Exploration Patterns at Gazelle Firms: The Creation of a Questionnaire

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Abstract

Finding the right balance between exploration and exploitation is a much discussed topic within the scientific literature. Organizations have difficulties with the question whether to keep exploiting the current capabilities or exploring for new opportunities. Several scholars have emphasized the importance of achieving an appropriate balance between exploration and exploitation within an organization in order to survive. The amount of evolution of exploratory activities within a firm is the exploration pattern. Scholars have differentiated several different exploration patterns. The aim of this research was to develop and test a tool which provides valid and reliable data in order to perform quantitative research on the topic of factors influencing the exploration pattern of firms. It took multiple steps to create this tool.

First a theoretical framework was created. Scientific literature was consulted in order to get deeper insights into factors that influence the exploration pattern of a firm. Because a lot of scientific literature was available choices had to be made which factors would be included into the research. Based on this research it was decided to structure the questionnaire around three major subjects, namely ambidexterity, collaboration and the innovation strategy. Next to these major subjects several organizational attributes were taken into account when designing the questionnaire.

The next step of this research was to translate the theoretical insights into a questionnaire. This was done through an operationalization of the different variables. The constructs for these variables were mainly taken from existing literature. The main advantage existing constructs is that they already have been tested on their reliability and validity. Unfortunately, not for all variables constructs existed. Therefore two constructs were created during this research, namely the constructs for ambidexterity and exploration patterns. These were created based on existing literature.

What followed was a series of tests. The questionnaire was presented to six different gazelle firms who were asked to complete it. This was done within face to face interviews. In this way the interviewees could directly ask questions about items that were not clear to them. This lead to insights about what part of questionnaire was difficult to complete. The interviews were also asked to explain certain choices for answers. By comparing the results from the questionnaire with the results from the interview the validity of the questionnaire can be tested.

The results of this validity check lead to the replacement of the construct for ambidexterity. Three interviewees had completed the questionnaire and for none of them could be determined what type of ambidexterity was present within their firm. The new construct lead to better results. Next to the validity check it became apparent that the questionnaire is not applicable for all types of firms. For this research several different firms, from different kinds of industries, have participated. Most of the participants created products or delivered services to customers. But there was one company which was primarily concerned with client specific projects. Within these projects this firm participated based on their knowledge or acted as a consultant. This type of 'knowledge intensive' firm did not correspond well with the items from the questionnaire.

From a content point of view this research supports that the steady exploration pattern fits the prospector strategy and that the recovery pattern fits the analyzer strategy. It also supports that companies use different ways to organize for innovation. The results show that both contextual and structural ambidexterity can lead high amounts of exploratory activities. The last contribution regards that the educational level of employees could influence the type of ambidexterity which is present at a firm. Highly educated employees are capable enough to divide their own time and to prioritize. This means that contextual ambidexterity can lead to high levels of exploratory activities.

Preface

As a final test every student Business Administration has to write a thesis. One of the most important aspects is finding an interesting, but also challenging subject to write about. After having participated in the minor *management of innovation* I finally found a subject that really interests me. Therefore I was very fortunate that the opportunity of this thesis arose.

The path of creating this thesis was not ideal. Being halfway with the assignment I decided to start with Master courses. And although all Master courses were passed this was not beneficial for my thesis. Almost six months went by before resuming. After a long summer, with a lot of hard work this process now came to an end.

During the creation process I had support from different corners. First of all I have to thank all the participant of the research. Without their time and co-operation I would not have gathered any data. Second of all I want to thank my family, girlfriend and all my friends for their input and support. Last I want to thank Klaasjan Visscher for giving me the opportunity to do this research. During the process his feedback and guidance helped me a lot.

I know the knowledge I gained while doing this research will help me with the Master Innovation and Entrepreneurship in Berlin. Not only from a content point of view, but also the skills of riding such a thesis will prove to be of great value.

Robin Barwegen
Enschede, September 10th, 2011

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1. Introduction

1.1 Background

Finding the right balance between exploration and exploitation is a much discussed topic within the scientific literature. March (1991) introduced the terms exploration and exploitation. With exploration he meant engaging individuals and organizations in search, experimentation, and variation, while exploitation enhances productivity and efficiency through choice, execution, and variance reduction. Organizations have difficulties with the question whether to keep exploiting the current capabilities or exploring for new opportunities (Levinthal and March, 1993). March (1991) emphasized the importance of achieving an appropriate balance between exploration and exploitation within an organization in order to survive. This means that both exploration and exploitation have to be present within the organization. Auh and Menguc (2005) share this view and point out that engaging in excessive exploration at the expense of exploitation is dangerous. Exploratory activities have a long-term and uncertain character because only a small percentage of these activities are successful. So only focusing on the exploratory activities could result into losses because not enough exploitative activities are carried out which provide profitable returns. But according to Auh and Menguc (2005) it is also dangerous when exploitation drives out exploration. This discourages the organization from pursuing learning and development. It would mean that possible profitable projects are not initiated. Therefore it is recommended that a balanced combination has to be created.

A lot of research has been done on how to balance exploration and exploitation within an organization. Scholars have looked at different kinds of methods in order to achieve an appropriate balance. Scientific research has also focused on what kind of aspects influence the amount of exploratory and exploitative activities within an organization. The initiated innovation strategy has influence on the amount of exploratory and exploitative activities. Organizations have a mission, a vision and set goals. In order to achieve these goals they operate according to a certain strategy. Because organizations only have a limited amount of available resources, conscious choices are made about whether to support exploratory or exploitative activities (Lavie et al., 2010). These choices will lead to a certain innovation strategy.

An appropriate balance can be achieved through the organizational structure. Several different structures are differentiated within the scientific literature (Lavie et al., 2010). According to O'Reilly and Tushman (2004) an ambidextrous organization is an organization which separates exploratory units from exploitative units. The balance is created through simultaneously engaging in both types of activities. Contextual ambidexterity refers to facts that individual employees divide their time between exploratory and exploitative activities (Gibson and Birkinshaw, 2004). In this way exploration and exploitation are simultaneously maintained. These units all have their own culture and tasks. Organizational separation can also have a temporal character. Temporal separation is characterized by cycles of periods of exploratory and exploitative activities.

Another aspect by which an appropriate balance can be achieved is through alliances. Koza and Lewin (1998) have made a distinction between exploratory and exploitative alliances. Exploitative alliances are, for example, licensing or franchising. Exploratory alliances include learning networks for sharing knowledge. Faems et al. (2011) conclude that the presence or absence of collaborative strategies has a huge impact on which kind of exploration pattern is present at a gazelle firm. Engaging in exploratory alliances has a positive on the impact of radically new products (Neyens et al, 2010). Scholars have pointed out that collaboration can be engaged with various kinds of partners; research institutes and universities (Faems et al., 2005) or lead users (Von Hippel, 1986).

This thesis will be focused on a special kind of firm, namely a gazelle firm. Gazelle firms are defined as fast growing entrepreneurial firms (Van Praag & Versloot, 2008). A definition which is more operationalised sounds as follow:"A business establishment which has achieved a minimum of 20% sales growth each year over the interval, starting from a base-year revenue of at least $100.000,-" (Birch et al., 1995, p.46). Henrekson and Johansson (2010) conclude that gazelles bring economic growth and create new jobs. Acs et al. (2008) have also pointed out that gazelles have high growth rates on sales and profits and that they have high return on shareholders. Amat (2010) agrees with this, but also points out that gazelles often get high growth rates in the first couple of years but that they have difficulties of maintaining high growth rates over time. Ahuja and Lampert (2001) suggest that these difficulties arise because of so called 'success traps'. Success traps occur when organizations have success with a certain strategy and they keep focusing itself on this strategy. This means that successful exploitation leads to even more exploitation. Because of the increased knowledge of exploitation, efficiency rates go up and the tendency to exploit even more is present. Exploitation causes this tension because these are more certain, short-term profits (March, 1991). This causes a lack of investments in really new capabilities, which are crucial for long-term success (Faems et al., 2011). According to Levinthal and March (1993), this trap can be broken by becoming aware of the high value of exploration or by a rapid adjustment of aspirations.

A lot of research has been performed on the topic of balancing exploration and exploitation. However, this research has mainly taken place at large high-tech organizations. Therefore the conclusions which have been drawn in these studies apply to these types of firms. Because gazelle firms are firms with different characteristics future research has to point out if the established relationships also apply for gazelle firms. Faems et al. (2011) have conducted a study in which they did research about influence of structural ambidexterity and collaborative structure on the amount of exploratory and exploitative activities at gazelle firms. This study was done in a qualitative way and the founded relationships are therefore hard to generalize. The goal of this thesis is to create a tool which provides data, with which quantitative research can be performed in order to test the influence of ambidexterity, structural collaboration and innovation strategies on the exploration pattern of a gazelle firm. This has resulted into the following research objective:

Developing and testing a tool which provides valid and reliable data in order to perform quantitative research on the topic of factors influencing the exploration pattern of gazelle firms.

1.2 Research questions

The research objective presented above resulted into the following main research question:

- How can a tool be developed which provides valid and reliable data in order to perform quantitative research on the topic of factors influencing the exploration pattern of gazelle firms.

In order to create a valid and reliable tool the subjects which are going to be included in the questionnaire need to be examined. Therefore the following research questions will be taken into account when creating the theoretical framework:

- What different exploration patterns can be found at gazelle firms?
- What type of ambidexterity do these gazelle firms have?
- How do gazelle firms collaborate for innovation?
- What kind of innovation strategies do gazelle firms use?
- What effect do these variables have on the evolution of an exploration pattern?

2. Theoretical Framework

This chapter contains the theoretical framework. Paragraph 2.1 contains an explanation of different types of exploration patterns. In paragraph 2.2 – 2.4 the variables *ambidexterity, structural collaboration* and *innovation strategy* will be dealt with. In paragraph 2.5 the context in which the different factors and exploration patterns occur are explained. In paragraph 2.6 a model is presented which includes the different relationship presented in the theoretical framework.

