resources and thereby launching lean.

Conceptual model

The following model was created to guide this research:



We have developed a model in which we combine the two literature streams. The first stream of articles regarding commercial capabilities in small and start-up firms is represented in the bottom half of the model. The articles concerning an MO/SO and customer development are shown in the upper half of the model in which the components of an MO/SO are included separately. To combine these two streams we built on Morgan et al. (2009) who have also studied the interaction between commercial capabilities and MO/SO in general. We on the other hand focussed on the start-up context discussed in the previous section and distinguished between marketing and sales capabilities, but also shared interpretation of the market information by the founding team.

Methodology

To test the newly developed model the original data set of Witte (2012) was extended from 35 to 68 cases, enhancing for instance also the measure for the level of technology push. The model was tested with a sample of Dutch spin-offs and spinouts involved in technology based innovations. We used a SEM based partial least square method to analyse the hypotheses.

Results

The reliability and validity of the measures was analysed and the hypotheses were tested. Validity of the model resulted in 4 of 13 supported hypotheses. The main hypothesis was supported, indicating a positive significant influence of founding team commercial capabilities on the business performance. When commercial capabilities are combined with a competitor orientation, this will benefit the performance even more. A combination of commercial capabilities and a low customer orientation benefits the business performance as well. No support could be found for an influence of a customer or sales orientation on the business performance. The results did show a significant positive effect of a competitor orientation on the business performance of a start-up. Monitoring the developments of the competitors and knowledge on whether the customers of the competitors are satisfied delivers a benefit for survival and growth of a start-up. Several other interaction effects are identified as well. A high orientation on the customer and sales only influences the business performance under a low share interpretation by the founding team. The results also show that when a start-up is highly driven by technology, the firm's performance benefits even more from an orientation towards the competitor.

Discussion

As hypothesized, commercial, i.e. marketing and sales, capabilities enable the founders to recognize valuable market information and turn this information into customer value. The positive influence of commercial capabilities on the performance of the start-up is dependent on the level of competitor and customer orientation. First, being commercially capable seems particularly important when little information about the customer is available and the start-up has little insights in the existing or latent needs of the customer. Second, when the start-up has a high focus on the competitor, the information of the competitor needs to be interpreted with the use of the commercial capabilities of the founders and transformed into useable information. No direct effects of having a customer and sales orientation could be found, in contrary to our hypotheses and findings of prior studies (Blankson and Cheng, 2005; Ruokolainen, 2005). It seems that predicting customer needs is a more difficult process for start-ups than assumed by researchers. An explanation could be the false assumption of a predictable and an *effectual* marketing approach might be more suitable for start-ups (Sarasvathy, 2001). Having an organization-wide traditional *causational* orientation towards customer and the selling activities might therefore not deliver a benefit for the business performance of the start-

ups. They should rather rely on the competitor for their information instead of their customer or sales activities. With a high focus on the customer, start-ups might become over dependent on their customer and lose the beneficial focus on the competitor. It seems that start-ups should mind the strategy of the competitor in order to determine the direction of the technology on the market, or certain technology paths. This is in line with the results on the level of technology push of the start-ups which indicate that especially start-ups who are driven by technology benefit from a focus on the competitor. Especially these start-ups should mind the technology strategy of the competitor and adapt their innovations accordingly.

How the information is interpreted by the founding team has a significant influence on the benefit of a commercial orientation. When a start-up is involved in the process of customer involvement, this process should not be interrupted with frequent meetings that can distort this process. What might happen, is that the more traditional marketing and sales functions interrupt the process by trying to convince the founding team with their own collected market information. It is however beneficial to meet frequently and create a shared interpretation when the start-up has a low focus on the customer and its selling activities and little customer and sales information available.

Preface

This thesis marks the completion of my Master Innovation Management at the Eindhoven University of Technology.

The writing of this thesis has been going through some ups and downs with the last mile as hardest. The passion of the entrepreneurs participating in my research kept me motivated throughout the whole process. With a life-long dream of starting a business on my own, I was more than happy to take a quick glance in the mind of the entrepreneur, characterized by endless persistence.

I am grateful towards several people which supported me during my research. Therefore, I would like to thank Ed Nijssen for keeping me focused and stimulating me to take a critical standpoint regarding my research. In our meetings he was able to give me direct feedback and quickly identify problems, leading to a better quality of the output. He taught me to look at my thesis in a structured way, accompanied with a large dose of common sense. Furthermore, I would like to thank Ad de Jong for providing an alternative and creative point of view on my work. I also want to thank Erwin Meinders from TNO Holst Centre for providing the basis of this research. Finally, I would like to thank my family and friends for the unconditional support during my research.

Joost van der Graaff,

Eindhoven, February 2014

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1 Introduction

Start-ups introducing new technology on the market face the challenge to develop their new product but also to discover their customers. The latter is a hazardous process which is best recognized and organized as a separate process. In a large scale world-wide survey start-up founders indicated late customer involvement as one of the key problems and reasons of firm failure (Onyemah et al., 2013). The founders of the start-ups first developed their new products and invested much money to then find that customers were sceptical towards their product or service.

The above problem can be prevented by and requires the timely development of commercial capabilities. As Onyemah et al. (2013) finds, these entrepreneurs lack commercial capabilities. If they have learned about sales and marketing they generally learned traditional sales and marketing which assumes market boundaries to be known. This suggests that we need to learn more about how start-ups can develop and use commercial capabilities and how these should ensure that the new products developed will get accepted by the market.

The literature on the role of commercial capabilities of entrepreneurs is limited. The first stream of literature includes work on commercial capabilities of small and start-up firms. The second stream of literature includes studies on market/sales orientation & customer development of these firms. However, these literature streams are still emerging and little integration of those streams has taken place. Hence, the goal of this study is to review this work and add to our understanding of commercial capabilities in small and start-up firms.

Commercial capabilities can be defined as *“commercial skills and knowledge of the founders that distinguish them from the founders of other small firms”* (Pitkänen et al., 2012; Y. L. Zhao et al., 2012). These capabilities reflect how the founder is able combine the different business functions and thereby create a competitive advantage (Day, 1994). In small and start-up firms, founders are mainly the decision makers and determine the strategy, mission and vision of the company. The commercial capabilities of these founders can therefore help an organization to develop innovations fit for the market. Studies on these commercial capabilities mainly focus on the marketing aspect and argue that the founder should be able to recognize valuable market information and transform this information to customer value. Recently, researchers have also paid attention to sales capabilities (Pitkänen et al., 2012). In the uncertain and unpredictable market of a small firm or start-up sales meetings deliver crucial feedback on the product or service. Integrating selling in the new product development (NPD) process can therefore benefit successful commercialization. The founder should thus develop, next to marketing capabilities, sales capabilities focused on transforming customer feedback into customer value.

This research as well pays attention to a market and sales orientation in small and start-up firms. A market orientation (MO) can be defined as *“an organization culture that most effectively and efficiently creates the necessary behaviours for the creation of superior value for buyers and, thus, superior performance for the business”* (Narver and Slater, 1990). With an MO, small and start-up firms gather market information concerning the customer and competitor which enables them to discover market trends and respond to those trends. According to Narver and Slater (1990), an MO consists of three components: customer orientation, competitor orientation and interfunctional coordination. Recently, the role of sales has gotten more attention and researchers argue that a sales orientation (SO) is needed in small and start-up firms, defined as *“the founder’s desire to change the status quo and by actively initiating new selling approaches and methods, like experimenting with selling tactics, developing solid sales arguments, and scanning and identifying sales opportunities in order to sell the products”* (Pitkänen et al., 2012). With difficulties to finding a first customer due to a lack of reputation, focussing on your sales activities as a start-up can be seen as the solution for this problem. During these sales meetings, customers provide feedback on the innovation early in the product development process which increases the chance of a product-market fit.

Although the importance of the commercial capabilities in small and start-up firms has been recognized, little is known on how these capabilities can be used within the organization to secure success and survival of these firms. Also, the influence of an MO or SO with regard to these commercial capabilities is not investigated to a large extent.

Problem statement & research question

After introducing the problem context, the problem statement can be defined as follows:

Problem statement:

Founders of technology start-ups and spin-outs need to possess relevant commercial capabilities to adapt to the uncertain and turbulent market. Although it is recognized that especially marketing and sales capabilities are required, little is known about how and under what conditions these capabilities are beneficial for these firms.

Based on this problem statement research questions are set forward to further guide research.

Main research question:

How do commercial capabilities of the founding team affect the commercializing process of a technology start-up firm?

Sub questions:

- *What is the role and influence of a customer orientation in the commercialization process of a technology start-up firm?*
- *What is the role and influence of a competitor orientation in the commercialization process of a technology start-up firm?*
- *What is the role and influence of a sales orientation in the commercialization process of a technology start-up firm?*

Research context

This master thesis describes research investigating the influence of commercial capabilities of the founding team on firm performance in start-ups and small firms. The research addresses issues raised by Holst Centre on how to commercialize their technology, with a focus on new ventures.

The Holst Centre is an independent open-innovation R&D centre aimed at developing generic technologies and was set up in 2005 by IMEC and TNO, with support from the Dutch and Flanders governments. Holst Centre is located on the High Tech Campus in Eindhoven, has over 150 employees and a commitment from close to 30 industrial partners.

Holst Centre mainly develops technology which will be marketed or implemented by a partner. In some cases, no partner can be found and Holst Centre commercializes the technology themselves by spinning it off as new ventures. However, as an R&D centre, Holst Centre is tailored to (co-) develop technology for partners. This raises the problem that the Holst Centre lacks the capabilities to commence (external) commercialization of developed technologies.

The issue mentioned above resulted in a study of 35 start-ups and spin-offs and their commercial capabilities by Witte (2012). He proposed a direct effect of commercial capabilities of the founder, consisting of marketing and sales capabilities, the performance of the start-up/spin-off. Furthermore, the study hypothesizes that having a market and sales orientation benefits the organizational performance as well. In line with Morgan et al. (2009) he modelled an interaction effect between the commercial capabilities and orientations. The result of the research show that

the hypothesized positive direct effect of the commercial capabilities is backed up by the data. Having an MO or SO is proven to be non-significant for a start-up or spin-off.

The study of Witte (2012) has its limitations. The research lacks to investigate the role of the separate components of an MO or SO. For the MO, these components are a customer orientation, a competitor orientation and a shared interpretation. For the SO, these elements are sales innovativeness and pro-active sales orientation. Investigating these components individually might reveal a different effect on firm performance. Furthermore, no attention is paid by Witte (2012) on result regarding a significant effect of the level of technology push on the performance of a start-up or spin-off firm.

To address the issues of Witte (2012), the data of the research were re-analysed. This re-analysis revealed interesting relationships which, together with a lack of empirical research in entrepreneurship, led to the decision to extend the model of Witte (2012). To test the newly developed model the original data set of Witte (2012) was extended from 35 to 68 cases, enhancing for instance also the measure for the level of technology push.

Aim of the study

This study aims to extend the research of Witte (2012). First, the research model is further developed by separating the components of an MO. Second, empirical data is collected and a second analysis led to a revision of the research model. This exposed the variables influencing commercial capabilities in start-up or spin-offs.

This data will be measured with identical items as Witte (2012), which justifies combining the data sets. Empirical studies in entrepreneurship appear to be problematic due to the dynamic nature of start-up and spin-off firms. Elimination of cases is not uncommon since failure of these firms is likely to occur. Extending the data complements the few empirical studies on entrepreneurship.

Scope

In this research, we make a distinction between small firms and entrepreneurial firms. Entrepreneurial firms or start-ups/spin-offs are by nature small firms. However, small firms are not necessary start-ups, because small firms can also be established firms, typically older than five years. Many of small firm's problems are shared by start-ups. This explains why in the Journals on small businesses there is more attention for entrepreneurial topics, e.g. founding teams or personal involvement of the owner (H. Zhao et al., 2010). Therefore, we include small firm marketing/sales in this study.

Included in this study as well are topics that are not specifically aimed at entrepreneurship, but do have an important application in the entrepreneurial setting, e.g. effectuation and early customer involvement (Coviello and Joseph, 2012; Read et al., 2009).

Outline

The following topics will be discussed in this master thesis. In the second chapter we review the current literature on commercial capabilities in small firms. The third chapter shows the development of the conceptual model accompanied by the relevant research hypotheses. The fourth chapter provides the research methodology which includes the research context, the sampling frame and the data collection method. In the fifth chapter the results of the data analysis are presented. Finally, the sixth chapter will conclude the master thesis with a discussion, including managerial implications and limitations of the study.

2 Literature background

An online search generated a set of 27 articles. The articles were identified using key words such as: *commercial capabilities, entrepreneurship, small firms, sales, marketing* or combinations thereof.

After reading the materials, the articles were tabulated for further analysis and relevant categories were labelled. This resulted into two relevant research streams:

1. Commercial capabilities in small and start-up firms
2. Market/Sales Orientation & customer development in small and start-up firms

These research streams will be described into detail below.

2.1 Commercial capabilities in small and start-up firms

The Resource Based Theory (RBT) states that firms achieve better performance than others because they possess resources that are valuable, rare, and difficult to imitate and substitute by competitors (Barney, 1991). When firms acquire and deploy those resources advantageously, they can differentiate themselves on the market and thus create a sustainable competitive advantage.

Researchers indicate that capabilities are needed to recognize these resources as valuable and transform them into customer value (Amit and Schoemaker, 1993; Day, 1994). In small firms and start-ups, these are mainly the founder's commercial capabilities since human capital in these firms is limited and the strategic decision making is often done by the founders. Therefore, commercial capabilities in small firms and start-ups can be defined as "*commercial skills and knowledge of the founders that distinguish them from the founders of other small firms*" (Pitkänen et al., 2012; Y. L. Zhao et al., 2012). More specifically, researchers indicate that founders should possess marketing capabilities. Recently, the role of sales has gotten more important in the literature and researchers argue that capabilities in selling are needed as well (Pitkänen et al., 2012).

Results of studies on small and start-up firms show the benefit of these marketing capabilities. Möller and Anttila (1987) found that capabilities in small firms involve gathering and combining information and especially the successful small firms were in possession of these capabilities. The results of Ripollés and Blesa (2012) as well show that the performance of new ventures benefits from the ability to collect customer information, networking capabilities, and transform this information within the organization, spanning capabilities. Accordingly, Santos-Vijande et al. (2012) report that possessing spanning capabilities, focused on managing and deploying market information within the organization, benefits small firms. Focused on start-ups, Merrilees et al. (2011) as well report a beneficial influence on the business performance when a firm is capable of collecting market information and linking this information to the internal functions of the

organization. The founder should thus be able to recognize marketing opportunities and transform these opportunities into customer value. He or she should be a jack-of-all-trades with an external focus, e.g. identifying market trends, and an internal focus, e.g. integrating business functions (Alvarez and Busenitz, 2001).

With a proven benefit of marketing capabilities in small firms and start-ups, researchers have begun to explore how and under what conditions these capabilities deliver a benefit on firm performance and argue that capabilities are especially beneficial when linked to an MO of a small or start-up firm (Merrilees et al., 2011; Pitkänen et al., 2012; Qureshi and Kratzer, 2011). These studies reason from a holistic perspective on commercial capabilities and argue that capabilities are needed to manage the firm's resources. As Merrilees et al. (2011) state, resources *per se* cannot do anything. What is important is the capacity to utilize resources effectively, that is, a capability. In small and start-up firms, resources are limited and having an MO can be seen as a unique resource. As discussed above, capabilities are needed to manage such an intangible resource. In support, Qureshi and Kratzer (2011) argue that marketing capabilities of firms are influenced by both external and internal factors, including an MO.

Recently, Pitkänen et al. (2012) reveal that the capabilities of the founder can, besides an MO, be linked to an organization-wide sales orientation of a start-up. This requires certain sales capabilities next to the marketing capabilities discussed earlier. The sales capabilities of the founder can trigger a sales culture which is needed to close the first important sale of the start-up (Pitkänen et al., 2012). They state that a founder's sales capabilities, i.e. knowledge and skills accumulated through work experience and educational background in selling, helps to identify sales opportunities in the market. With these capabilities the founder is capable of closing a first important deal which provides a sustainable customer relationship. When mutual trust has been achieved, this customer can refer the start-up to other prospects and thus grant access to the main market, a process which is considered as difficult for start-up companies (Moore, 1991).

Although researchers agree on the relationship between marketing/sales capabilities and an MO/SO in a small or start-up firm, the findings differ on the causality direction. Some researchers argue that an MO generates a competitive advantage via the marketing capabilities of a firm (Merrilees et al., 2011; Qureshi and Kratzer, 2011). These studies state that a n MO generates valuable market information which needs to be transformed into a competitive advantage and for this process, a firm needs to possess certain capabilities. In contrast, Pitkänen et al. (2012) posit that the capabilities of the founders influences the company's performance via human actions and social processes, a

commercial orientation, within the firm. Since none of the studies has collected longitudinal data, ambiguity exists on the casual direction between these concepts.

Conclusion

Findings report that both marketing and sales capabilities are needed as a founder. These capabilities involve recognizing and transforming market information and learning from the customer in sales meetings. Several studies reason in line with the RBT that marketing and sales capabilities on itself do not deliver a competitive position in the market place and these capabilities influence the business performance through the culture of an organization, i.e. a market or sales orientation. Ambiguity however exists on the type of relation between these commercial capabilities and orientations and especially literature regarding this topic on small and start-up firms is yet undeveloped.

2.2 Market/Sales orientation & customer development in small and start-up firms

MO is a concept developed and used primarily in marketing and management literature describing large organisations. Recently, researchers on small businesses and entrepreneurship have also adopted the MO concept to describe the marketing activities of small firms and start-ups. The results of these studies reveal that these firms mainly rely on their customers for the acquisition of market information (Blankson and Cheng, 2005; Blankson et al., 2006). The vital role of the customer has been highlighted by studies on the importance of having a reference customer as a small or start-up firms, who is able to refer the firm to other customers. With little experience in customer development and relationship building, researchers argue that the sales activities of a firm are crucial to identify and connect with these customers. Therefore, recent attention has focused on the benefit of an SO, next to an MO, in small and start-up firms.

2.2.1 Market orientation

Studies on MO in small firms and start-ups adopt two perspectives of MO, namely a *behavioural* and a *cultural* perspective. The behavioural perspective defines an MO as *“the organization wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organization wide responsiveness”*, introduced by Kohli and Jaworski (1990).

The three elements determining such an MO are:

1. Generation of market intelligence pertaining to current and future customer needs.
2. Dissemination of the intelligence across departments.
3. Organization-wide responsiveness to this market intelligence.

The cultural perspective defines an MO as *“an organization culture that most effectively and efficiently creates the necessary behaviours for the creation of superior value for buyers and, thus, superior performance for the business”*, introduced by Narver and Slater (1990). The three elements underlying this definition are:

1. Customer orientation.
2. Competitor orientation.
3. Interfunctional coordination.

Although literature adopts both definitions, the cultural perspective of MO seems to fit the small firms and start-ups context best. This perspective takes the external environment into account where the behavioural MO is more focused on the internal organization. Especially being aware of the competition as a small firm reveals to be a crucial inclusion discussed later on in this chapter.

Despite the limited number of studies on MO in small firms and start-ups, a congruence has been reached on the benefit on firm performance. First to investigate an MO in small firms, Pelham and Wilson (1995) found that new product success and firm growth was mainly due to a high level of MO within the firm. Accordingly, Mahmoud (2010) discovered that an MO in small and medium enterprises (SMEs) directly influences the business growth and profitability of the firms. In support, Keskin (2006) reveal an indirect benefit of MO where being market oriented increases learning within a small firm and subsequently delivers more innovative products which generate business performance. These findings relate to several recent studies, reporting an indirect effect on the business performance of MO through the mediating role of capabilities (Merrilees et al., 2011; Qureshi and Kratzer, 2011).

The benefit of an MO in small firms and start-ups is mainly due to acquiring crucial customer feedback. Blankson and Cheng (2005) revealed that marketing in small firms had many similarities with the MO concept, but a difference could be seen on the aspect of customer service, which was more present than the other marketing dimensions investigated. In line with these findings, Blankson et al. (2006) showed a strong role of the customer and revealed that small business owners had developed a distinctive MO in which they acquired their market information by customer engagement. Formal marketing methods were outsourced, e.g. performing market research. As

Sciascia et al. (2006) conclude, formal marketing departments are often absent in small firms and market information is collected with the use of informal, unplanned marketing methods, such as acquiring feedback on the product or service by engaging with the customer.

Since small and start-up firms are highly dependent on the customer, the importance of focusing on the right customer, a *reference customer*, to acquire product feedback has been highlighted by several studies (Popovic and Fahrni, 2004; Ruokolainen, 2005). A reference customer can give feedback on the innovation and provide access to the main market by referring firms to potential customers on the market. As Popovic and Fahrni (2004) found in a case study of a Swiss company involved in watchmaking components, high-tech start-ups use their first customer to access the main market. The start-up firm made use of Swatch, an established watch brand, as their reference customer and after a successful collaboration the start-up firm was recommended to other potential customers on the market. In line with these findings, Ruokolainen (2005) reveal in their research on small Thai high-tech software firms that the success of a firm depended on whether the firm could find a customer willing to act as reference. The process of identifying and collaborating with a reference customer can thus benefit a firm in two ways, namely by providing a reference on the market and by delivering feedback on the product or service. Since small and start-up firms are generally undeveloped and have not yet built the required skills, collaborating with the customer is a fuzzy process characterized as trial and error.

2.2.2 Customer development

With the benefit of involving a reference customer in small and start-ups firms, studies have paid attention on how to build and involve customers in these firms. These studies emphasize the need to validate the customer early on instead of market a fully developed product. As Lynn (1996) discovered in case studies on firms involved in radical innovations, successful firms had involved the customer early on in the life cycle of their products. By involving the customer early on, firms are able to *probe and learn* from the market. This probe and learn process by differs from conventional market testing, where market testing is done in a late stage of development and just prior to full-scale introduction. This unconventional probe and learn process comprises of three stages:

1. Observing a site or customer before probing
2. Introducing the probe, i.e. an early version product or service
3. Observing the effect on the site/customer

Accordingly, Coviello and Joseph (2012) identified five beneficial customer activities in this unconventional product development process in young and small technology firms: *opportunity recognition, customer-based funding, development and testing, wider commercialization and*

(ongoing) feedback. These activities overlap each other and are iterated in the NPD process. Although perceived as risky for the entrepreneurs, the study reveals that involving customers early on leads to a more successful business. Another major contribution in customer building and involvement is the study of Blank (2005), which advocates validation and discovery of the customer prior to complete product development. He has developed the “Customer development model” which includes four steps in order to correctly involve and build customers (see Figure 1).

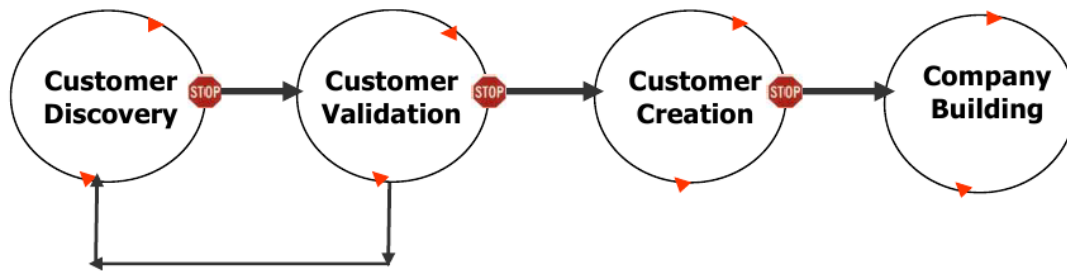


Figure 1 Customer development model (Blank, 2005)

1. *Customer discovery*, which involves discovering whether the problem, product and customer hypotheses in the business plan are correct.
2. *Customer validation*, which aims to build a repeatable sales road map for the sales and marketing teams that will follow.
3. *Customer creation*, which aims to create end-user demand and drive that demand into the company’s sales channel.
4. *Company building*, which focuses on building mission-oriented departments that can exploit the company’s early market success.