2.1 Exploration patterns

The levels of exploration and exploitation can change during a period of time within an organization. The way this balance evolves during the existence of the organization is called an exploration pattern. This evolution can have different causes. Scholars provide different views on the evolution of the exploratory activities within gazelle firms (Faems et al., 2011). According to Gupta et al. (2006) a focus on exploitative activities can be caused by a 'success trap'. This indicates that exploitation often leads to early success, this can lead to a continuous focus on exploitation which drives out exploration. On the other hand, scholars propose different views. According to Levinthal and March (1993) exploration leads to failure, which causes a firm to focus even more on exploration to search for newer ideas, this is called a 'failure trap'. Nohria and Gulati (1996) provide other reasons for a focus on exploration. They state that organizational slack can cause a focus on exploratory activities. The fast growth of gazelle firms allows for organizational slack, which subsequently stimulates exploration. These different views indicate that the development of the exploratory activities differ and can evolve in different ways. Faems et al. (2011) have differentiated four different exploration patterns. These are *stable recovery exploration pattern, non-recovery exploration pattern, punctuated exploration pattern* and *steady exploration pattern*.

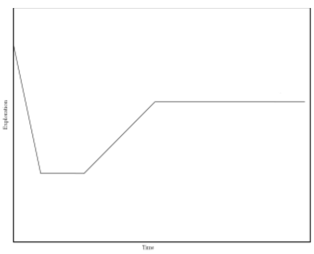

Figure 2.1. Stable recovery exploration pattern

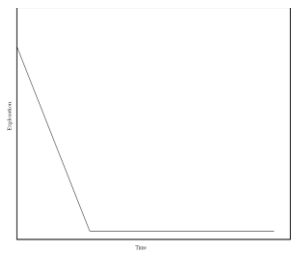

Figure 2.2. Non recovery exploration pattern

Exploration patterns exist of two different phases. The first phase is the initial stage of the growth trajectory and the second phase is the maturity phase. This initial growth phase can either consist of a drop of exploratory activities or a stable amount of exploratory activities. Three of the four differentiated patterns are characterized by a substantial drop of exploratory activities in the initial stage of growth (Faems et al., 2011). As explained above a reason for this drop can be the 'success trap'. When this happens the focus is more on improving the current products and processes. When the focus is almost exclusive on exploitative activities the organization can get behind on the competition. After the recovery of the exploratory activities some companies are able to keep up with this level. This pattern is called a *stable recovery exploration pattern* (figure 2.1). A reason for this recovery is that companies have increased their resources over time. They can invest their slack resources into exploratory activities. It can also happen that the organizations are not able to keep up with these levels. This can either lead to a non-recovery exploration pattern or a punctuated recovery pattern. Companies with a *non-recovery exploration pattern* (figure 2.2) are not able or willing to increase the exploratory activities. They almost solely invest in exploitative activities. This exploration pattern is not viable for gazelle firms (Faems et al., 2011).

Some companies tend to vary with their amount of exploratory and exploitative activities. At first these companies are looking for new products or processes, in this phase the exploratory activities are high. When they have developed a product or process they want to exploit this. This indicates that long periods of stable development are followed by short periods of high exploratory activities. This is called a *punctuated recovery exploration pattern* (figure 2.3). Three exploration patterns are described above who all had a substantial drop in their initial growth phase, but is also possible that there is no drop in this phase. These organizations are able to keep a relative high, stable amount of exploratory activities throughout their initial growth and their maturity phase. This is called a *steady exploration pattern* (figure 2.4). This can be caused by the 'failure trap' described above.

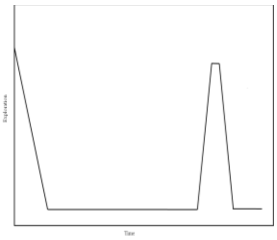

Figure 2.3. Punctuated recovery exploration pattern

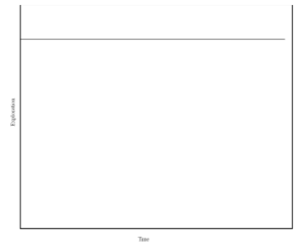

Figure 2.4. Steady exploration pattern

2.2 Ambidexterity

Lavie et al. (2010) propose that ambidexterity is an appropriate approach for balancing exploration and exploitation within an organization. Van Looy et al. (2005) indicate that some scholars argue that simultaneously incorporating exploratory and exploitative activities within an organization is not viable for a firm because of the differences in nature. Exploration asks for creativity, while exploitation demands productivity (Van Looy et al., 2005). Other scholars (Gibson & Birkinshaw, 2004; O'Reilly & Tushman, 1996; Lavie & Rosenkopf, 2006) have identified three different modes for coping with the conflicting demands of exploration and exploitation: *contextual ambidexterity*, *organizational separation* and *temporal separation* (Lavie et al, 2010).

2.2.1 Contextual ambidexterity

Some scholars suggest that an appropriate balance can be achieved through contextual ambidexterity (Gibson & Birkinshaw, 2004). This form of balance enables the individual freedom of employees. They have to decide for themselves whether they focus on exploratory or exploitative activities. Important aspects for this approach are discipline, support, and trust because individuals act relatively autonomously (Gibson & Birkinshaw, 2004).

This is supported by research that shows how cultural values that promote innovation coexist with values of quality and efficiency (Lavie et al, 2010). According to Miron, Erez & Naveh (2004) individuals are supported to be creative and come up with new ideas (exploration), while at the same time efficiency is not undermined (exploitation). A requirement for successful implementing this strategy is that the organization has to build up stable patterns of interaction throughout the organization. It becomes clear that contextual ambidexterity implies that there is no separation between exploratory and exploitative project teams, but that an employee both performs exploratory and exploitative duties.

2.2.2 Organizational separation

Organizational separation is another mode for attaining an effective balance. Structural ambidexterity emerges from the organizational separation of exploratory and exploitative activities. In this method exploitative and exploratory activities are separated into different units (Schulze, 2009). Every unit has its own tasks, culture and organizational arrangements (O'Reilly & Tushman, 1996). Exploitative units are often larger and more centralized. The culture within such units is generally tight, with a focus on maximizing efficiency and control (Benner & Tushman, 2002, 2003). Exploratory units are characterized by their design to generate new innovations by experimentation (Lavie, 2010). These are relatively small, decentralized units with loose cultures and flexible processes.

By implementing structural ambidexterity both exploratory and exploitative activities are simultaneously managed within an organization. Important for successful implementing this approach is coordination by senior-management team (Lavie, 2010). Because all units have a relatively high level of autonomy, senior management has to coordinate and keep track of the developments of different projects.

2.2.3 Temporal separation

Temporal separation refers to cycles of exploration and exploitation. During these cycles the focus is on one particular activity and in a later stadium shifts to the other activity. Employees are allocated to either an exploratory activity or an exploitative activity. The employees return within the organization when such a project is finished. From there on individual employees are allocated to different project. The balance is achieved through these shifts of activities (Duncan, 1976). By implementing this mode conflicts about simultaneously managing exploration and exploitation are avoided (Lavie & Rosenkopf, 2006).

The difficulty of this mode lies in the transition from one type of activity into the other type (Lavie et al., 2010). Some scholars advice, to maintain a balance on the long-term, that the shift between exploration and exploitation are performed slowly and gradually (Rothaermel & Deeds, 2004). So temporal separation involves an organizational separation in which exploration and exploitation are not separated across different units, but by time.

2.3 Collaborative structure

Rothaermel and Deeds (2004) have done research about the relationship between a firm's external collaborations and its innovativeness. They stress that this is an important subject of research because innovativeness has a direct impact on the survival and performance of a firm. This paragraph consists of an explanation of different types of collaboration. The distinction is made between exploratory and exploitative collaborations.

Organizing for collaborations can have a substantial impact on the character of technology sharing, organizational context and possible economic consequences for participating organizations (Osborn and Baughn, 1990). Because of the impact of collaborations an organization has to make conscious choices about what type of cooperation is initiated.

A distinction between different types of R&D alliances can be made based of different factors. They can be distinguished based on the number of partners or the ownership structure. For this research the distinction from Koza and Lewin (1998) is used. They argued that an alliance "can be distinguished in terms of its motivation to exploit an existing capability or to explore for new opportunities" (Koza and Lewin, 1998, p.256). It is very difficult to separate types of exploration alliances and types of exploitation alliances because this is not so black and white. The type of collaboration depends on the context of the alliance. Although it is difficult to rigidly separate these types, there are signs that certain types of collaboration indicate an exploratory or an exploitative alliance.

Exploratory alliances are situated in the initial stages of a technological innovation trajectory. In this specific part of the trajectory new ideas and inventions are developed. The purpose of such an alliance is to identify new technological opportunities (George et al., 2002). Activities which can be undertaken in order to achieve this goal are fundamental research and experimentation. This can be done with different kinds of partners. Universities and research institutes are always looking for ways to create new inventions and to increase their knowledge. Therefore these types of partners are often used for exploratory alliances (Wheelwright and Clark, 1992).

Exploitative alliances are situated at the more mature stages of a technological innovation trajectory. The purpose of these alliances is not to create new breakthrough inventions, but they intend to increase the capabilities of current products and processes. The activities which are used for this purpose are standardization, upscaling and fine-tuning (Schoonhoven and Jelinek, 1997). This is often done through creating an alliance with suppliers. Suppliers have knowledge about the product and can help with incremental improvements. Another option is to create an alliance with existing customers. Customers who are using the products or processes can indicate what should be improved. This indicates these collaborations have an exploitative character (Tripsas, 1997).

2.4 Innovation Strategy

Organizations have a mission, a vision and set goals. In order to achieve these goals they operate according to a certain strategy. Some organizations want to defend their market because there is a lot of competition, while others are looking for new opportunities. Miles et al. (1978) have differentiated four different strategies in their research, namely the *defender, prospector, analyzer* and *reactor* strategy.

According to Miles et al. (1978) *defenders* want to seal off a portion of the total market in order to create a stable domain, they want to achieve this by producing a limited set of products and enter a narrow segment of the potential market. Once they have entered the market and have sealed a small portion of the total market they will defend it. They do not want competition entering because this could decrease their market percentage, so they act very aggressive. A typical *defender* creates a single core technology that is highly cost-efficient (Miles et al., 1978). Linking this strategy with exploration patterns it becomes apparent that *defenders* vary their exploration and exploitation balance. Before entering a market they will have a high level of exploration and a low level of exploitation because they are looking for opportunities to enter a promising market. Once they have entered this market they don't have to look for new opportunities anymore because they want to defend their market. In order to this they increase the level of exploitation and decrease the level of exploration. When they fail to defend their market this pattern will repeat itself. This is called a *punctuated equilibrium pattern* (Faems et al, 2011).