This model provides clear guidelines on how to validate and develop customers as a company. However, it does not focus on how to approach these customers as a small or start-up, a difficult process for an organization lacking an established position in the market.

2.2.3 Sales orientation

Where young firms are advised to involve customers in the start-up phase, the problem they might face is how to interact with the customer. With undeveloped knowledge on customer relationship building, in contrast to large organizations, this problem can be solved by focussing on their sales activities. Small firms and start-ups should involve and learn from the customer via sales meetings. As Leslie and Holloway (2006) argue, an organization has a certain ‘Sales learning curve’ (see Figure 2).

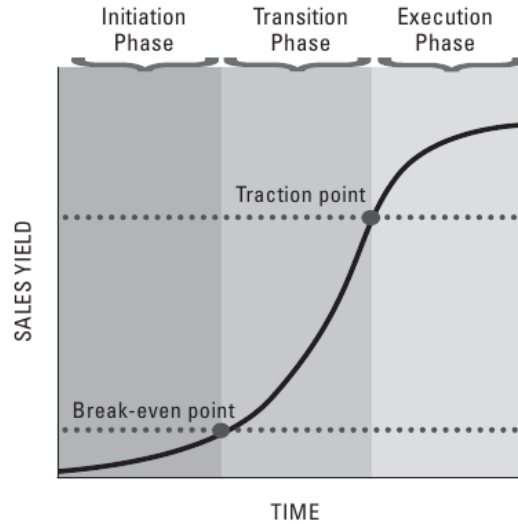


Figure 2 Sales Learning Curve (Leslie & Holloway, 2006)

The Sales learning curve states that a company will be more efficient at selling when the sales activities increase and is divided into three phases: *initiation*, *transition* and *execution*. During the *initiation phase*, only few customers are willing to buy the innovation and they require many incentives to close a sale. As the innovation needs validation and adjustment, sales people in this phase should focus on learning and creating a big interest in the technology. This way, they can pass on the customer feedback to the R&D function within the start-up team. This phase will last until the break-even point, where the revenue per sale equals the costs of a sales representative. In the *transition phase*, after the break-even point, the firm has built a large customer base and this phase will last until market validation, 'traction', has been reached. In this phase, sales reps will focus on refining their market position and keep a focus on learning from the customer. When market 'traction' has been found, the *execution phase* commences in which sales reps should be hired who have capabilities focused on selling a complete innovation and applying traditional sales techniques. The importance of sales learning is also stressed by Onyemah et al. (2013) with the 'entrepreneur-friendly sales model' generated from interviews with 120 company founders in Hong Kong, Kenya, Mexico, Nigeria, the United Kingdom and the United States. The researchers distinguish two stages in the early sales activities of a start-up: *idea generation* and *product execution*. The *idea generation* stage is aimed at validating and refining the initial idea of the start-up. Sales reps share the idea with prospects and the start-up team refines this idea when necessary. This stage determines whether the idea should advance to the next stage, *product execution*. After developing and testing a prototype with the initial group of prospects, more leads should be generated from a larger group of prospects. With these prospects, the product will be explored and objections addressed. Hereafter, a deal can be closed and the start-up can build its position on the market.

When learning via sales meetings with (potential) customers as a small firm or start-up, you should be adaptive and adjust the amount of organizational resources to the feedback of the customer, which is described as the *Lean Start-up method*. This method advocates acquiring resources according to market feedback and is introduced by Ries (2011), making use of the concepts of customer development of Blank (2005). The method proposes that entrepreneurs should first invest time and energy in finding customers prior to acquiring resources. With a focus on introducing a Minimal Viable Product (MVP) to meet the needs of early customers, risks of investing large amounts of money without a market validation are reduced. An MVP is the minimal version of a new product which allows a team to collect the maximum amount of validated learning about customers with the least effort (Ries, 2011). Ries (2011) proposes three stages to launch lean as a start-up:

1. *The problem / solution-phase*, where the entrepreneur should ask himself whether he has found a problem that is worth solving and identify early potential users to test this problem.
2. *The solution / market phase*, where the entrepreneur should focus on how to quickly and cost efficient introduce a MVP on the market, so he can learn about his audience.
3. *The scale-phase*, which initiates when the entrepreneur has validated its innovation and can focus on growing his business as quickly as possible.

Although the Lean Start-up method got world-wide attention as a philosophy for entrepreneurs, it is mainly based on personal experiences of the author and empirical evidence lacks. Recent effort has been made by Patz (2013) to link academic concepts to the Lean Start-up method. The findings indicate that being *lean* as a start-up has many similarities with having a learning orientation, aimed at being adaptive to the market. Validating the Lean start-up method with academic concepts is still undeveloped and little efforts are made by researchers to expand knowledge on this topic.

Conclusion

Although the benefit of being market or selling oriented has been indicated by researchers and recognized by owners of small and start-ups firms, literature on the topic is still undeveloped. Studies agree on the benefit of focusing on learning from the customer via sales and thus integrating sales in the NPD process, which is seen as a crucial aspect of a successful small firm or start-up. By acquiring minimal resources and thereby launching lean, the start-up has the ability to adapt swiftly to the feedback of the customer gained via sales activities. Literature on this subject is however still in a stage of exploration and mainly based on personal experience of the authors with few attempts to validate this process with academic concepts (Patz, 2013).

3 Model and hypotheses

This chapter builds upon the introduction and the literature background and bundles findings into an integrative model for empirical research. Besides the argumentation for the proposed model, this chapter will provide the hypotheses.

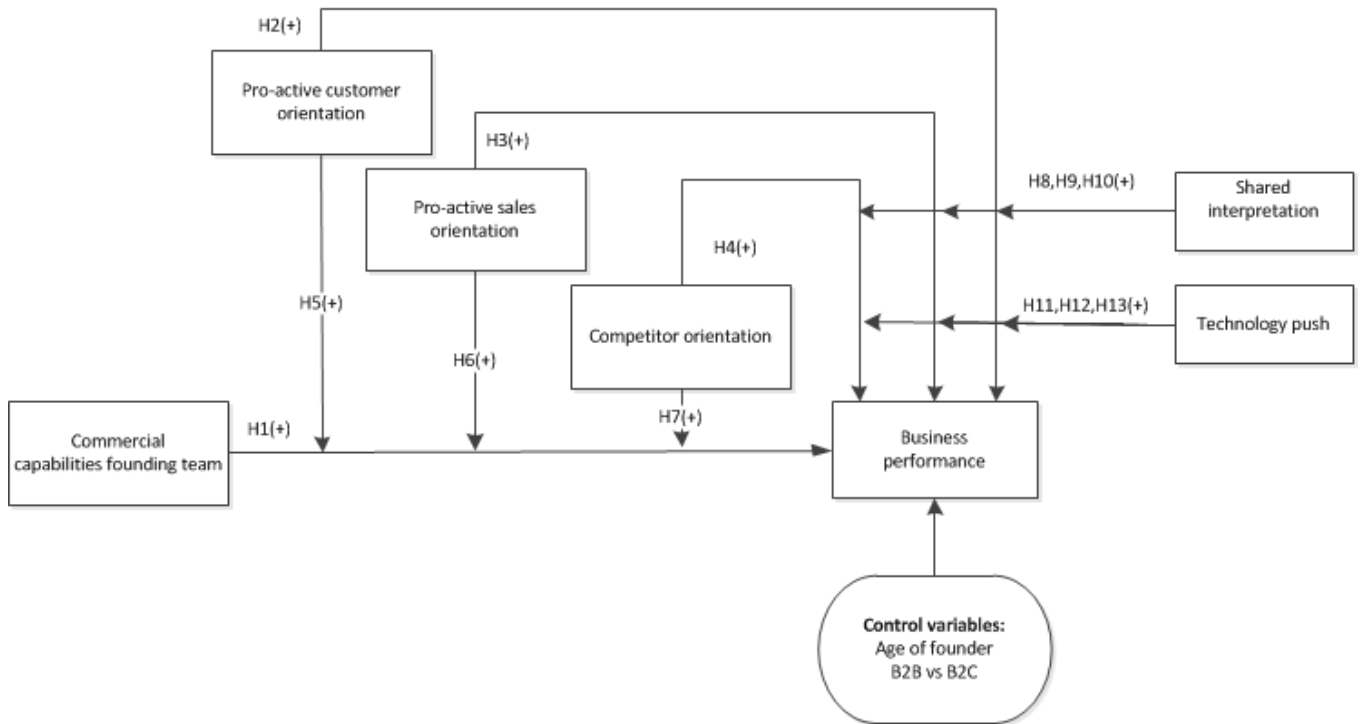


Figure 3 Conceptual model

Model

We have developed a model (see Figure 3) in which we combine the two literature streams described in the previous section. The first stream of articles regarding commercial capabilities in small and start-up firms is represented in the bottom half of the model. The articles concerning an MO/SO & customer development is shown in the upper half of the model in which the components of an MO/SO are included separately. To combine these two streams we build on Morgan et al. (2009) who have also studied the interaction between commercial capabilities and MO/SO in general. We on the other hand focus on the start-up context discussed in the previous section and distinguish between marketing and sales capabilities, but also shared interpretation by the founding team. This is explained in detail, next.

We propose that a firm benefits most from an MO or SO when combined with commercial capabilities of the founding team. According to the RBT, an MO or SO can be seen as a unique knowledge asset that creates a competitive advantage. Commercial capabilities are viewed in the

literature as important mechanisms by which valuable market knowledge can be deployed in firms to generate business performance (Day, 1994). This makes them especially complementary with market-based knowledge resources, such as MO and SO. An MO or SO thus requires complementary organizational capabilities if their value to the firm is to be fully realized.

This study chooses to combine marketing and sales capabilities into commercial capabilities. Start-ups often lack formal departments and distinctive business functions. In these firms, marketing and sales activities have a large overlap and particularly the marketing and sales capabilities of the founders are hard to distinguish. Therefore, we label in line with Pitkänen et al. (2012) both these capabilities of the founding team with the same term: commercial capabilities.

The model takes the components of an MO and SO into account separately, arguing in line with De Luca et al. (2010). They investigate the different components of an MO in high-tech context and reveal a significantly different influence of the three components on the R&D effectiveness of an organization. The components of an MO include a customer, competitor orientation, based on Narver and Slater (1990). Analysing these components separately is expected to yield different relationships between the customer and competitor components on the business performance, in line with Ledwith and O'Dwyer (2009). Apparently, measuring an MO or SO as one concept is not sufficient to understand the role of the competitor and customer in start-ups and small firms. We therefore take the following components into account separately: a customer orientation, a competitor orientation and a sales orientation.

We propose in line with De Luca et al. (2010) that the founding team should jointly develop a shared interpretation of the market information in order to benefit business performance. Multiple studies look at an MO from a contingency view and argue that the benefit of an MO depends on the characteristics of an organization, e.g. the way information is processed within the firm (Atuahene-Gima et al., 2005; Kahn, 2001).

Figure 3 also shows that we expect that the more technology driven a start-up is, the higher the benefit of an MO or SO on the business performance. When developing innovations driven by technology instead of market demands, start-ups should be even more aware of the market to adapt this technology to the needs of the customer. We therefore argue that being market and sales oriented benefits a successful market implementation even more in highly technology driven start-ups.

Regarding the dependent variable, business performance, literature makes a distinction between the overall business performance and the innovation performance of an organization. However, in

the context of the present study, the firms investigated are new technology ventures that are typically involved in a single product or service and therefore the performance definitions mentioned are interchangeable. The young technology ventures focus on a single product and service and therefore measuring the amount of products or services introduced on the market does not reflect the new venture's ability to innovate. Therefore, business performance is defined as both *financial performance* and *market performance* of the start-ups in this research.

Hypotheses

In line with the RBT, we state that commercial capabilities can be seen as a unique resource of a start-up that delivers a competitive advantage. These commercial capabilities, comprising of sales and marketing capabilities, mainly involve the founders of the start-up and are defined as *"commercial skills and knowledge of the founders that distinguish them from the founders of other small firms"* (Pitkänen, 2012). With these capabilities, founders are able to recognize valuable market information and transform this information into an innovation that delivers customer value. Especially in start-ups, who are generally commercially undeveloped, commercial capabilities of the founder can distinguish them from other founders by reacting to market trends and develop innovations in line with those trends. Moreover, commercial capabilities are needed to identify and collaborate with reference customers. When the founder is capable of recognizing the needs of the customer during meetings, it creates the ability to deal with the uncertain market of the firm. Hence, creating innovations fit for the market will increase the business performance. We therefore posit:

H1: Founder's commercial capabilities positively affect the firm's business performance.

With informal and undeveloped marketing activities, small and start-up firms benefit highly from acquiring market information from their customers. These firms should therefore adopt an orientation towards the customer. More explicitly for start-ups addressing needs unknown to the customer, a pro-active customer orientation is needed, which is defined as *"a provider's capability to continuously probe customers' latent needs and uncover future needs, possibly offering ideas even before customers realize they had such a need"* (Blocker et al., 2011). In general, marketing and sales in start-ups is underdeveloped, marketing activities are unplanned and unstructured and a marketing department is often absent. Customer meetings therefore deliver vital market information and contribute to a better market understanding (Blankson and Cheng, 2005; Blankson et al., 2006). Especially having a reference customer is crucial for start-up survival and success. Using a reference customer provides early feedback on the innovation and such a customer is able to refer the start-up to other players on the market (Popovic and Fahrni, 2004; Ruokolainen, 2005). Technology start-ups often address latent and future needs of the customer, which are hard to

express. Being oriented towards the customer does not mean focusing solely on current markets. The organization should therefore adopt a pro-active attitude focused on asking 'why' instead of 'what' a customer needs. A pro-active customer orientation is therefore expected to benefit the business performance. Therefore, we posit:

H2: A pro-active customer orientation is positively linked to the firm's business performance.

With undeveloped knowledge on customer relationship building, start-ups should focus on their sales activities to involve and develop customers. The organization should therefore create an organization-wide SO. In case of technology start-ups, latent and future needs are addressed and this requires looking further than the expressed needs, which demands a pro-active SO. A pro-active SO reflects *"the founder's desire to change the status quo and by actively initiating new selling approaches and methods, like experimenting with selling tactics, developing solid sales arguments, and scanning and identifying sales opportunities in order to sell the products"* (Pitkänen et al., 2012). In small and start-up firms, sales activities can deliver multiple advantages. With the problem of lacking knowledge on how to approach the customer, selling provides the solution by delivering the first interaction with the customer. Furthermore, when the start-up is able to learn from the feedback of the customer in early sales meetings, the innovation can be adapted to that feedback in order to achieve a product-market fit. When sales is involved early on in the development of start-up, the firm is still able to adapt itself to the market with minimal resources. To benefit from these sales activities, a start-up should implement a sales culture aimed at identifying sales opportunities and learning from the customer. This requires an open and proactive attitude since (potential) customer have trouble articulating their needs in these sales meetings. We therefore posit:

H3: A pro-active sales orientation is positively linked to the firm's business performance.

Although often neglected due to the over dependence on the customer of small and start-up firms, an orientation towards the competition is vital for the performance of a new venture (Ledwith and O'Dwyer, 2009). A competitor orientation can be defined as *"the way an organization understands the short-term strengths and weaknesses and long-term capabilities and strategies of both the key current and the key potential competitors"* (Narver and Slater, 1990). By investigating the competitor and the technological developments of the competitor, start-ups are able to determine the strategy of the competitor. Instead of focusing on the needs of the customer, following the direction of the technology of the competitive players on the market is a way to deal with the dynamic market as a start-up. This also explains why it is not uncommon in technology firms that their marketing activities are done by the engineers, instead of the marketing department, who possess the

knowledge and skills to analyze the technology of the competitor (Workman Jr, 1993). In line with the findings of Ledwith and Dwyer (2009), we argue that a competitor orientation is crucial for the business performance of start-ups. Therefore, a competitor orientation is expected to influence the business performance in a positive direction. Hence, we hypothesize that:

H4: A competitor orientation is positively linked to the firm's business performance.

We argue that commercial capabilities complement an MO or SO in a start-up. Commercial capabilities of the founder are needed to recognize valuable market information and transform this information into customer value. The RBT indicates that it is crucial for an organization to combine the 'know-what' knowledge resources and its complementary 'know-how' deployment capabilities (Morgan et al., 2009). This 'know-how' market and sales knowledge is generated by an MO and SO. In this study, the separate components of these orientations are taken into account, which are: a (pro-active) customer orientation, a competitor orientation and a (pro-active) SO. Complementary capabilities are thus needed to deploy these orientations to an advantage and the interaction between these capabilities and orientations is expected to benefit the business performance. This leads to the hypotheses below:

H5: The interaction between a firm's pro-active customer orientation and founders' commercial capabilities is positively associated with the firm's business performance.

H6: The interaction between a firm's pro-active sales orientation and founders' commercial capabilities is positively associated with the firm's business performance.

H7: The interaction between a firm's competitor orientation and founders' commercial capabilities is positively associated with the firm's business performance.

As mentioned prior in this section, a shared interpretation by the founding team of the market information is expected to determine how much an MO or SO affects the business performance. Sharing market information within the founding team and interpreting this information jointly is needed to incorporate the market needs into the innovation of the start-up. Narver and Slater (1990) include the dimension 'interfunctional coordination' in their definition of an MO. This dimension reflects whether the goals of all the business functions are aligned. This stresses the importance of an organization-wide aspect of an MO. In start-ups, organizational structures are often undeveloped and business functions have a significant overlap in tasks. This study therefore chooses not to include this component as such. Rather, we argue that this coordination should be present within the founding team and involves creating a shared interpretation by that team. Since a shared interpretation involves processing and translating market and sales information, we propose

that a shared interpretation moderates the relationship between an MO and SO and the business performance. We therefore posit:

H8: A shared interpretation by the founding team positively moderates the relationship between pro-active customer orientation and the firm's business performance.

H9: A shared interpretation by the founding team positively moderates the relationship between a pro-active sales orientation and the firm's business performance.

H10: A shared interpretation by the founding team positively moderates the relationship between a competitor orientation and the firm's business performance.

We argue that the level of technology push positively moderates the benefit of the components of an MO and SO on the business performance. Being technology driven demands a better focus on the customer, competitor and the sales activities in order to adapt the innovation to the needs of the market. Compared to start-ups driven by the market, technology driven start-ups have more difficulty finding an application on the market since these technologies are initiated by firm resources' and competences instead of market demands. Therefore, finding the right market application for such a technology is an iterative process which requires listening to needs of the customer, focusing on selling and identifying the direction of the competitor. This leads to the following hypotheses:

H11: The level of technology push positively moderates the relationship between pro-active customer orientation and the firm's business performance.

H12: The level of technology push positively moderates the relationship between a pro-active sales orientation and the firm's business performance.

H13: The level of technology push positively moderates the relationship between a competitor orientation and the firm's business performance.

4 Research methodology

In this section, the data collection and measurement of the research is described.

4.1 Data collection

The model was tested with a sample of 68 Dutch spinoffs and spinouts involved in technology based innovations.

To test the model, data of Witte (2012) was extended by collecting extra data from 33 start-ups or spinoffs involved in technology based innovations in the Netherlands. Contact data of the entrepreneurs was gathered from websites of several Dutch independent and university based incubators. In addition, an online search on Google on relevant keywords, such as “*Dutch technology start-up*”, was done. For inclusion, the firm had to 1) be based in the Netherlands, 2) be involved in a medium-tech or high-tech product or service, 3) be founded in the past five years, 4) be a start-up or spinoff 5) generate revenue.

A member of the founding team of the collected start-ups and spin-offs were notified by e-mail and followed-up by phone. A phone survey was chosen since it provides a higher response rate, gives the opportunity to clarify the questions to the participant and is more anonymous than personal interviews. 111 start-ups and spin-offs were contacted by phone and yielded 33 completed questionnaires (29.7% response rate). Measurement of the constructs was done in line with the constructs of Witte (2012) and at least 80% of the constructs were measured identically. A pre-test of the constructs was therefore not necessary.

After data collection, both datasets were compared and the outcome of the comparison justified combining the datasets. This generated the final dataset of the study, comprising of 68 technology start-ups and spin-offs.

4.2 Measurement

All the latent constructs in the conceptual model were measured using multi-item scales based on contemporary literature. Respondents were asked to indicate their (dis)agreement with a set of statements using a five-point Likert scale which ranged from completely disagree to completely agree, with exception of the construct business performance. For this construct, the respondents were asked to indicate the level of objectives achieved on a set of performance objectives which ranged from much lower than objectives to much higher than objectives. The measurement of sales capabilities as well as marketing capabilities were deducted from Pitkänen et al. (2012), which were based on prior research of Song et al. (2007). Pro-active customer orientation was adapted from Blocker et al. (2011) and Narver et al. (2004). The competitor orientation construct was based on

Narver and Slater (1990). Shared interpretation was deduced from Hult et al., 2005. The measurement of pro-active SO was done according to van der Borgh et al. (2010). Finally, a subjective business performance measure was adapted from Moorman (1995), with addition of items generated in open interviews of Witte (2012). The measurement of level of technology push of Witte (2012) has been extended with two additional items in order to increase reliability of the construct. Finally, in addition to measuring the latent constructs the survey was extended with several general questions in order to characterize the sample and used as control variables.

4.3 Sample characteristics

All respondents were part of the team when the start-up was founded. The function within the start-up is mainly CEO or CTO. Of those respondents, 60% had previous entrepreneurial experience. The average age of the respondent was 39 years. The larger part (88%) of the start-ups were supported by an incubator. This is due to the fact that the majority of the start-ups were found through the websites of Dutch incubators. Figure 4 shows that 41% of the start-ups deliver a product and 10% deliver a service. Almost half (49%) of the start-ups were involved in both a product and a service. The market the start-ups serve is mostly B2B (85%), as illustrated in Figure 5. This type of market and innovation is characteristic for the technology driven mind-set of the start-ups.

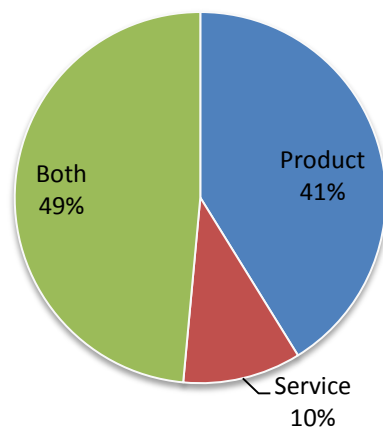


Figure 4 Product or Service

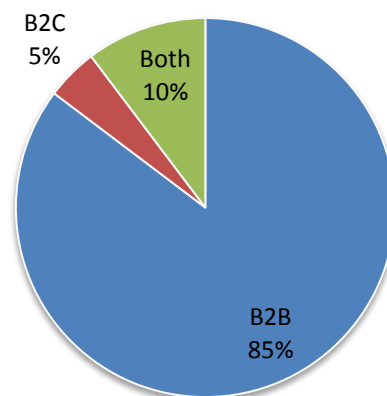


Figure 5 Market type

4.4 Data analysis

A Partial Least Squares (PLS) approach to structural equation modelling (SEM) was used to analyse the data. We followed Chin's (1998) recommendation to use bootstrapping (with 500 runs) as the resampling procedure. SmartPLS 2.0 software was used to run the analyses.