The prospector's strength is that of finding and exploiting new product and market opportunities (Miles et al., 1978). In such an organization both exploration and exploitation are present. Both new product development and high profitability are important for a prospector. Because of the presence of innovative activities prospector's have difficulties of attaining the high profit levels of the defender (Miles et al., 1978).The prospector generally operates in a dynamic domain which continues to develop. In order to keep up with the competition high levels of exploration are needed in order to survive within this environment. In order to engage in both exploratory and exploitative activities resources are allocated to decentralized units and projects instead of a centralized control system. According to Faems et al. (2011) the steady exploration pattern fits with this innovation strategy. The key aspect of the steady exploration pattern is the stable level of exploration throughout both the initial growth and maturity phase. When an exploratory project succeeds the organization does not focus solely on exploiting this, but immediately invests in new exploratory activities. By doing this steady levels of exploration and exploitation are achieved.

A third possible innovation strategy is called the *analyzer* strategy. This strategy combines aspects of the defender and the prospector. According to Miles et al. (1978) a true analyzer is an organization that attempts to minimize risk while maximizing the opportunity of profit. It is very difficult to successfully act as an analyzer because the right balance has to be achieved between aspects of the defender and the prospector strategy. Just like a prospector, an analyzer likes to operate within a new market or with new products. This is accomplished by imitating successful market or product innovations. Meanwhile, the majority of the analyzer's revenue is generated by a stable set of products and customers, just like a defender (Miles et al., 1978). In order to achieve the right balance between defender and prospector characteristics, an analyzer structure looks like a matrix organization structure. Heads of key functional units unite with product managers to form a balanced dominant coalition (Miles et al., 1978). Because this strategy combines exploitation with exploration it fits the recovery pattern (Faems et al., 2011).

The defender, the prospector and the analyzer all use well thought-out strategies in order achieve their goals and be successful. In contrast the reactor is a type of organization which is both inconsistent and unstable (Miles et al., 1978). They usually can't cope with environmental change and uncertainty. This leads to a poor performance. Miles et al. (1978) have identified three reasons how reactors become reactors:

1. Top management may not have clearly articulated the organization's strategy
2. Management does not fully shape the organization's structure and processes to fit a chosen strategy
3. A tendency for management to maintain the organization's current strategy-structure relationship despite overwhelming changes in environmental conditions.

According to Faems et al. (2011) the reactor strategy fits the non-recovery pattern because: "it is characterized by a half-hearted strategy and the inability to adapt to organizational structures to the changing circumstances".

2.5 Context

In this paragraph the context in which the relationships occur are explained. Firms have a unique character and their difference in characteristics can affect the evolution of the exploration patterns. Three different characteristics are dealt with, namely *organizational size*, *organization age* and *R&D intensity*.

2.5.1 Organizational size

Mixtures of results have been found on the relationship of the size of an organization on the innovativeness. Several scholars have concluded that larger firms have more complex and diverse facilities. Therefore these large firms can initiate a larger amount of innovation projects. Larger firms often have more financial resources. This means that a failure of an innovation project is not disastrous because of financial back-up. Looking at the amount of employees it is obvious that larger firm have more capacity for employees. More skilled and professional workers are present within larger organizations. According to Damanpour (1992) this means that these organizations have high technical knowledge and technical potential.

Other scholars have found that a large size does not necessarily result into more innovativeness (Hage, 1980; Utterback, 1974). Smaller organizations are more flexible and can adapt more easily to their environment. Mintzberg (1979) argued that smaller organizations can more easily combine different parts of their organization in order to create an innovation. Because the hierarchy in a smaller organization is more flat people are more familiar with each other and it therefore it is easier to collaborate with other divisions from the organization.

2.5.2 Organizational age

Young organizations generally have a lack of specific resources, limited customer base, and they need investments in the organizational structure (Lavie et al, 2010). These attributes allows young organizations to explore for new opportunities. Having a limited customer base allows them to focus on exploration. They have to spend relatively few time and money on improving their current products or processes, because their limited amount of customers causes little pressure and allows them to focus on exploring new ideas.

Organizations which already have launched products can have difficulties in keeping up with technological developments (Lavie et al., 2010). These organizations become dependent of their current knowledge and routines. Their current customers expect that they keep improving their current products. This implicates that these organizations are more focused on exploitation rather than exploration. By relying on the knowledge and the routines an organization already has it becomes more efficient in its current capabilities. This leads to a better performance, which is favored by stakeholders with a financial motive. These stakeholders will encourage the organization to keep investing in improving their current capabilities, leading to a lack in investments on the exploratory activities.

2.5.3 R&D Intensity

Several studies have examined the relationship between R&D spending, productivity returns and firm performance. These studies have been done in a different context, with a mixture of industries. McEvily and Chakravarthy (1999) have done research in a complex technological context and found that there are significant positive returns to R&D investments. Deeds (2001) found support for this relationship. He stated that in a high technology environment, investors clearly value investments in R&D.

Looking at gazelle's in this thesis it is important to consider that these firms often have both limited resources and numerous investment needs including R&D, organizational building, market development (Deeds, 2001). Therefore the firm has to make a balanced decision how to invest their slack resources. The research done by Deeds (2001) and McEvily & Chakravarthy (1991), which show that there is a positive relationship between the R&D investments and the outcome of these investments, implicates that high technology start-ups should invest in their R&D.

Although the investment in R&D is an indicator of innovativeness of a firm, some studies have found that firms can replace investing in R&D by acquisition. Hitt et al. (1991) concluded that they found strong empirical evidence for the negative effects of acquisition on R&D investments. This means that the acquisition of technologies or products may have a strong negative effect on firm innovation (Hitt et al., 1990). Instead of exploring for innovation by themselves firms buy technologies or products.

2.6 Conclusion

From the scientific literature presented above can be derived that the type of ambidexterity, type of partners for collaboration and strategy influence the exploration pattern of a firm. Lavie et al. (2010) indicate that ambidexterity is a mode of balancing exploration and exploitation. Therefore a type of ambidexterity influences the evolution of the exploration pattern. Faems et al. (2005) propose that collaboration with universities and research institutes have an exploratory character. Therefore it can be stated that the type partner with who is collaborated influences the exploration pattern of a firm. It also became apparent that the strategy a firm can have an impact on the amount of exploratory activities. Faems et al. (2011) indicate that the *analyzer*, *prospector* and *defender* strategy are viable strategies for gazelle firms because they can foster exploratory activities, whereas the *reactor* strategy hampers exploratory activities.

The relationships described above can also be moderated by three other variables, namely *size*, *age* and *R&D intensity* of a firm. A mixture of results exists on the influence of the size of the firm on the amount of exploratory activities. Damanpour (1992) states that larger firms often have more financial resources, this indicates that they can initiate more exploratory activities. On the other hand, Mintzberg (1979) argues that smaller organizations can more easily combine different parts of their organization in order to create an innovation. According to Lavie et al. (2010) the age of a firm influences the amount of exploratory activities that are present. Young firms have to spend relatively few time and money on improving their current products or processes, because their limited amount of customers causes little pressure and allows them to focus on exploring new ideas. Deeds (2001) shows that R&D investments are positively related with the outcome of these investments. According to He & Wong (2004) exploratory activities are indirectly positively related to the sales growth and thus the performance of a firm. These relationships result into the following model:

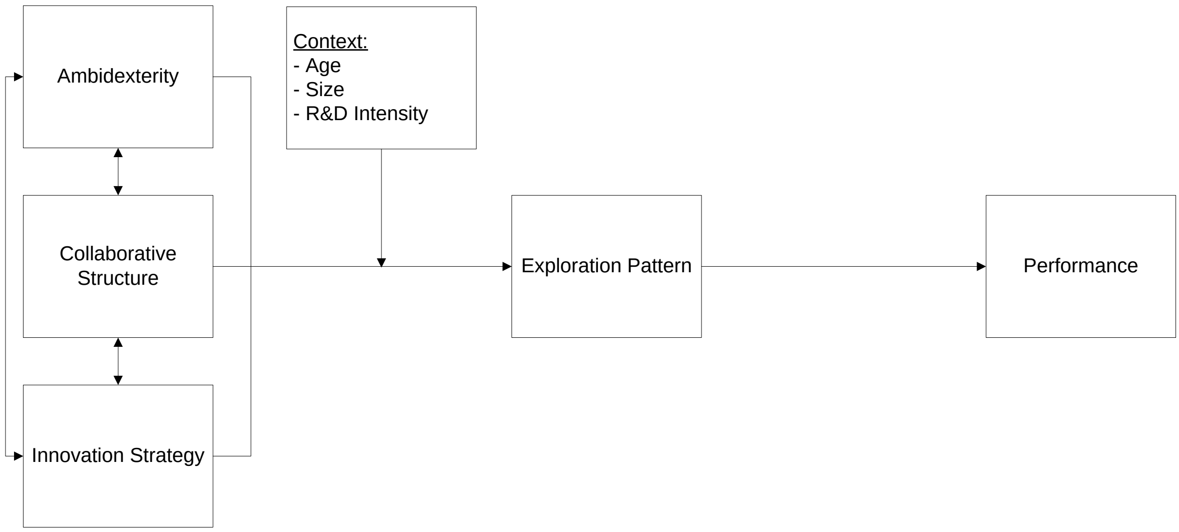

Figure 2.5. Model of variables and their relationships

3. Methodology

This chapter contains the methodology that is used for this research. In paragraph 3.1 the research design is described. Paragraph 3.2 contains the case selection, while paragraph 3.3 describes how the data is collected. The way the different variables are operationalized is explained in paragraph 3.4.

3.1 Research design

The aim of this research was to create a questionnaire with which quantitative research can be performed on the topic of exploration patterns. This indicates that the main purpose of this research is exploration. According to Babbie (2007) one of the features of exploratory studies are to develop the methods to be employed in any subsequent study. It took three steps to create the questionnaire, namely the development of a theoretical framework, the creation of a prototype questionnaire, and the testing and improving of the questionnaire.

The first step was to create a theoretical framework. This framework consists of a literature review. In this framework variables which influence the exploration pattern of a firm were described. To structuralize the framework a model has been developed which shows the different variables and their relationships (Figure 2.5). Because there are too many different variables that could influence the evolution of the exploration pattern decisions had to be made on which factors are included in this research.

The next step of the research consisted of the development of a prototype questionnaire. In order to test the relationships between the different variables the questionnaire has to provide both valid and reliable data to be able to draw significant conclusions. Therefore scientific literature (Babbie, 2007; Shadish, Cook & Campbell, 2002) was used for the development of the questionnaire. Churchill (1979) developed a procedure to obtain greater construct validity. The questionnaire was developed and tested according to this procedure. The first step is to specify the domain of construct. According to Churchill (1979) the researcher must be exacting in delineating what is included in the definition and what is excluded. This was done within the theoretical framework. The next step is to generate a sample of items. Several scholars (Sidhu et al., 2004; Jansen et al., 2009) have done empirical research about the influence of different variables on the presence of exploratory activities within a firm. In this research they developed a questionnaire and tested their constructs. Relevant items were added to a pool. This resulted into a prototype questionnaire. It was decided to create the questionnaire in English. The main reason for this is that the questionnaire is focused on CEO's, and these generally have a high level of education. Furthermore the aim of the questionnaire is not just the Netherlands, but an international applicability was preferred. According to Harkness et al. (2004) translating a questionnaire is a complex process that calls for proven procedures and protocols with cross-cultural expertise. Taking this into account it was decided to keep the constructs of the variables in English.

The last step consisted of testing the prototype questionnaire which resulted into a final version. According to Babbie (2007) researchers have to be very careful with their constructs, because errors can always happen. Therefore a pretest was carried out after the construction of the prototype at six gazelle firms. This was done through a cross-sectional study. Interviews were held at a single point in time. This was divided into two phases. The prototype questionnaire was first tested at three gazelle firms. These test lead to new insights regarding the questionnaire which resulted into an adjusted questionnaire. The last three interviews were used to test the new version of the questionnaire. These test lead to a final version of the questionnaire which can be found in Appendix A.

3.2 Case selection

The data collection process took place at six gazelle firms. During the selection process of these firms several things were taken into account. It was attempted to obtain a heterogeneous pool of respondents. This was done in order to test the questionnaire at different firms. Therefore it can be stated that the selection of units was not done randomly, also because the geographical location was taken into account for the convenience of the researcher. From a list of 320 gazelle firms in the Netherlands there was concrete contact with seven firms. Only one firm decided not to participate with the research because they were in the middle of a re-organization and therefore did not have time to participate. The characteristics of the different firms who participated can be found in table 3.1.

Company	Position	Foundation	Industry	Employees	Annual turnover	Growth percentage
DESI	Client Strategist	1999	Online marketing	50-249	€2m-30m	23%
ERP	Product Manager	1996	ICT	50-249	More than €30m	21%
Design Ltd.	CEO	2002	Leisure	10-49	€2m-30m	27%
TWS	CEO	2001	Water treatment	50-249	€2m-30m	18%
IFGL	CEO	2001	ICT	Less than 10	€2m-30m	27%
Blood Inc.	CEO	2000	Healthcare	250-500	More than €30m	23%

Table 3.1. General information of the firms

3.3 Data collection

The data collection is done in a qualitative way. Six in-depth interviews were held in order to test the questionnaire. The tests have been performed with the use of semi-structured interviews. During the interviews managers were asked to complete the questionnaire and indicate any ambiguity regarding the phrasing of the items (Jansen et al., 2005). Furthermore the managers were encouraged to provide suggestions for improving the questionnaire. Managers were also asked to explain why they choose for certain answers. In order to validate the questionnaire the results from the questionnaire were matched with the results from the interview. The main advantage of this type of testing is that the researcher can observe the respondents while they complete the questionnaire. The researcher can see with what type of questions the respondents have difficulties and the researcher can also see how long it takes a respondent to complete the different questions. The problems interviewees had with words or with understanding certain constructs can be found in Appendix H.

3.4 Operationalization

This paragraph contains the operationalization of the theoretical framework presented in chapter 2. In order to find suitable constructs a literature review is done. The outcome of the research will be elaborated within this paragraph.

3.3.1 Strategy

Croteau & Bergeron (2001) introduced an empirical study to identify various profiles of technological deployment specific to various types of business strategy that best support the organizational performance. They have translated the four business strategies (prospector, analyzer, defender and reactor) of Miles et al. (1978) into four dimensions in order to measure the business strategy of a firm. Based on their data they could not clearly classify a firm into one strategy. Therefore they have measured the level of strategic activities for each type of business strategy. The instrument which they have created was mainly based on existing literature. In order to test the validity of the research instrument in-depth interviews were used. In order to measure the internal consistency they have used the rho-alpha. According to Croteau & Bergeron (2001, p.87) the rho alpha is somewhat similar to the Cronbach alpha, but with the distinction that its value is weighted by the respective loading of items and not by the number of items per construct. A construct with a rho alpha of more than 0.70 should be kept. After the pre-test several items were dropped and this resulted into a total of 16 items distributed over 4 constructs (Table 3.2).

Measure of strategic activities
Prospector (0.86)
Our firm leads in innovations in its industry
Our firm believes that being 'first-in' in the industry is attained through the development of new products/services
Our firms responds rapidly to early signals of opportunities in the environment
Our firm's actions often lead to a new round of competitive activity in the industry
Our firm adopts quickly promising innovations in our industry
Analyzer (0.78)
The innovations which are chosen by our firm are carefully examined
Our firm carefully monitors competitors' actions in our industry
Defender (0.80)
Our firm tries to locate a safe niche in a relatively stable products/services domain
Our firm tries to maintain a safe niche in a relatively stable products/services domain
Our firm tends to offer a narrower set of products/services than its principal competitors
Our firm concentrates on trying to achieve the best performance in a relatively narrow product-market domain
Our firm tries to maintain a limited line of products/services
Our firm tries to maintain a stable line of products/services
Reactor (0.77)
Compared to its competitors in the industry, our firm is aggressive in maintaining its products/services domain (*reverse*)
Our firm takes many risks (*reverse*)
Our firm responds to areas which its environment puts pressure on it

Table 3.2. Constructs and items of the variable *innovation strategy*

3.3.2 Ambidexterity

The most common way to measure ambidexterity is done through measuring the presence of exploratory and exploitative activities within an organization. Several authors have made attempts in order to measure the presence of these activities (Mom et al., 2007; Jansen et al., 2006; He & Wong, 2004). Because this research focuses on different kinds of ambidexterity is not sufficient to solely measure the presence of exploratory and exploitative activities. It is also necessary to know how these activities are organized to assess whether firms have *temporal*, *structural* or *contextual* ambidexterity. Empirical research is present on this topic. Venkatraman et al. (2007) incorporated time into the conceptualization of ambidexterity and therefore assess whether firms have simultaneous or sequential forms of ambidexterity. However, this research does not use a questionnaire to gather data but obtained data from a period of 10 years. Other empirical studies also do not make use of questionnaires. Katila and Ahuja (2002) use the number of new citations to measure the degree of exploration, where He & Wong (2004) use the number of new product launches. Due to the absence of these constructs within the scientific literature, they have been created by the researcher.

For the measurement of the presence of exploratory and exploitative activities multiple constructs were available. Therefore a decision had to be made which constructs were used for this research. Because the focus of this research is on a firm level the constructs created by Mom et al. (2007) did not seem appropriate. These constructs took the perspective of a manager while the perspective of the firm suited this research better. Therefore the constructs of Jansen et al. (2006) have been used. These constructs were created through the review of relevant literature and the generation of a pool of items for these constructs. Next, a pretest in the form of in-depth interviews was carried out to enhance construct validity. This resulted into a six-item measure for exploratory innovation with a cronbach alpha of 0.86. The exploitative innovation measure also consists of six items with a cronbach alpha of 0.80. The cronbach alpha's are at an acceptable level because they exceeded the 0.70. The original items can be found in table 3.3. Because some of these items use a business unit focus, these have been changed to a firm level perspective. This indicates that where Mom et al. (2007) used "unit" this was replaced by "firm" within the questionnaire. This was the case for four items.

Measure of ambidexterity
Exploratory innovation (0.86)
Our unit accepts demands that go beyond existing products and services
We invent new products and services
We experiment with new products and services in our local market
We commercialize products and services that are completely new to the unit
We frequently utilize new opportunities in new markets
Our unit regularly uses new distribution channels
Exploratory innovation (0.80)
We frequently refine the provision of existing products and services
We regularly implement small adaptations to existing products and services
We introduce improved, but existing products and services for our local market
We improve our provision's efficiency of products and services
We increase economies of scales in existing markets
Our unit expands services for existing clients

Table 3.3. Constructs *exploration* and *exploitation* of the variable *ambidexterity*

As explained before there were no useable constructs for the different types of ambidexterity. Therefore these items are created based on the theoretical framework presented before. Lavie et al. (2010) point out that organizational ambidexterity facilitates simultaneous exploration and exploitation. Temporal separation involves cycles of exploration and exploitation, during which an organization focuses only on one dominant activity and later shifts to the other (Lavie et al., 2010, p.133). To capture the distinction between these forms of ambidexterity two items have been created namely: "In our firm exploratory activities are continuously present" and "Our firm goes through phases of high levels of exploratory activities followed by low levels of exploratory activities". Contextual separation refers to the fact that employees have the freedom to choose whether they focus their attention on exploratory or exploitative activities and was captured through the following item: "In our firm the same employees carry out both exploratory and exploitative activities". To see whether exploratory activities were separated within the company three extra items were created which can be seen in table 3.4.

Measure of Ambidexterity
In our firm exploratory activities are continuously present
In our firm exploratory activities are present during certain moments
In our firm the same employees carry out both exploratory and exploitative activities
In our firm exploratory activities are done by dedicated teams
In our firm exploratory activities are done by separate business units
In our firm exploratory activities are done by spin offs / separate companies

Table 3.4. Construct *organizing for innovation* of the variable *ambidexterity*

3.3.3 Exploration Patterns

Faems et al. (2011) presented different exploration patterns in their article. The gathering of data was done through interviews and therefore the different exploration patterns have not yet been captured into a questionnaire. Within the article the exploration patterns are thoroughly explained both textual and visual. The visual representations are adopted into the questionnaire. They are supported by one or two lines of explanation for clarification. The questionnaire is attached in Appendix A.