There are two popular approaches for SEM: covariance based SEM (CBSEM) and PLS is more appropriate for small sample sizes in contrast to CBSEM that requires hundred or more observations (Henseler et al., 2009). PLS has been performed with sample sizes as low as 50 or even less observations (Haenlein and Kaplan, 2004). PLS is furthermore non-parametric in nature and does not require the data to be normally distributed.

4.5 Measure reliability and validity

To assess reliability, item reliability and internal consistency reliability is examined. For the assessment of validity, the convergent validity and the discriminant validity is assessed.

4.5.1 Internal consistency reliability

The traditional criterion for internal consistency is Cronbach's alpha, which provides an estimate for the reliability based on the indicator intercorrelations. However, PLS assumes that all indicators are equally reliable, PLS prioritizes indicators according to their reliability, resulting in a more reliable composite (Hulland, 1999). As Cronbach's alpha tends to provide a severe underestimation of the internal consistency reliability of latent variables in PLS path models, it is more appropriate to apply a different measure, the composite reliability (Henseler et al., 2009). The composite reliability takes into account that indicators have different loadings. An internal consistency reliability value above 0.7 in early stages of research and values above 0.8 or 0.9 in more advanced stages of research are regarded as satisfactory (Nunnally and Bernstein, 1991), whereas a value below 0.6 indicates a lack of reliability. Table 1 shows that the Cronbach's alpha of the construct 'pro-active customer orientation' is below 0.6. The composite reliability, which is more appropriate for PLS path models, is however above the value 0.7 indicating a sufficient internal consistency reliability.

4.5.2 Item reliability

The item reliability assesses the internal consistency of the items in the measures. In PLS, the item reliability can be measured by the factor loadings. Table 2 shows the measured items with their factor loadings. Studies state that 50% of the variance of the indicator is due to the construct. Therefore, outer loadings should be above 0.7. However, in PLS one should be careful whether an indicator should be eliminated. Only if an indicator's reliability is low and eliminating this indicator goes along with a substantial increase of composite reliability, it makes sense to discard this indicator (Henseler et al., 2009).

With the above in mind, this study maintains the threshold of 0.7 or higher for the outer loadings, with few exceptions to secure a sufficient level of internal consistency. This led to the deletion of the items: *BP4*, *BP5*, *MC3*, *SC3*, *CoO2*, *CuO1*, *CuO4*, *SO2*, *ShI2*.

4.5.3 Convergent validity

Convergent validity signifies that the indicators represents one and the same underlying construct. We examine the convergent validity, as proposed by Fornell and Larcker (1981), with the average variance extracted (AVE). An AVE value of 0.5 or higher indicates that a latent variable is able to explain more than half of the variance of its indicators on average. Table 1 shows that all AVE values are practically above the 0.5 threshold.

4.5.4 Discriminant validity

The discriminant validity measures whether a given construct differ from measures of other constructs in the same model. We measure the discriminant validity with the use of the Fornell-Larcker criterion and the cross-loadings of the items. First, Fornell and Larcker (1981) propose that a latent variable should share more variance with its assigned indicators than with any other latent variable. In statistical terms, the AVE of each latent variable should be greater than the latent variable's highest squared correlation with any other latent variable. Table 1 shows the square root AVE values and the correlations between the latent variables. It can be seen that the correlations do not exceed the square root AVE values and thus the discriminant validity is secured according to the Fornell-Larcker criterion.

Next, cross-loadings of the items are checked (see Table 6, Appendix A). The loadings of each indicator should not be higher than any of its cross-loadings. Table 6 shows that this is not the case. Furthermore, according to Hair (2009), cross-loadings should not exceed 0.6. The results of Table 6 show that no items exceed that value and therefore no items are deleted based on this criterion.

Table 1 Descriptives, reliability, validity and construct interrelations

| Variables | Mean | (S.D) | Cronbrach's alpha | Composite reliability | AVE | Square root AVE | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | X9 |
|------------------------------------|-------|--------|-------------------|-----------------------|------|-----------------|-------|-------|------|-------|------|-------|------|------|----|
| X1 Age | 39.72 | (9.27) | N/A | N/A | N/A | N/A | | | | | | | | | |
| X2 B2B | 0.85 | (0.36) | N/A | N/A | N/A | N/A | 0.20 | | | | | | | | |
| X3 Business performance | 2.93 | (0.92) | 0.852 | 0.911 | 0.77 | 0.88 | -0.05 | -0.03 | | | | | | | |
| X4 Commercial capabilities | 3.16 | (1.30) | 0.877 | 0.914 | 0.73 | 0.85 | 0.33 | -0.08 | 0.27 | | | | | | |
| X5 Competitor orientation | 3.42 | (0,89) | 0.654 | 0.806 | 0.58 | 0.76 | 0.03 | 0.08 | 0.47 | 0.26 | | | | | |
| X6 Pro-active customer orientation | 4.09 | (0.65) | 0.521 | 0.736 | 0.49 | 0.70 | 0.04 | 0.16 | 0.18 | 0.09 | 0.27 | | | | |
| X7 Pro-active sales orientation | 3.59 | (1.03) | 0.813 | 0.888 | 0.72 | 0.85 | 0.08 | 0.02 | 0.15 | 0.32 | 0.25 | 0.28 | | | |
| X8 Shared Interpretation | 4.03 | (0,73) | 0.662 | 0.802 | 0.59 | 0.77 | 0.18 | 0.05 | 0.17 | 0.23 | 0.35 | 0.47 | 0.32 | | |
| X9 Tech push | 3.9 | (1.01) | 0.619 | N/A | N/A | N/A | -0.08 | -0.06 | 0.27 | -0.03 | 0.18 | -0.14 | 0.05 | 0.05 | |

Table 2 Constructs, items and survey questions

| Construct | Item | Survey questions | Factor loadings |
|--|-------------|--|------------------------|
| Business performance | | <i>How did the organization perform, relative to...</i> | |
| <i>Moorman (1995)</i> | BP1* | Return on investment objectives? | 0.727 |
| | BP2* | Sales and customer growth objectives? | 0.859 |
| | BP3* | Market share objectives? | 0.845 |
| | BP4 | Innovation reputation objectives? | 0.602 |
| | BP5 | Planned value creation objectives? | 0.605 |
| Commercial capabilities | | <i>In our organization, myself or one or more of my colleagues had...</i> | |
| <i>Pitkänen et al. (2012)</i> | MC1* | Work experience in advertising and promotion. | 0.785 |
| | MC2* | Experience in dividing the market into customer segments. | 0.802 |
| | MC3 | Academic studies in marketing. | 0.810 |
| | SC1* | Work experience in selling at the customer interface. | 0.724 |
| | SC2* | Experience in managing sales team/function. | 0.640 |
| | SC3 | Academic studies in selling. | 0.785 |
| Competitor orientation | | <i>In our organization, we...</i> | |
| <i>Narver and Slater (1990)</i> | CoO1* | Exactly knew who are competitors were. | 0.703 |
| | CoO2 | Monitored new developments of our competitors. | 0.707 |
| | CoO3* | Did not know what attracted customers to competitors. | 0.755 |
| | CoO4* | Knew if our competitors' customers were satisfied. | 0.771 |
| Pro-active customer orientation | | <i>In our organization, we...</i> | |
| <i>Blocker et al. (2011)</i> | CuO1 | Continuously tried to discover additional needs of our customers of which they were unaware. | 0.626 |
| <i>and Narver et al. (2004)</i> | CuO2* | Frequently brainstormed on how customers will use our technology. | 0.739 |
| | CuO3* | Incorporated solutions to unarticulated customer requirements. | 0.637 |
| | CuO4 | Identified key market trends to gain insights into what users require in the future. | 0.167 |
| | CuO5* | Looked for clues beyond the requirements expressed by customers to identify their requirement drivers. | 0.647 |

| | | | |
|-------------------------------------|-------|---|--------|
| Pro-active sales orientation | | <i>In our organization we put in a lot of time and energy into...</i> | |
| <i>van der Borgh et al. (2010)</i> | SO1* | Actual sales work of products/services to the potential customers. | 0.847 |
| | SO2 | The development of sales arguments for the product/service. | 0.631 |
| | SO3* | Experimenting with selling tactics with the potential customers. | 0.833 |
| | SO4* | Creating and identifying sales opportunities in the market. | 0.866 |
| Shared Interpretation | | <i>In our organization, we...</i> | |
| <i>Hult et al., 2005</i> | Sh1* | Jointly developed a shared understanding of the available market information. | 0.562 |
| | Sh12 | Formally met to discuss information regarding markets, customers and competitors. | 0.442 |
| | Sh13* | Jointly developed a shared understanding of the implications of market developments. | 0.894 |
| | Sh14* | Frequently met informally and discussed information regarding markets, customers and competitors. | 0.823 |
| Technology push | TP1* | Technological possibilities provided the driving force for the development of the project | 0.951 |
| | TP2* | Our product was driven by new technology opportunities. | 0.649 |
| | TP3 | Our product-technology combination was really new for the market. | -0.060 |

* Included in SEM analysis based on factor loading and composite reliability

4.1.1 'Technology push' construct

The 'technology push' construct was originally measured with one item by Witte (2012). The important role of the level of technology push demanded a better measurement and the construct is therefore extended with two extra survey questions (see Table 3).

Table 3 Items 'technology push'

| Items | Survey questions |
|-------|---|
| TP1 | Technological possibilities provided the driving force for the development of the project |
| TP2* | Our product was driven by new technology opportunities. |
| TP3* | Our product-technology combination was really new for the market. |

Notes: * Newly added items

A Confirmatory Factor Analysis with Varimax rotation and a reliability analysis is executed in IBM SPSS statistics 20 in order to test whether the items related to one construct. The results of the CFA identified two components, shown in Table 4 with their item correlations.

Table 4 Rotated Component Matrix

| | Component 1 | Component 2 |
|-----|-------------|-------------|
| TP1 | .951 | -.066 |
| TP2 | .649 | .639 |
| TP3 | -.060 | .953 |

Table 4 shows that the 'technology push' construct can be extended with the item TP2, maintaining a threshold of 0.6 or higher. Although TP3 does meet the criterion regarding component 2, it does not with relate to the originally measured item TP1. Therefore, TP3 is excluded. A reliability analysis of the items TP1 and TP2 resulted into an acceptable level of Cronbach's Alpha (0.619). Finally, an average of the items TP1 and TP2 is calculated and added to the original data of Witte (2012).

5 Results

With the use of structural equation modelling (SEM), four models test the hypotheses. Assessing multiple models avoids distorting results due to the many interactions present.

To assess Hypotheses 1, 2, 3 and 4, a main effects model is estimated (Model 1) with direct paths to business performance. To test Hypotheses 5, 6 and 7 we estimated Model 2, which includes all the interaction effects between commercial capabilities and orientations on the business performance. Model 3 shows the interactional effects of Hypotheses 8, 9 and 10 with technology push as a moderator on the relation between the commercial orientations and the business performance. To assess Hypotheses 11, 12 and 13 the moderating effect of a shared interpretation on the relationship between the commercial orientations and the business performance is included in Model 4. The results of the SEM analyses are presented in Table 5.

In support of H1, a significant direct positive effect of founder's commercial capabilities on the business performance can be seen in all the estimated models. A pro-active customer orientation on the business performance does not directly affect the business performance on a significant level in any of the models, lacking support for H2. Support is found for H3, linking a competitor orientation directly to the business performance on a significant level in all models. A pro-active SO does not influence the business performance significantly in any of the models, thereby rejecting H4.

In Model 2, the interaction of commercial capabilities and pro-active customer orientation is linked to business performance significantly in a negative direction, not supporting H5. No interactional effect of commercial capabilities and pro-active SO on the business performance can be seen, lacking support for H6. However, the effect of commercial capabilities and competitor orientation is significantly positive, confirming H7.

The results of Model 3 show a significant negative moderating effect of shared interpretation on the relationship between pro-active customer orientation and the business performance. The effect of a pro-active SO on the business performance is negatively affected by a shared interpretation as well. It can be seen that both path coefficients are in the opposite of the hypothesized direction. Thus no support of H8 and H9 can be found. No significant moderating effect can be found of a shared interpretation on the relationship between a competitor orientation on the business performance, rejecting H10.

Table 5 Overview results SEM models

| | | Model 1 | R2=0.31 | Model 2 | R2= 0.43 | Model 3 | R2 = 0.47 | Model 4 | R2 = 0.41 |
|--|------------------------|----------------|-------------|---|-------------|--|-------------|---|-------------|
| | | Main effects | | Interaction Capabilities & Orientations | | Interaction Orientations & Shared interpretation | | Interactions Orientations & Technology push | |
| Paths modelled | | Coefficient | t-value | Coefficient | t-value | Coefficient | t-value | Coefficient | t-value |
| Commercial capabilities | → Business performance | 0.22** | 2.04 | 0.23** | 2.14 | 0.16* | 1.65 | 0.19* | 1.76 |
| Pro-active customer orientation | → Business performance | 0.14 | 1.13 | 0.07 | 0.69 | 0.11 | 1.02 | 0.14 | 1.11 |
| Competitor orientation | → Business performance | 0.37*** | 3.10 | 0.35*** | 2.83 | 0.34*** | 2.71 | 0.38** | 2.56 |
| Pro-active sales orientation | → Business performance | -0.03 | 0.38 | -0.07 | 0.29 | 0.03 | 0.35 | -0.08 | 0.60 |
| Shared Interpretation | → Business performance | -0.06 | 0.68 | 0.05 | 0.54 | -0.02 | 0.14 | 0.02 | 0.18 |
| Technology push | → Business performance | 0.22** | 2.03 | 0.15 | 1.45 | 0.20* | 1.91 | 0.13 | 1.28 |
| B2B | → Business performance | -0.02 | 0.27 | 0.02 | 0.27 | 0.04 | 0.27 | 0.01 | 0.02 |
| Age of founder | → Business performance | -0.10 | 1.09 | -0.09 | 1.03 | -0.07 | 0.83 | -0.01 | 1.09 |
| Commercial capabilities X Pro-active customer orientation | → Business performance | | | -0.31*** | 2.75 | | | | |
| Commercial capabilities X Competitor orientation | → Business performance | | | 0.23** | 2.00 | | | | |
| Commercial capabilities X Pro-active sales orientation | → Business performance | | | 0.11 | 0.97 | | | | |
| Pro-active customer orientation X Shared interpretation | → Business performance | | | | | -0.23* | 1.93 | | |
| Competitor orientation X Shared interpretation | → Business performance | | | | | 0.17 | 1.24 | | |
| Pro-active sales orientation X Shared interpretation | → Business performance | | | | | -0.23* | 1.87 | | |

| | | | | |
|--|---|----------------------|--------|-------------|
| Pro-active customer orientation X Technology push | → | Business performance | 0.15 | 1.28 |
| Competitor orientation X Technology push | → | Business performance | 0.26** | 2.15 |
| Pro-active sales orientation X Technology push | → | Business performance | -0.05 | 0.51 |

Notes: significance levels ***p<0.01, **p<0.05, *p<0.10

Although in the hypothesized direction, a technology push does not significantly moderate the relationship between pro-active customer orientation and the business performance in Model 4. No support can thus be found for H11. However, the effect of competitor orientation on business performance interacts with technology significantly with a positive path coefficient, providing support for H12. No significant influence is found of technology push on the relationship between a pro-active sales orientation on business performance, thereby rejecting H13. Looking at the direct effect of technology on the business performance, a significant effect can be seen in Model 1 and Model 3.

The relatively high R2 values, ranging from 0.31 to 0.47, indicate the importance of our main effect and interaction variables in explaining business performance. Moreover, including the interactions increases the overall model fit R2. The best overall model fit can be seen with Model 3. Among the control variables, no significant effect on the business performance can be found in any of the models.

To further interpret the results, the significant interaction coefficients are plotted and described.

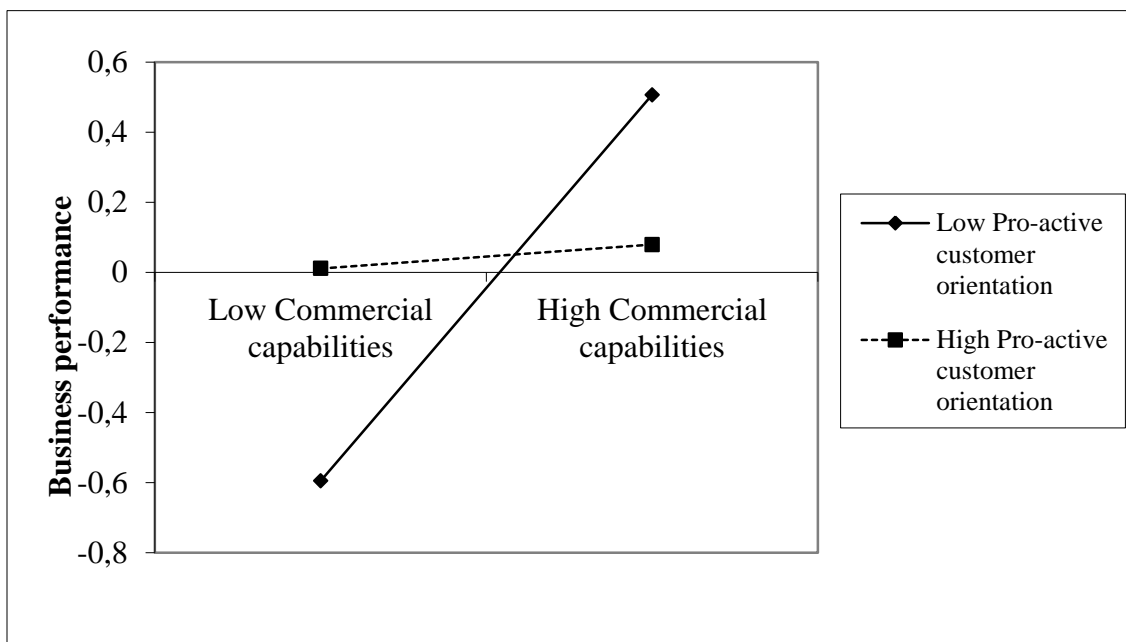


Figure 6 Commercial capabilities X Pro-active customer orientation

The negative interaction effect of Figure 6 demonstrates that commercial capabilities are more beneficial for a start-up's performance when the start-up has a low pro-active orientation on the customer. Moreover, the positive effect of commercial capabilities dissolves with a high pro-active customer orientation of the organization. It seems that especially in situations where little is known

about the customer, which is not uncommon for start-ups, commercial capabilities are needed to interpret that little amount of information and transform that information into a competitive advantage.

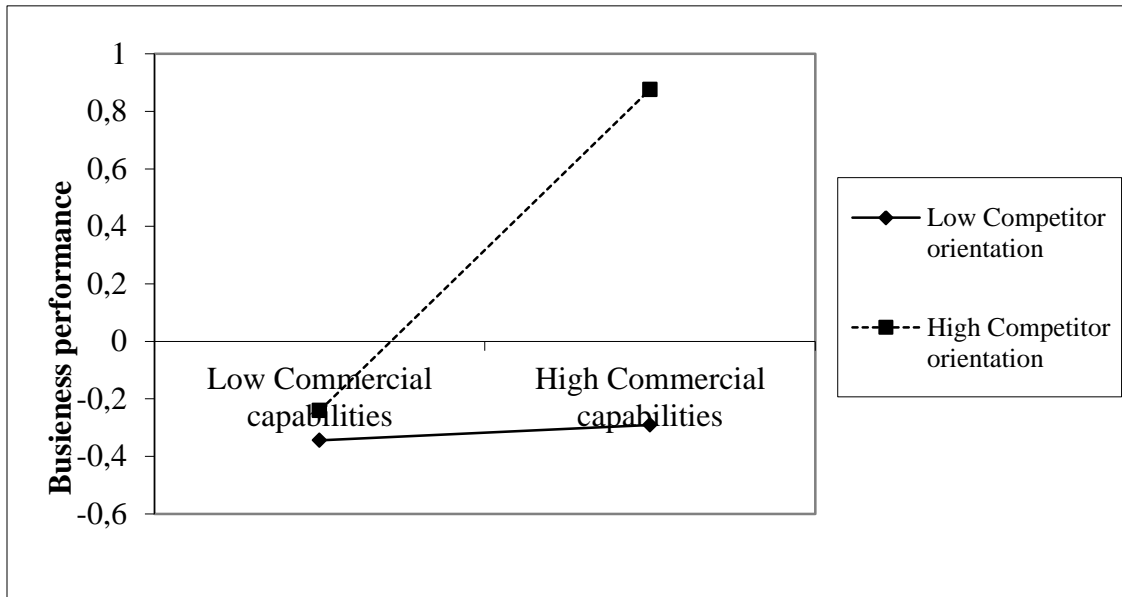


Figure 7 Commercial capabilities X competitor orientation

As can be seen in Figure 7, combining founder's commercial capabilities with a competitor orientation benefits the performance of the firm. The positive effect of possessing commercial capabilities is stronger when the organization is highly focused on the competitor. This is a complementary effect where two variables interact as complements and the marginal benefit of each variable increases as the level of the other variable increases. When a start-up is in possession of a high level of commercial capabilities, the information of the competitor can be transformed into a benefit on the performance of the firm. Apparently, the commercial capabilities are very much useful when interpreting the information of the competitor.

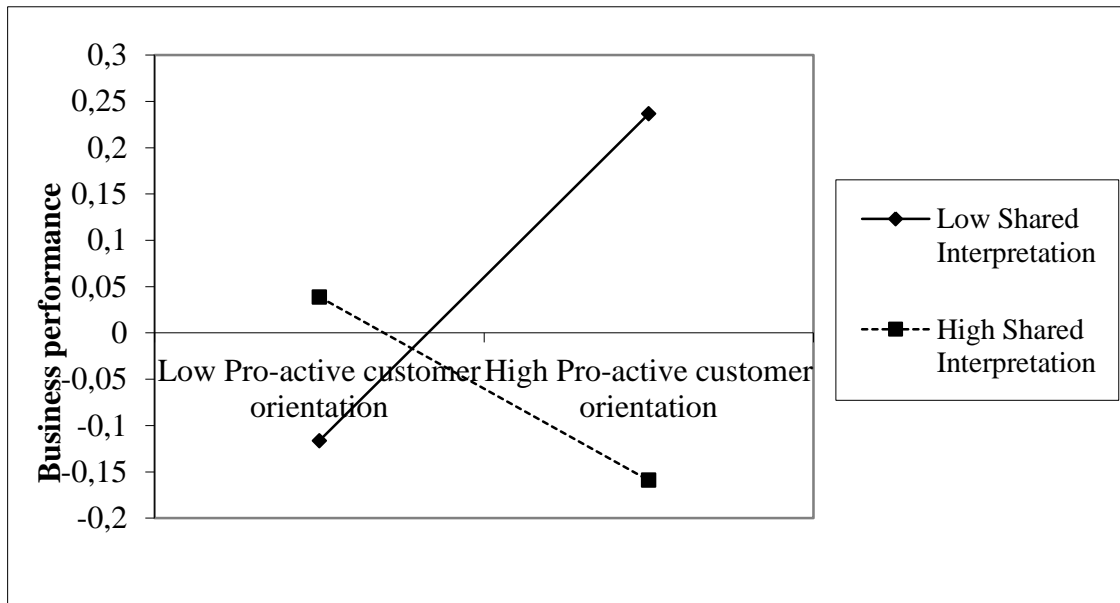


Figure 8 Pro-active customer orientation X Shared interpretation

The negative interaction effect in Figure 8 demonstrates that when a start-up has a high level of pro-active customer orientation, the information should not be jointly interpreted by the whole founding team. It seems that when a start-up is in the process of early customer involvement, meeting frequently does not benefit this process. What might happen, is that the more traditional marketing and sales persons will interrupt the process by trying to convince the team with their collected market information. On the other hand, with little involvement and interaction with the customer, the more traditional marketing and sales functions can support the start-up by delivering market information and providing information about the direction of the market.