3.3.4 Collaboration

The UK Innovation Survey (2009) introduced a construct to measure the extent to which firms collaborate with other firms in order to create innovations. This construct included several different types of actors with whom firms can collaborate. Faems et al. (2005) have used this construct for their research. In this research they have made a distinction between partners used for exploratory and for exploitative activities. Partners used for exploratory activities are universities and research institutes. Collaboration with customers or suppliers indicates an exploitative nature because they are used for optimizing existing core competencies (Brown & Eisenhardt, 1995). Collaborating with competitors does not indicate an exploratory or exploitative nature of collaboration. This can bring both the creation of new products as well as the optimization of existing products (Faems et al., 2005). Therefore this type of partner was not included into the questionnaire because it does not provide relevant information for the distinction between exploratory and exploitative activities. The items were tested through an exploratory factor analysis. This supported the theoretical insights that collaborations with customers and suppliers differ from collaborations with universities and research institutes. The original construct made a distinction between regional, national, outside Europe and global collaboration. A distinction this specific is not necessary for this study, therefore the localization was limited to either national or international collaborations.

3.3.5 Performance

For measuring the performance of an organization several different measures can be used. First, financial information from, for example, annual reports can be a good way of obtaining information to measure the performance of an organization. By acquiring such information an overview can be created of the exact amount of turnover and growth percentages. Next to these measures Gibson and Birkinshaw (2004) have created a construct which measures how a manager perceives the performance of an organization. The original items can be found in table 3.5. The internal reliability was tested through a cronbach alpha test, which was 0.80. As explained before the focus of this research is on firm level and therefore the items are adjusted within the questionnaire. Where Gibson and Birkinshaw (2004) used “business unit” this was replaced by “firm” within the questionnaire. This was the case for all four items.

Measure of perceived performance (0.80)
This business unit is achieving its full potential
People at my level are satisfied with the level of business unit performance
This business unit does a good job of satisfying our customers
This business unit gives me the opportunity and encouragement to do the best work I am capable of

Table 3.5. Construct *perceived performance* of the variable *performance*

Next to the perceived performance of the firm the innovation performance was also included in the questionnaire. Pullen (2010) used items to measure the new product development within a firm. The first item concerns the type of activities which are present. Respondents are asked to distribute the amount of activities (in percentages) over radical breakthrough, next generation or enhancements, hybrids, and derivatives. The second item concerns the total annual sales originating from the different types of products. The different kinds of products are (1) breakthrough, (2) next generation, (3) addition to product family and/or derivatives/enhancements or (4) non modified products. These items are included because they measure the input of innovative activities and the output of innovative products.

Furthermore dimensions for the R&D budget (table 3.6) and employees concerned with NPD / R&D (table 3.7) are included. These are included because they can give more information about the way an organization organizes for innovation. Questions 52, 54, 55 and 56 are based on the items from

Pullen (2010). While in that thesis the distinction between radical and incremental innovation is made, this is modified within this questionnaire to exploratory and exploitative activities. Question 53 was extracted from Altena (2005).

Measure of R&D budget		
52	Approximate NPD/R&D spending as % of sales (R&D intensity)	___%
53	What is the NPD/R&D budget per year?	€__________________
54	How is this divided over the different types of NPD activities?	
	□ Not divided	
	□ Exploratory activities: ___%	
	□ Exploitative activities: ___%	

Table 3.6. Construct *R&D budget* of the variable *performance*

Measure of employees		
55	How many employees are concerned with NPD/R&D	___FTE
56	How is this divided over the different types of NPD activities?	
	□ Not divided	
	□ Exploratory activities: ___FTE	
	□ Exploitative activities: ___FTE	

Table 3.7. Construct *employees* of the variable *performance*

4. Results

This chapter contains the data description of the questionnaire and the interview. Furthermore a comparison is made between these descriptions which results into a validity conclusion for every variable. This chapter also contains an overall assessment of the validity and the results concerning the content of the research.

4.1 Exploration and exploitation

This paragraph contains the results from the constructs *exploration* and *exploitation*. These constructs are the first part of variable *ambidexterity*. For the readability it was decided to split the constructs of this variable into different paragraphs.

4.1.1 Results questionnaire

This part of the questionnaire contained items about the extent to which the firms engaged into exploratory and exploitative activities. The results can be found in table 4.1.

Company	Exploration	Exploitation
DESI	5.17	6.00*
ERP	4.83	6.33
Design Ltd.	5.17	6.50
TWS	4.50	4.20*
IFGL	5.33	6.17
Blood Inc.	5.83	6.17

**= The respondent completed 5 out of the 6 items.*

Table 4.1. Means from the constructs *exploration* and *exploitation*

The results show that all firms score relatively high for both exploration and exploitation, only TWS scores significantly lower than the other firms. It can also be noticed that that exploitative activities are judged higher than exploratory activities for all respondents except for TWS.

Several outliers were noticed. At least one exploitative item was judged to be very low (<3) by four of the six respondents. This was not the same item for every respondent. One respondent completely disagreed with the statement: ‘Our firm accepts demand that go beyond existing products and services’. He judged this with a 1 because:

> “It comes mostly from ourselves. We develop a lot of things, only we do this with our own vision and then we just sell it. And we listen less to the customer. Off course, we do have contact with customers and we create partnerships. […] But we do not accept everything. If there is some demand, we are not automatically going to do it. Then we say, we would rather do this or this. We do go beyond existing products, as stated in the question. But this is not because of the demand. Therefore I have to say I strongly disagree”. (Design Ltd. interviewee)

Another respondent indicated that he did not agree (2) with the item: ‘we commercialize products and services that are completely new to the firm’. He explained before that they are a very small company and that this could play a role. Therefore the products and services they offer are linked closely together:

> “We do not create entirely new products and services; it is all an extension of our current offerings.” (IFGL interviewee)

Another thing that can be noticed is that two respondents only completed five out of six items. For one respondent this was caused by the fact that she did not know the meaning of the word 'provision'. Two other respondents also indicated they did not know the meaning of this word. Another respondent completed the item 'We increase economies of scale in existing markets' with not applicable. The reason for this is:

> "When we would be a hundred times as big it would not lead to any real scale advantages because we are working on a project bases. So economies of scale are not really applicable in our market." (TWS interviewee)

4.1.2 Results interview

During the interview the respondents indicated how they perceived exploration and exploitation within their firm:

> "I'm always looking for new small things where I can make all my clients happy with. You can do a big project for only one client, but the best thing to do is to make small adaptations where a lot of clients can profit from." (ERP interviewee)
> "Yes, absolutely, we are constantly improving our current products." (Design Ltd. interviewee)
> "That [exploitation] captures our main attention. We are also focused on economies of scale." (IFGL interviewee)

Exploration was also regarded to be important for the respondents:

> "We started with storing umbilical cord blood in 2002. In 2008 we expended with the storage off cells from the umbilical cord, so that is the innovation. This is focused on new born babies. And in 2010 we introduced a new service for adults. This involved the storage of stem cells from fat. We are currently active with service in multiple countries, and we are now in an advanced stadium in the USA. We take the lessons into account we have learned in Europe for the introduction in America." (Blood Inc. interviewee)

What became clear during the interviews is that it was sometimes very hard to differentiate exploratory activities from exploitative activities:

> "Well, sometimes it was difficult to judge what is exploration and what is not. Some things would be considered as exploration for the Dutch market, but it would not be for the American market. We use a lot of things from America. We do explore some things by ourselves, but the market for internet marketing is much bigger in America, so we monitor that market very closely and start working with it ourselves. So to what extend is it real exploration? To us, it is new but we did not invent it ourselves." (DESI interviewee)

An overall trend which is noticeable is that the respondents have scored the exploitative activities higher than the exploratory activities within their organization. The only exception in this case is TWS, according to the interviewee this becomes of the fact that they operate based on projects:

> "The main reason why I completed it in this way is because my company is focused around projects. We do have some trade activities, but 70% of the turnover is located in the projects. We have a big network of companies, and collaborate with the University of Twente for example. There is a lot of input in the form of ideas, and then you have to select promising projects." (TWS interviewee)

4.1.3 Conclusion

For the constructs exploration and exploitation there are little questions regarding the validity. The interviewees regarded both exploration and exploitation as important. This was reflected by the answers from the questionnaire. The high means correspond with view of importance for exploration and exploitation. The only remark regards the relatively low scores for one respondent. This was influenced by three items: ‘We frequently utilize new opportunities in new markets’, ‘Our firm regularly uses new distribution channels’ and ‘We frequently refine the provision of existing products and services’. The disagreement with these items can be explained by the fact that the items in the questionnaire regard the product or a service a firm offers. According to the interviewee this firm is innovative because of their project teams. These project teams do client specific project whereby they offer products but also consult and manage project. This was illustrated by the fact that only 30% of their turnover is located into trade activities and 70% into projects teams. The major strength of this company is not located into creating new products or services but mainly into the knowledge this company has. Because of this knowledge they have added value within the projects they do for clients. But these are not necessarily exploratory projects, they can also have an exploitative nature. According to Taminiau et al. (2009) it is difficult to classify the innovative activities of a consultancy firm because the innovation is much more difficult to pinpoint than more tangible innovation projects. The nature of these activities can explain the relatively low means. Furthermore several respondents indicated that they did not know the meaning of the word ‘provision’. To increase the validity of the questionnaire a translation of this word should be included.

4.2 Organizing for innovation

This paragraph contains the results from the construct *organizing for innovation*. Together with the constructs *exploration* and *exploitation* this makes up the variable *ambidexterity*.

4.2.1 Results questionnaire

Table 4.2 shows the results from the first three respondents. These were given the first version of the construct. Table 4.3 regards the answers from the last three interviewees. They were given the second version of the construct.