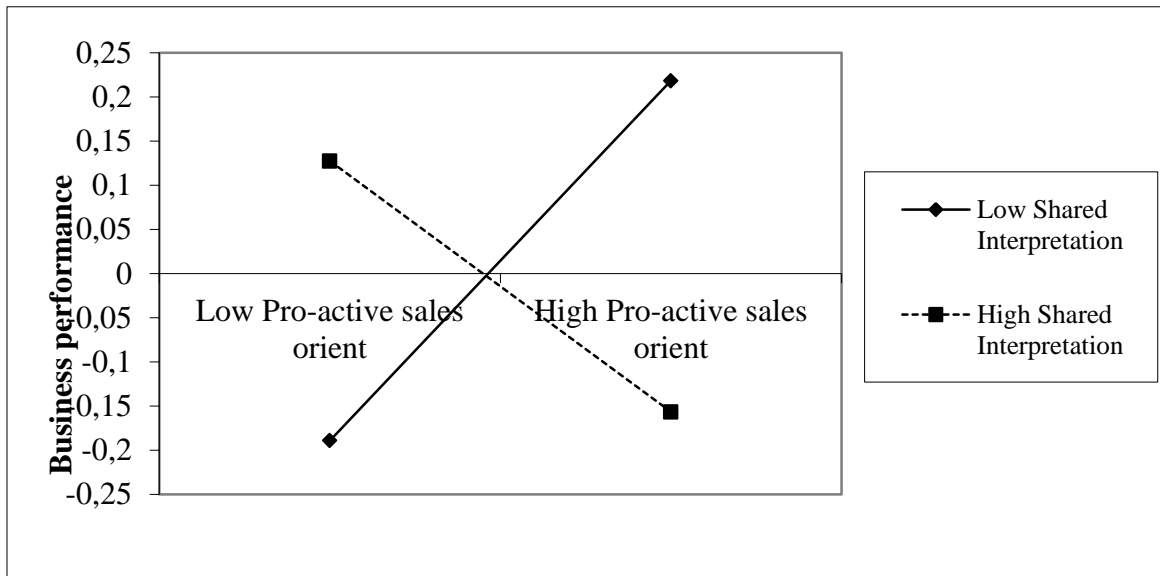


Figure 9 Pro-active sales orientation X Shared interpretation

In line with the prior section, Figure 9 shows a similar effect of a shared interpretation and pro-active SO. Meeting frequently and trying to interpret the information jointly seems to affect the customer involvement process. Only within an organization that has a low focus on their selling activities, discussing this information frequently can help to overcome the low availability of information.

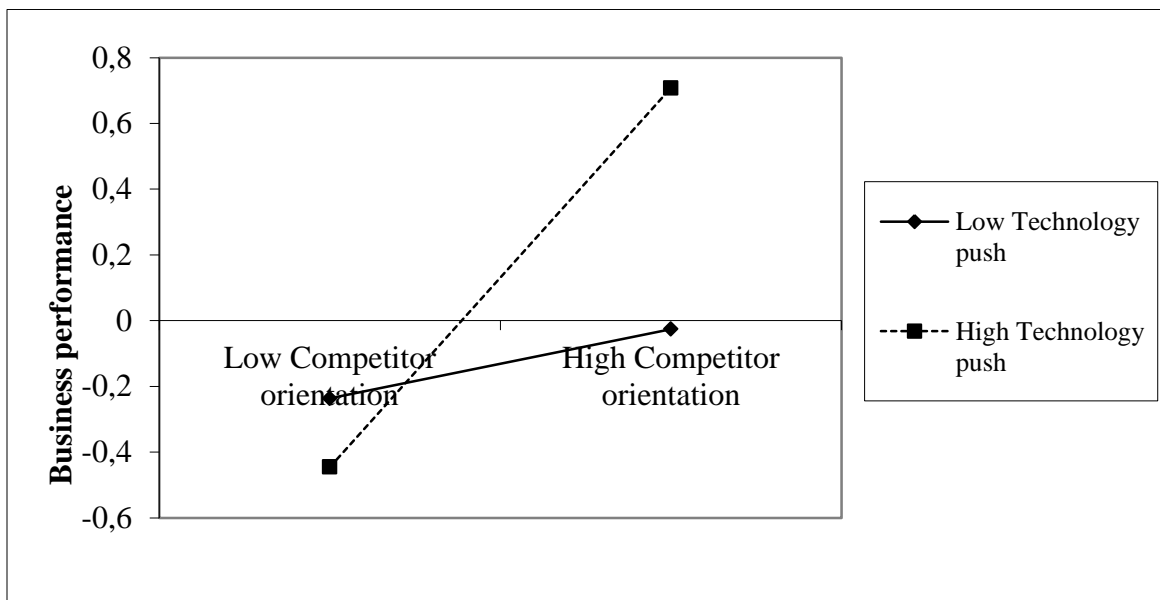


Figure 10 Competitor orientation X Technology push

Figure 10 shows that when an organization is driven by technology instead of market demands, having a high competitor orientation benefits the business performance significantly. This is a complementary

interaction where have a high level of technology push complements the effect of being focused on the competitor. These start-ups should try to identify why customers are drawn to their competitors and discover market trends by looking at the direction of the competitor. With no focus on the competitors, these start-ups can develop the wrong technology and fail on the market.

6 Discussion

This final chapter discusses the results and provides main conclusions. The first section elaborates on the theoretical contribution in the field of commercial capabilities of the founder. Next, the managerial implications are described which discusses how the results relate to the founder of a start-up founders and Holst Centre. Hereafter, the limitations of this research and directions for future research are described.

6.1 Discussion of results

The main purpose of this study was to investigate the influence of having commercial capabilities present within the members of the founding team on the business performance. Second, we asked how an MO or SO could influence the process of commercializing the innovations of the start-ups. We took two contingencies into account, namely whether the market information interpreted jointly by the founding team and how technology driven the start-ups is.

The results show that the presence of commercial capabilities in the founding team are crucial for the success of a start-up firm, consistent with prior studies (Merrilees et al., 2011; Pitkänen et al., 2012; Ripollés and Blesa, 2012; Santos-Vijande et al., 2012; Y. L. Zhao et al., 2012). When the founders have developed skills and knowledge with their work experience and educational background in marketing and sales, this can be used to recognize valuable market information and transform this information into customer value.

The positive influence of commercial capabilities on the performance of the start-up is dependent on the level of competitor and customer orientation. First, being commercially capable seems particularly important when little information about the customer is available and the start-up has little insights in the existing or latent needs of the customer. Having the capabilities to provide the start-up with guidelines regarding the market despite this lack of information can create a competitive advantage for a start-up. Second, when the start-up has a high focus on the competitor, the competitor information of the competitor needs to be interpreted with the use of the commercial capabilities of the founders and transformed into useable information.

No direct effects of having a customer orientation and SO could be found, in contrary to our hypotheses and findings of prior studies (Blankson and Cheng, 2005; Ruokolainen, 2005). It seems that predicting customer needs is a more difficult process for start-ups than assumed earlier by researchers. An explanation could be the false assumption of a predictable and an effectual marketing approach might

be more suitable for start-ups. As Sarasvathy (2001) states, the more traditional *causation* marketing takes a particular effect as given and focuses on means to create that effect and assumes that the environment can be totally controlled for. *Effectuation* does not claim to control the environment and takes a set of means as given and focuses on selecting between possible effects that can be created with that set of means. Four principles underlie entrepreneurial effectuation. When applied to start-ups, the entrepreneur should therefore aim at 1) affordable loss rather than expected returns, 2) strategic alliances rather than competitive analyses, 3) exploitation of contingencies rather than exploitation of pre-existing knowledge, 4) controlling an unpredictable future rather than predicting an uncertain one. It is empirically proven that the entrepreneurial mind-set is more effectuation based than the mind-set of managers in established firms (Read et al., 2009). Entrepreneurs are more likely to use analogical reasoning based on their own experience and more sceptical about the market data available. They tend to define their market approaches based on their own perception and experience on the market. Having an organization-wide orientation towards customer and the selling activities might therefore not deliver a benefit for the business performance of the start-ups.

The result show that start-ups should rather rely on the competitor for their information instead of their customer or sales activities. Being oriented towards the competitor shows a direct significant and positive effect on the business performance, in line with the findings of Ledwith and O'Dwyer (2009). They indicate that start-ups might become over dependent on their customer and lose the beneficial focus on the competitor. It seems that start-ups should mind the strategy of the competitor in order to determine the direction of the technology on the market, or certain technology paths. After a period of incremental innovations, disruptive technology will cause a change of the current technology paradigm after which a new paradigm arises and demands the companies to adapt. Analyzing these technology trajectories can identify opportunities for start-ups (Norhashim, 2007). These shifts in paradigms can cause a change in the required assets and competences of an organization. This results in losing value of accumulated assets of the organizations. When these assets cannot be used in the new technology paradigm, an established organization can lose its place on the market to new entrants (Tripsas, 1997). From a start-up's point of view, they are able to gain market share by developing technology which makes the assets and competences of the larger incumbent organizations redundant. This requires knowing your competitors and their technological developments. This might explain why it is not uncommon for technology driven firms to have their engineers highly involved in the strategic decision process (Workman Jr, 1993). Engineers are able to analyze the technology of competitor and thereby the strategy of the competitor which relates to the technology paths on the market. This is in line with

the results on the level of technology push of the start-ups which indicate that especially start-ups who are driven by technology benefit from a focus on the competitor. Especially these start-ups should mind the technology strategy of the competitor and adapt their innovations accordingly.

How the information is interpreted by the founding team has a significant influence on the benefit of a commercial orientation. The results reveal that when a start-up has a high focus on the customer and sales, they should not attempt to jointly interpret the generated information. Apparently, when a start-up is involved in the process of customer involvement, this process should not be interrupted with frequent meetings that can distort this process. What might happen, is that the more traditional marketing and sales functions interrupt the process by trying to convince the founding team with their own collected market information. It is however beneficial to meet frequently and create a shared interpretation when the start-up has a low focus on the customer and its selling activities. With little information available, traditional marketing and sales functions can support the start-up by delivering basic market information and thus provide some insights in the market. As Gupta and Govindarajan (1991) state, the level of uncertainty of a particular problem or situation determines the frequency of the communication between the members of the founding team.

6.2 Comparison present study and study of Witte (2012)

The present study extends the data and model of Witte (2012). Appendix C shows a comparison between both studies. It can be seen that both studies reason according to the RBT regarding the commercial capabilities of the founding team. Furthermore, an MO and SO is included in the theoretical basis. The present study however does pay more attention on the process of involving and developing customers as a start-up and the sales learning aspect along with a lean launch. Another important difference is the larger sample size of the present study as a result of extending the dataset of Witte (2012). The present study has furthermore included the level of technology push in the core variables whereas the study of Witte (2012) only includes this variable as control variable. Also taken account the core variables of the present study are the separate components of an MO and SO. The results of the data analysis of the present study show that analysing these components separately is crucial, indicated by the multiple significant interaction effects in the results section.

6.3 Managerial implications

The results of this study has implications for start-ups and for Holst Centre who aims to successfully commercialize their technology via new ventures.