Item	DESI	ERP	Design Ltd.
In our firm exploratory activities are continuously present	Yes	Yes	Yes
Our firm goes through phases of high levels of exploratory activities followed by low levels of exploratory activities	No	Yes	Yes
In our firm the same employees carry out both exploratory and exploitative activities	Yes	Yes	Yes
In our firm exploratory activities are done by dedicated teams	Yes	Yes	Yes
In our firm exploratory activities are done by separate business units	Yes	No	Yes
In our firm exploratory activities are done by spin offs / separate companies	No	No	No

Table 4.2. Answers from the 'old' construct *organizing for innovation*

From the answers that the interviewee (DESI) gave in the questionnaire can be concluded that they do not have temporal ambidexterity. Exploratory activities are continuously present and not only during certain moments in time. The respondent also indicated that the same employees carry out both exploratory and exploitative activities. This would indicate that this organization separates exploratory and exploitative activities contextually. But this is contradicted by the last answers of the respondent because here was indicated that exploratory activities are done within dedicated teams and separate business units. This indicates a more structural separation approach. So from the answers given in the questionnaire no unambiguous conclusion could be drawn.

The results from the next respondent (ERP) also did not lead to a clear answer of what type of ambidexterity is present. The respondent indicated in the questionnaire that exploratory activities are continuously present. He also indicated that the firm goes through high levels of exploratory activities followed by low levels of exploratory activities and that the same employees carry out both exploratory and exploitative activities. Based on these answers it is not possible to draw a conclusion of what type of ambidexterity is present at ERP.

From the answers given by the third respondent (Design Ltd.) it was again not possible to draw a clear conclusion regarding the type of ambidexterity. The respondent indicated that exploratory activities are continuously present. But it is also stated that the company goes through phases of high levels of exploration followed by low levels of exploratory activities. It is therefore again not possible to derive from these answers whether it is structurally or temporarily separated. To make things even more unclear the respondent also indicated that the same employees carry out both exploratory and exploitative activities, and that exploratory activities are done by dedicated teams and by separate business units. So the possibility of contextual ambidexterity also still exists based on these answers.

Item	TWS	IFGL	Blood Inc.
Our firm simultaneously performs both exploratory and exploitative activities at the same time	Yes	Yes	Yes
Our firm focuses on either exploration or exploitation at one point in time	No	No	No
Our firm uses distinct units that either exploit or explore	Yes	No	No
In our firm a unit both performs exploitative and exploratory activities	No	Yes	Yes

Table 4.3. Answers from the 'new' construct *organizing for innovation*

The results of the last three respondents lead to better results. From the answers given by the interviewees can be concluded that IFGL and Blood Inc. both use contextual ambidexterity to organize for innovation. Exploration and exploitation and simultaneously performed within the firm and units both perform exploitative and exploratory activities. Based on the answers from TWS can be concluded that they use structural ambidexterity to organize for innovation because exploratory and exploitative activities are present simultaneously and done by dedicated units that either exploit or explore.

4.2.2 Results interview

The respondent from DESI was asked how exploration and exploitation are organized within the company. The reaction was the following:

> “We have 3 employees who are concerned with new products and services full time. Those employees get a budget in order to look for new opportunities. They can run all kinds of test to look for new opportunities. But it is more commercial exploration. And we have about 15 employees who are full time busy with programming. This is real exploitation. Those employees are constantly busy with making small adjustments to the current system. So we do have exploration and exploitation at the same time. And it also occurs separately. Sometimes you do see that the people who are concerned with exploitative activities communicate with employees who are concerned with exploration. If for example the ‘exploitative’ employees find out that the ‘exploratory’ employees are busy with something new which cannot be incorporated in the current system, the ‘exploitative’ employees continue with building new tools in order for the exploratory products and services to fit in the current system.” (DESI interviewee)

Based on this clarification from the respondent can be seen that structural separation fits this organization most. During the interview it became clearer how ERP organizes for innovation:

> “It [exploration and exploitation] is not clearly divided. Sure, there are always some people dealing with exploratory activities. And it depends on what they are working on. But the

same people, who today are coping with current products, can be used tomorrow for entirely new activities. […] Yes, they can see for themselves what they do. We work on a project basis. And we as product managers decide which projects are present within the organization. So I will say to them I want to have a new e-mail button there. But a few days later I can give them a project to cope with the new developments and to create something new. Then they will explore this. So the real answer to this is that it is not divided. But, people are always working on exploratory activities." (ERP interviewee)

Based on this information it becomes clear that the employees at ERP are not structurally assigned to projects. He also explained how different projects are organized:

> "We have created teams for this [exploration]. We made time free for people to work on this. Those teams look for example what Apple, Google and Facebook are doing. Yes, we are creating totally different ERP concepts in the market. Yes, those are actually exploratory activities."

This indicates that ERP uses a form of structural ambidexterity to organize for innovation. The interviewee from Design Ltd. was the last one to be given the old version of the questionnaire. During the interview it became clear that temporal ambidexterity does not fit Design Ltd.:

> "When you are going to exploit one set of products you are already developing new projects." (Design Ltd. interviewee)

He further clarified the way innovation is organized:

> "We have a department at Design Ltd. of 3 FTE who cope with product development. These are industrial designers. But, at the same time they are used for improving the current products. So I think they are busy with new products development for about 70% of their time. And about 30% for providing service for current products. For example for coin machines, which we supply. They are used to provide service for those machines". (Design Ltd. interviewee)

This illustrates that the employees both carry out exploratory and exploitative tasks and that therefore this is not structurally separated within the company. Contextual ambidexterity fits the organization the most based on the interview.

The interviewee from TWS was the first respondent given the new construct. In the questionnaire he indicated that his firm simultaneously performs both exploratory and exploitative activities at the same time. He also agrees with the fact that his firm uses units that either exploit or explore. Based on these answers can be concluded that they organize for innovation through structural ambidexterity. This was not entirely supported by the interview. This organization has several projects running at the same time. And taking the project-level perspective the respondent said:

> "It [exploration and exploitation] does occur, but not simultaneously. If you look at the development process there are a number of steps. It is not the case that we immediately think about the market. We do look whether there is market for it and you follow the process with go and no-go moments. But it is not the case that is happens simultaneously. It is sequential. […] We now have about 5 or 6 of such projects." (TWS interviewee)

This shows that exploration is followed by exploitation taking a project-level perspective. But looking at it with a firm-level perspective there are always exploratory activities present within the firm. This indicates that exploratory and exploitative activities are not structurally separated because both are present within different projects; it is rather separated by time.

The interviewees from both IFGL and Blood Inc. indicated in the questionnaire that their firms simultaneously perform both exploratory and exploitative activities at the same. And they also agreed with the fact that the firm does not focus on either exploration or exploitation at one point in time. This indicates that temporal separation can be ruled out. From the answers could also be derived that in both firms a unit performs both exploitative and exploratory activities. So based on the answers from the questionnaire can be derived that the organization for innovation of these firms can be classified as contextual ambidexterity. This was supported by the reactions from the interviewees:

> "So at this point in time we have two people who are focused on technology. They are responsible for keeping the current products and services running, but also to renew them." (IFGL interviewee)

The question 'can these employees choose for themselves where they are going to work on?' was answered with:

> "Yes. But that is also a characteristic of a small company that the current products and the renewal of those products are very closely linked together. Because you are working with clients on a daily bases with the products and services, so you hear from them what their wishes are regarding the products and services. So exploration and exploitation are very closely linked together." (IFGL interviewee)

The interviewee from Blood Inc. indicated that they do not have separate teams who focus on either exploration or exploitation. He also indicated that they can decide for themselves whether they work on exploratory or exploitative activities. He reasoned it as the following:

> "That's mainly because we have 'professional' employees. People who work on a high level and can work independently. They are capable enough to divide their own time and to prioritize. Next to these activities they also have to perform their daily routines. But we are at a point now where we should have two people where one focuses on exploration and the other focuses on exploitation. I think we have reached this phase right now, but whether these are full-time jobs, I don't think so, yet. But like I said earlier they are real 'professionals'. And if you are good, you can create your own labor. So we are at the turning point right now. To be more professional, without more bureaucracy, I think we need separate managers. But I still would not call it separate units." (Blood Inc. interviewee)

4.2.3 Conclusion

The questionnaires completed by the first three respondents lead to disappointing results. From the answers given in the questionnaire could not be derived what kind of ambidexterity is present in the different firms. This was the case for all three of the respondents. For the first respondent both contextual and structural ambidexterity could fit this organization. For the other respondents who completed these items all forms of ambidexterity were still possible. This means that the validity of this construct was very low. Therefore it was decided to replace this construct.

The last three interviewees were given the 'new' version. For two of the three respondents the results from questionnaire matched with the answers from the interview. For one respondent it did not match. This was again the company TWS. Because they work on a project base exploration and exploitation are not separated into different units. This did not correspond with the answers given in the questionnaire. This respondent also misunderstood the questions at first. He thought the questions were aimed at project level while they were in fact aimed at firm level. He also asked or an explanation of the item 'Our firm uses distinct units that either exploit or explore'.

Because of the fact that the new construct has been completed by only three respondents it can't be stated that the validity of this construct is very high. Furthermore the fact that for one of the three respondents the outcome of the questionnaire did not match with the answer from the interview also does not contribute to the validity of this item.

4.3 Exploration patterns

This paragraph contains the results from the variable *exploration patterns*. Below the results from the questionnaire and the interview are described and subsequently a comparison is made to assess the validity of the variable.

4.3.1 Results questionnaire

In table 4.4 can be found which exploration pattern the interviewees marked in the questionnaire. The interviewees indicated that they had some trouble regarding this question. The reason for this was that the images of the different exploration patterns did not fit with how it evolved at their company. The Design Ltd. interviewee indicated that "the development was very different". The respondent from ERP also indicated that he had some trouble with this question: "But again it is a lot of reading and you have to translate it into the different patterns. I don't think one picture fits exactly with my company".

Company	Exploration pattern
DESI	Recovery
ERP	Steady
Design Ltd.	Recovery
TWS	Recovery
IFGL	Recovery
Blood Inc.	Recovery

Table 4.4. Answers from the construct *exploration pattern*

4.3.2 Results interview

Recovery Pattern at DESI, Blood Inc. and IFGL

The interviewee of DESI was asked to explain the choice for the 'recovery' pattern:

> "Yes, now they [exploratory activities] are constantly present. When I was doing research here it was not the case. The last one and a half years exploratory activities are constantly present within the company. The number of exploratory activities is reasonably stable. It always fluctuates a bit, but it is relatively stable." (DESI interviewee)

The interviewee from Cry-Save also crossed the 'recovery' pattern. From the explanation he gave can be derived that since the first products have been developed exploratory activities first decline and then grew again within his organization and therefore corresponds with the crossed answer:

> "Yes sure. I would say that we have pattern A [recovery pattern]. In 2000 we were very innovative, until 2004-2005 we didn't have any other things really. Then a new opportunity

arose, the umbilical cord, and later on the stem cells from fat. And now it is constantly present within the organization. But that is also because of the money we have available now. This company was build with own financial resources, and you can only spend money once. So in the beginning we had constrained resources." (Interviewee Blood Inc.)

The interviewee from IFGL explained the rationally behind his choice for the *recovery* pattern:

> "First we had a product that was technically not entirely new, but as a product in the market was new. We worked very hard to sell this product. This took a couple of years. Until we saw that we generated a reasonable amount of money we could afford it to spend it on research and development of new services and products, and to put those into the market. I think it still grows a bit and is not entirely steady. But at the early stages of the company it was about survival, but you have to realize that you came with something new on the market and because of that you are making money. So therefore we did continue with exploration." (IFGL interviewee)

After they put their product on the market the exploratory activities declined. Now he sees a recovery of these activities. This shows the *recovery* suits this company best. Especially because the interviewee is aware of the fact that he came with something new on the market and was making money because of that and therefore he has to continue with exploration.

Stable exploration pattern at ERP and TWS

Two other cases (i.e. ERP and TWS) show a stable exploration when the first product or service was launched onto the market. The interviewee at ERP stated that there are always some people dealing with exploratory activities. Therefore he concluded that "pattern D [Stable exploration pattern] fits us best. But it is not a complete stable line, there are always some fluctuations".

The interviewee at TWS explained how the exploration pattern evolved in his company since its establishment. He said that "the exploratory activities started later on. We never started with a high amount of exploratory activities. If the initial decrease in pattern A [recovery pattern] was not present, this pattern would fit my company best." Because the exploration pattern starts at the point when firms were confronted for the first time with significant growth pressure (Faems et al., 2010) it can be derived that the steady exploration pattern fits this company the best.

Non-recovery pattern at Design Ltd.

The interviewee from Design Ltd. explained how the exploration pattern evolved since the establishment of the organization:

> "We started with no exploratory activities. Then it grew fast. We started our business with trade to gain market knowledge. Therefore we did not have exploratory activities at the beginning of the company. It was not our goal to keep trading forever; we always had in the back of our minds that we wanted to create products. But the trading phase was for getting to know the market. Currently, we see a drop of exploratory activities for Design Ltd.. I hope it goes up again." (Design Ltd. interviewee)

The interviewee explained that the drop occurred because a part of the company was sold. This part of the company was mainly concerned with exploratory activities. The drop of exploratory activities and the sale of an exploratory part of the company indicate that at this point in time the *non-recovery* pattern fits the company the best.

4.3.3 Conclusion

There were some problems regarding the validity of this variable. The exploration patterns from four of the six firms matched with the questionnaire and the results from the interview. The answers from the questionnaire did not match with the answers from the interview for TWS and Design Ltd.. For the respondent of TWS this was because he judged the start of the line in the image to represent the establishment of the firm. Therefore he crossed the answer of the *recovery* pattern because it started out low and when they launched their first product is stayed stable. The respondent of Design Ltd. crossed the *recovery* pattern because he hoped that the exploratory activities went up again.

The majority of the complaints regard the fact that not one of the exploration patterns fits well with their firm. This can also be caused by the fact that the respondents thought that the start of the line in the image represented the establishment of the firm. This was caused by a mistake in the questionnaire. It stated that the line in the image represents the amount of exploratory activities within the firm since the establishment, while it should be when firms were confronted for the first time with significant growth pressure (Faems et al., 2011). Although it only affected one case the outcome could have been different.

4.4 Innovation strategy

This paragraph contains the results from the variable *innovation strategy*. This includes a description of the results from the questionnaire and the interview and furthermore a comparison is made to assess the validity.

4.4.1 Results questionnaire

Table 4.5 contains the means of the different constructs for all the companies. The respondents had some difficulties with completing some of the items. They asked for a clarification of five items in total. The item 'our firm responds to areas in which its environment puts pressure on it' was asked to clarify by twice by different interviewees.

Company	Prospector	Analyzer	Defender	Reactor
DESI	5.8	5.5	3.5	4.66
ERP	5.2	5	4.5	4.66
Design Ltd.	6.6	5.5	6	3.33
TWS	5	4.5	4.33	6
IFGL	5.8	6.5	6.17	4
Blood Inc.	5.4	5.5	4	4.33

Table 4.5. Means from the construct *innovation strategy*

The results in table 4.5 give an indication of the level of strategic activities for each type of business strategy. The results show that the strategic activities of DESI and Blood Inc. correspond most with the prospector and analyzer strategy. Design Ltd. and IFGL score high for the prospector, analyzer and defender strategy. This implies that the strategy these firms use have aspects of these different strategies. The results also show that ERP has a very diverse strategy, with aspects from all different types of strategies. TWS is most likely to use a reactor type of strategy.

4.4.2 Results interview

The respondent from DESI explained that they monitor the American market very closely because the technology is more developed there. At the same time they try to be innovative to become market leader with new products. The interviewee explained:

> "We took the knowledge from America. But we do have to think how we are going to incorporate this into the Dutch market. For some products we try to be very strong and stable, in order to become market lead. But on the other hand are we always exploring new opportunities. But, maybe that is because of the dynamic market in which we operate." (DESI interviewee)

The respondent from Blood Inc. explained that they "are almost everywhere the first mover". It was also said that because they act in the healthcare industry you have to be very careful and therefore everything was monitored very carefully, also what competitors do.

The respondent from ERP explained they have different strategies for different products: "Sometimes we like to be the first into the market, but sometimes we are also the smart follower. It depends on the kind of product."

4.4.3 Conclusion

The validity of the variable 'innovation strategy' can be regarded as good. The scores of DESI match very well with the answers given during the interview. DESI scored high means for both prospector and analyzer. It was explained that they monitor the American market very closely because the technology is more developed there. At the same time they try to be innovative to become market leader with new products. This explains the high means for the prospector and analyzer strategy.

Blood Inc. also has relatively high scores for the prospector and analyzer strategy. This was confirmed during the interview: "We are almost everywhere the first mover". It was also said that because they act in the healthcare industry you have to be very careful and therefore everything was monitored very carefully, also what competitors do.

The results from ERP also match with what the interviewee said during the interview. He explained they have different strategies for different products: "Sometimes we like to be the first into the market, but sometimes we are also the smart follower. It depends on the kind of product." This explains that the means of all strategies are relatively close together.

Design Ltd. and IFGL score relatively high for all the strategies except for the reactor strategy. For Design Ltd. this becomes of the fact that their competitors are mainly traders. Design Ltd. is the only company that has exploratory activities and therefore can defend its market quite easily while at the same time they have no competition from innovative products from competitors. For IFGL the profits come mainly from non-modified products. This indicates that they have to defend their position within the market. According to the interviewee they invest a lot of time and money into innovation relatively seen. This explains the high score for the prospector strategy.

TWS scores relatively the lowest scores for the prospector and analyzer strategy. This can again be explained by the nature of the activities which are more focused on exploitation. But what catches the eye even more is that they have a very high mean (6), both absolute and relatively, for the reactor strategy. The respondent indicated that he thought that these questions were ambiguous: "you can interpret them in different ways".

4.5 Collaboration for innovation

This paragraph regards the results from the variable *exploration patterns*. The results from the questionnaire and the interview can be found below. A comparison is included in order to assess the validity of this variable.

4.5.1 Results questionnaire

Table 4.6 illustrates which answers the respondents have given with whom they collaborate. In this table no distinction was made between national and international collaborations. There were no ambiguities regarding these items. The results show that the firms use all different types of partners to collaborate with.

Company	Suppliers	Customers	Research institutes	Universities
DESI	X	X	X	X
ERP	X	X	X	X
Design Ltd.	X	X		X
TWS	X	X	X	X
IFGL	X	X	X	X
Blood Inc.	X		X	X

Table 4.6. Answers from the construct *collaboration*

4.5.2 Results interview

It became apparent that collaborating was used often as a channel for innovation:

> "So we are always collaborating with these clients [advertisers and websites] for new developments. We also collaborate with call centers for example." (DESI interviewee)
> "We do a lot of things together with the University of Utrecht. And also with research institutes. And with clients too." (ERP interviewee)
> "Yes, we collaborate very intensively with customers. For successful trajectories we have used an end user, a research institute and a company which finishes everything and puts it into the market." (TWS interviewee)

The items for collaboration for innovation were split into two groups, namely exploratory and exploitative partners for collaboration. There was a mix of responses about the nature of collaborative activities:

> "And with the University of Utrecht the collaboration is mainly focused on scientific information. How do you make sure that the client learns about your organization, what do they want, how do you test it. If you come up with something really innovative, how do you cope with that, are you going to only one customer or are you going to multiple?" (ERP interviewee)
> "Yes we collaborate for example with customers from big festivals abroad. We rather look for small things which we can improve. Customers for example indicate that they want thinner bands, so that is to improve our current products. And the graduates are working on new product development." (Design Ltd. interviewee)

Other respondents indicated that they do not use research institutes and universities purely for exploratory ends:

> "Universities and research institutes are very important to us. We have both direct and indirect collaborations with them. Those partners have running projects and they need a private company for those projects. Because of our reputation we are asked to join. This is mostly aimed at improving current processes." (Blood Inc. interviewee)

When the interviewee from DESI was asked whether collaborations with universities and research institutes were more aimed at exploratory activities she responded with: "No, not really. Universities are not so up to date."

4.5.3 Conclusion

There is very little question regarding the matching of answers for this variable. All of the respondents regarded in the questionnaire that they collaborate with different kinds of partners for innovation. This was supported during the interviews. Therefore it can be stated that the validity is high for this variable.

What is remarkable though is that several respondents indicated that they did not only use research institutes and universities for exploratory activities, but also for exploitative purposes. Because the number of participators of this research is very small no evident conclusions can be drawn from this, but the results are noteworthy.