The results indicate the importance for start-ups to possess commercial capabilities in the founding team at the starting phase. They should therefore either attract human resources who possess these commercial capabilities when initiating the venture or develop these commercial capabilities within the existing team members. Important is that these commercial team members should be highly involved with and affiliated to the technology of the start-up. With a shift towards learning via sales activities, traditional sales and marketing skills and knowledge is not sufficient and should be accompanied by an understanding of technology. Outsourcing marketing and sales activities is therefore not the solution, since these marketing and sales representatives cannot identify themselves with the innovation.

Start-ups should furthermore be aware that the benefit commercial capabilities is strongly related to whether they create an organization-wide commercial culture, orientation. Particularly creating a culture focused on the competitor facilitates successful commercialization. This is especially important for start-up where technology provided the reason to start the venture. Not only should they mind their organizational culture, but as well take their frequency of meetings into account. Meeting very frequently and creating a shared understanding within the founding team is not always beneficial. Only when the start-up has minor details regarding their customer and sales, the team should regularly meet to determine the direction of the organization.

Implications for Holst Centre

Holst Centre should carefully compose the teams who will be involved in the early stage of the spin-off companies. Besides technology experts, they should be aware that such a team possess relevant marketing and sales skills and knowledge as well. They could do this by offering courses aimed at integrating sales and marketing in the NPD process or attract commercially capable employees with sufficient affiliation with the technology. Holst Centre should furthermore create an understanding of who the competitors of the spin-off company are and discover the technology trajectories of the market by analysing these competitors. Being aware of these technology trajectories as Holst Centre prevents developing technology not aligned with the market and thus direct R&D efforts and expenses into the right direction.

6.4 Limitations & directions for future research

Every study has its limitations and this thesis is no exception. We will list these limitations in this section and provide opportunities for future research.

First, causality cannot be predicted due to the lack of longitudinal data which is a common problem in small business and entrepreneurship studies. The fatality rate of small and start-up firms is relatively high which makes it hard to investigate the same organizations on different moments in time. This provides a challenge for future research. Second, we investigated commercial capabilities within the founding team and did not account for separate business functions and their capabilities. This provides the opportunity to investigate these capabilities on an individual level in further research. Third, the predictive power of this research is low due to the small sample size, despite the fact that this research has extended the data of the research of Witte (2012). Fourth, entrepreneurs might be inclined to glorify their knowledge and information of their marketing and sales. This self-serving bias might be occur less easy when collecting data through personal interviews. Fifth, the concepts and constructs used are mainly developed in marketing and management literature regarding large established organizations and might therefore not fit the tough world of the entrepreneur. Creating new constructs might solve this problem, but decreases the possibility to compare results. Sixth, the sample includes Dutch start-ups and spin-offs that are connected to incubators, which hinders generalization. Finally, entrepreneurs made notice that their business performance fluctuates severely during the start-up and growth phase. Although this research takes this issue into account by considering the past five years of the organization, it does solve the problem entirely. Future research could identify the several stages of a start-up and control for these stages in the data analysis.

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Appendix A: Cross-loadings of items

Table 6 Cross-loadings of items

| | Business performance | Commercial capabilities | Competitor orientation | Pro-active customer orient | Pro-active sales orient | Shared Interpretation |
|--------|----------------------|-------------------------|------------------------|----------------------------|-------------------------|-----------------------|
| BP1 | 0,8446 | 0,3310 | 0,4426 | 0,1586 | 0,0274 | 0,1236 |
| BP2 | 0,9179 | 0,1972 | 0,3915 | 0,1930 | 0,1989 | 0,1774 |
| BP3 | 0,8734 | 0,1693 | 0,4058 | 0,1268 | 0,1904 | 0,1388 |
| MC1 | 0,2963 | 0,8954 | 0,3153 | 0,1331 | 0,2798 | 0,2244 |
| MC2 | 0,2164 | 0,8501 | 0,3309 | 0,2015 | 0,4203 | 0,2582 |
| SC1 | 0,1674 | 0,8347 | 0,0112 | -0,0770 | 0,2505 | 0,1460 |
| SC2 | 0,1793 | 0,8267 | 0,1451 | -0,0318 | 0,0929 | 0,1277 |
| CoO1 | 0,2292 | 0,2673 | 0,7075 | 0,2502 | 0,0654 | 0,2631 |
| CoO3_r | 0,3633 | 0,1754 | 0,7599 | 0,1332 | 0,2065 | 0,1798 |
| CoO4 | 0,4330 | 0,1900 | 0,8167 | 0,2534 | 0,2520 | 0,3497 |
| CuO2 | 0,1598 | 0,1353 | 0,3078 | 0,8225 | 0,3044 | 0,4279 |
| CuO3_r | 0,1293 | -0,0681 | 0,0002 | 0,6558 | 0,0276 | 0,1587 |
| CuO5 | 0,0448 | 0,1877 | 0,3763 | 0,5954 | 0,3383 | 0,5571 |
| SO1 | 0,1600 | 0,3130 | 0,0986 | 0,2236 | 0,8650 | 0,1929 |
| SO3 | 0,1144 | 0,2318 | 0,2413 | 0,2460 | 0,8182 | 0,3321 |
| SO4 | 0,1228 | 0,2462 | 0,3406 | 0,2447 | 0,8700 | 0,3246 |
| ShI1 | 0,0463 | 0,1280 | 0,0700 | 0,2021 | 0,0635 | 0,4841 |
| ShI3 | 0,1709 | 0,2505 | 0,3173 | 0,4022 | 0,3066 | 0,9088 |
| ShI4 | 0,1281 | 0,1324 | 0,3308 | 0,4348 | 0,2828 | 0,8405 |

Appendix B: Survey questions

Table 7 Overview survey questions

| Construct | Items | Output |
|--|--|---|
| Background questions | | |
| Year of birth | What is your year of birth? | [Year] |
| Entrepreneurial experience | Did you have any previous entrepreneurial experience? | 1= Yes, 2= No |
| Product or service | Does your company involve in a product, service or both? | 1 = Product, 2 = Service, 3 = Both, service and product |
| Sector | In which sector is the developed technology positioned? | [Sector] |
| Incubator | Was the innovation supported by an incubator? | 1= Yes, 2= No |
| Market type | What type of market does the innovation serve? | 1 = Business-to-business, 2 = Business-to-consumer, 3 = Both |
| Position | What is your position in the organization? | [Position] |
| Pro-active Customer orientation | | |
| | <i>In our organization, we.....</i> | |
| CuO1 | Continuously tried to discover additional needs of our customers of which they were unaware. | Completely disagree - completely agree (1...5) |
| CuO2 | Frequently brainstormed on how customers will use our technology. | Completely disagree - completely agree (1...5) |
| CuO3 | Incorporated solutions to unarticulated customer requirements. | Completely disagree - completely agree (1...5) |
| CuO4 | Identified key market trends to gain insights into what users require in the future. | Completely disagree - completely agree (1...5) |
| CuO5 | Looked for clues beyond the requirements expressed by customers to identify their requirement drivers. | Completely disagree - completely agree (1...5) |
| Competitor orientation | | |
| | <i>In our organization, we...</i> | |
| CoO1 | Exactly knew who are competitors were | Completely disagree - completely agree (1...5) |
| CoO2 | Monitored new developments of our competitors. | Completely disagree - completely agree (1...5) |
| CoO3 | Did not know what attracted customers to competitors. | Completely disagree - completely agree (1...5) |
| CoO4 | Knew if our competitors' customers were satisfied. | Completely disagree - completely agree (1...5) |
| Shared Interpretation | | |
| | <i>In our organization, we....</i> | |
| ShI1 | Jointly developed a shared understanding of the available market information. | Completely disagree - completely agree (1...5) |
| ShI2 | Formally met to discuss information regarding markets, customers and competitors. | Completely disagree - completely agree (1...5) |
| ShI3 | Jointly developed a shared understanding of the implications of market developments. | Completely disagree - completely agree (1...5) |
| ShI4 | Frequently met informally and discussed information regarding markets, customers and competitors. | Completely disagree - completely agree (1...5) |
| Pro-active sales orientation | | |
| | <i>In our organization we put in a lot of time and energy into...</i> | |
| SO1 | Actual sales work of products/services to the potential customers. | Completely disagree - completely agree (1...5) |
| SO2 | The development of sales arguments for the product/service. | Completely disagree - completely agree (1...5) |
| SO3 | Experimenting with selling tactics with the potential customers. | Completely disagree - completely agree (1...5) |
| SO4 | Creating and identifying sales opportunities in the market. | Completely disagree - completely agree (1...5) |
| Commercial Capabilities | | |
| | <i>In our organization, myself or one or more of my colleagues had...</i> | |
| MC1 | Work experience in advertising and promotion. | Completely disagree - completely agree (1...5) |
| MC2 | Experience in dividing the market into customer segments. | Completely disagree - completely agree (1...5) |
| MC3 | Academic studies in marketing. | Completely disagree - completely agree (1...5) |
| SC1 | Work experience in selling at the customer interface. | Completely disagree - completely agree (1...5) |
| SC2 | Experience in managing sales team/function. | Completely disagree - completely agree (1...5) |
| SC3 | Academic studies in selling. | Completely disagree - completely agree (1...5) |
| Business Performance | | |
| | <i>How did the organization perform, relative to...</i> | |
| BP1 | Return on investment objectives? | Much lower than the objectives - Much higher than the objectives (1...5) |
| BP2 | Sales and customer growth objectives? | Much lower than the objectives - Much higher than the objectives (1...5) |
| BP3 | Market share objectives? | Much lower than the objectives - Much higher than the objectives (1...5) |
| BP4 | Innovation reputation objectives? | Much lower than the objectives - Much higher than the objectives (1...5) |
| BP5 | Planned value creation objectives? | Much lower than the objectives - Much higher than the objectives (1...5) |
| Technology push | | |
| TP1 | Technological possibilities provided the driving force for the development of the project | Completely disagree - completely agree (1...5) |
| TP2 | Our product was driven by new technology opportunities. | Completely disagree - completely agree (1...5) |
| TP3 | Our product-technology combination was really new for the market. | Completely disagree - completely agree (1...5) |

Appendix C: Comparison present study and study Witte (2012)

Table 8 Comparison present study and study Witte (2012)

| | Present study | Study of Witte (2012) |
|--|--|--|
| Sample size | 68 | 33 |
| Theoretical basis | <ul style="list-style-type: none"> - Commercial capabilities in view of RBT - Market orientation - Customer involvement and development - Sales orientation | <ul style="list-style-type: none"> - Commercial capabilities in view of RBT - Market orientation - Sales orientation |
| Core variables | <ul style="list-style-type: none"> - Commercial capabilities founding team - Customer orientation - Competitor orientation - Sales orientation - Shared interpretation - Level of technology push | <ul style="list-style-type: none"> - Commercial capabilities founding team - Market orientation - Sales orientation |
| Analysis of separate components MO and SO | Yes | No |
| Moderators in model | <p>Moderators on Commercial capabilities founding team:</p> <ul style="list-style-type: none"> - Customer orientation - Competitor orientation - Sales orientation <p>Moderators on Customer, Competitor and Sales orientation:</p> <ul style="list-style-type: none"> - Shared Interpretation - Level of Technology push | <p>Moderators on Commercial capabilities founding team:</p> <ul style="list-style-type: none"> - Market orientation - Sales orientation |
| Method of data analysis | Partial Least Squares (Structural Equation Modelling) | Multiple regression |
| Results | <p>Significant effects on business performance:</p> <ul style="list-style-type: none"> - Commercial capabilities founding team (+) - Competitor orientation (+) <p>Significant moderation effects on business performance:</p> <ul style="list-style-type: none"> - Commercial capabilities X Customer orientation (-) - Commercial capabilities X Competitor orientation (+) - Customer orientation X Shared interpretation (-) - Sales orientation X Shared interpretation (-) - Competitor orientation X Technology push (+) | <p>Significant effects on business performance:</p> <ul style="list-style-type: none"> - Commercial capabilities founding team (+) - Technology maturity (-) - Technology push (+) <p>No significant moderation effects</p> |