4.6 Performance

This paragraph contains the results from the variable *performance*. Below the results from the questionnaire and the interview are described and thereafter a comparison is made to assess the validity of the variable.

4.6.1 Results questionnaire

The first construct is *perceived performance*. The results of this construct can be found in table 4.7. The main thing that can be taken from these results is the great dispersion. It ranges from 2.75 until 6.75.

Company	Performance
DESI	5.75
ERP	6.75
Design Ltd.	2.75
TWS	4.5
IFGL	5.75
Blood Inc.	5.25

Table 4.7. Means from the construct *perceived performance*

The next construct is the *NPD function*. This constructs consists of two items, namely *NPD activities* and the *NPD sales* of the different firms. The respondents had trouble with differentiating the different types of activities and products. It was hard to judge what radical new products or what next generation products are. The results of the items *NPD activities* can be found in table 4.8, while the results of *NPD sales* are shown in table 4.9.

Company	Radical	Next Generation	Enhancements, hybrids, derivatives
DESI	25	25	50
ERP	10	40	50
Design Ltd.	5	15	80
TWS	5	15	80
IFGL	5	20	75
Blood Inc.	80	10	10

Table 4.8. Answers from the item *NPD activities*

Company	Breakthrough	Next generation	Addition	Non modified
DESI	25	25	10	40
ERP	10	30	20	40
Design Ltd.	60	20	10	10
TWS	1	4	15	80
IFGL	0	5	15	80
Blood Inc.	60	20	20	0

Table 4.9. Answers from the item *NPD sales*

The following constructs are *R&D Budget* (table 4.10) and *R&D Employees* (table 4.11). The interviewee from ERP indicated that he could not complete the items from the construct *R&D Budget*. According to this interviewee this was caused by the fact that he was not the CEO of the firm. Regarding the construct *R&D employees* the interviewees indicated they had trouble with judging what real exploration is and what exploitation is because within the firms they do not separate them so black and white.

Company	R&D Intensity %	Not divided	Exploratory activities %	Exploitative activities %
DESI	40	-	25	75
ERP	-	-	-	-
Design Ltd.	8	-	5	95
TWS	0.5	X	-	-
IFGL	7	-	50	50
Blood Inc.	2	X	-	-

Table 4.10. Answers from the construct *R&D budget*

Company	Employees NPD (FTE)	Not divided	Exploratory activities (FTE)	Exploitative activities (FTE)
DESI	20	-	3	17
ERP	60	X	-	-
Design Ltd.	3	-	0.25	2.75
TWS	4	X	-	-
IFGL	3	-	1.5	1.5
Blood Inc.	3	-	-	-

Table 4.11. Answers from the construct *R&D employees*

4.6.2 Results interview

It is very difficult to assess within an interview whether the numbers are correct. The comments that the interviewees made regarding the different constructs will be dealt with. First, the subjectivity of the construct *perceived performance* was brought to the attention. Several interviewees had comments regarding this subjectivity. The interviewee from Design Ltd. said: “This firm is achieving its full potential. How should I know? Maybe we could have been 10 times bigger. No, I am never satisfied; we can always be better and bigger”.

The next construct is *NPD function*. Several interviewees indicated that they had trouble with this construct:

> “What kind of model is this? I am trying to understand the model, but there are no subtitles, so I am not sure what it is about. I don’t know what the image is for. I don’t know where you want to go with it. I don’t understand the connection between process and product within the model. If I had to complete it by myself I would have skipped it. Such a model without the context included is not understandable. You don’t even know whether it is about a company.

It becomes very unclear [because of the picture]. It takes too long to analyze the image. And is about last year? Or since the establishment?" (Design Ltd. interviewee)

It took this respondent more than eight minutes to understand the image and to finish the question. The interviewee at ERP completely disagreed with the respondent from Design Ltd.. He said that it "made it a lot clearer" and that it is "a good image, absolutely". It took him also quite some time to finish this question. There were more difficulties regarding this question:

> "Question 50 [NPD Function] is also difficult to answer because a radical breakthrough is not a radical breakthrough anymore at a certain point in time. The breakthrough is improved continuously, but the competition also has it at a certain point in time." (Design Ltd. interviewee)
> **"**Question 50 [NPD Function] is difficult to answer. I could take from our figures." (TWS interviewee)

Regarding the construct *R&D budget* there were also some difficulties:

> **"**The questions starting at 52 [R&D budget] are quite difficult to answer. We do not really have a budget for R&D research, but we do have a few people behind their desk doing research about new opportunities in the market. So it is not really a budget but it rather concerns the labor costs of those employees. Therefore it is quite difficult to answer that question. And I can't say anything useful about question 53, so I do not answer that question." (DESI interviewee)
> **"**I really don't know questions 52 until 54 [R&D budget]. I need to check the annual reports for that." (ERP interviewee)

4.6.3 Conclusion

Checking the validity of the variable performance is rather difficult because it regards subjective items. The other constructs regarding new product development are also hard to validate because they contain numbers like the R&D intensity and the number of employees concerned with R&D. The validation can be judged based on the comments that the respondents had.

Regarding the construct *perceived performance* the respondents indicated that this was a very subjective construct. This was shown in the results from the questionnaire by the fact that the dispersion was very great. The results of this construct did not lead to great added value mainly because of this subjectivity.

The construct *NPD function* also lead to some trouble. One item of this construct contained an image to clarify the question. The respondent had mixed feelings about the image. One respondent said it made the item a lot clearer while another indicated that it made it a lot more unclear. What did become apparent is that it took the respondents a lot of time to analyze the image. It took one respondent more than eight minutes. Based on the reactions and the observations it was decided to delete this image after the first three interviews. For the time and the understandability of the questionnaire this seemed the best decision.

Regarding the construct *R&D budget* can be concluded that it is necessary for the validity that this is completed by the CEO of the company. The respondents who were not CEO's (DESI & ERP) had more problems with completing the items from this construct. The respondent from ERP could not complete these items and the respondent from DESI indicated she had trouble with this because she did not have the entire overview of the whole company. The CEO's could complete these items without a lot of difficulties. It was also decided to delete one item because three out of four of the respondents couldn't complete this item. The construct *R&D employees* did not lead to great ambiguities.

Although it is very difficult to assess the validity of these constructs, some things became apparent. The great dispersion of the construct *perceived performance* couldn't be linked to any other variables. Therefore this does construct does seem to have a lot of added value. Moreover because this construct itself does not lead to any insights about the actual performance of the firm. To increase the validity for this variable it should be completed by a CEO, this became apparent from the results of the construct *R&D budget*.

4.7 Validity Analysis

For the variables *innovation strategy* and *collaboration* are little questions regarding the validity. The answers given in the questionnaire reflected the answers from the interview well. The constructs *exploration* and *exploitation* from the variable *ambidexterity* also had a high validity. The answers from the firms that scored high on the items of these constructs validated this during the interview.

There are more problems with the validity of the construct *organizing for innovation* of the variable *ambidexterity*. From the answers given in the questionnaire could not be derived what kind of ambidexterity is present in the different firms. This was the case for all three of the respondents. This means that the validity of this construct was very low. Therefore it was decided to replace this construct. For two of the three respondents the results from the new construct matched with the answers from the interview. For one respondent this did not correspond with the answers given in the questionnaire. This respondent also misunderstood the questions at first. He thought the questions were aimed at project level while they were in fact aimed at firm level. To increase the validity it is stated in the adjusted version whether the questions regard a firm level or project level perspective.

There were also some problems regarding the validity of the variable *exploration patterns*. The exploration patterns from four of the six firms matched with the questionnaire and the results from the interview. The answers from the questionnaire did not match with the answers from the interview for two firms (TWS & Design Ltd.). For TWS this was because the respondent judged the start of the line in the image to represent the establishment of the firm. Therefore he crossed the answer of recovery pattern because it started out low and when they launched their first product is stayed stable. For Design Ltd. this was because the respondent hoped the amount of exploratory activities went up again.

The majority of the complaints regard the fact that not one of the exploration patterns fits well with their firm. This can be caused by the fact that the respondents thought that the start of the line in the image represented the establishment of the firm. This was caused by a mistake in the questionnaire. It stated that the line in the image represents the amount of exploratory activities within the firm since the establishment, while it should have been when firms were confronted for the first time with significant growth pressure (Faems et al., 2011). Although it only affected one case the outcome could have been different. These results lead to an adjustment in the question statement of this question.

Checking the validity of the variable *performance* is rather difficult because it regards subjective and numeric items. The validation can be judged based on the comments that the respondents had. Based on these reactions it was decided to delete an image from a construct regarding *NPD performance*. Although one respondent indicated that it became clearer because of the picture it still took him quite some time to finish it. For the time and the understandability of questionnaire this seemed the best decision. Another item was deleted from the construct *R&D budget* because three out of four respondents couldn't complete the item.

Although it does become apparent that the picture of the questionnaire matches with the answers from the respondents it can't be stated that the overall validity of the questionnaire is very high. This is mainly due to the problems with the variables *ambidexterity* and *exploration patterns*. The constructs of these variables had never been tested before and the outcomes of these tests lead to several modifications. This lead to a final version which needs more testing before it can be concluded that the overall validity of the questionnaire is high.

4.8 Content Analysis

Next to the validity of the questionnaire the content is also considered in this respect. The most remarkable outcomes will be dealt with below.

The first aspect regards ambidexterity. From the data description can be derived that two of the firms have indicated that they have structurally separated exploratory activities from exploitative activities. And one firm has no separation between these activities. What is remarkable is that three firms have contextual ambidexterity. Exploratory and exploitative activities are not separated within these companies but employees have the freedom to decide for themselves what they are working on. For two of the firms this is because they are small companies. They do not have the resources and or the amount employees to separate these activities structurally. The other firm is a large firm; it has an annual turnover of more than 30 million euro's each year. And it has between the 250 and 500 employees. But still exploratory activities are not structurally separated within this company. The CEO indicates that even though they have so many employees they are still too small to separate it structurally. He reasons that they have highly educated employees who work on a high level. They are capable enough to divide their own time and prioritize. This illustrates that the educational level of the employees could influence the type of ambidexterity.

Another remarkable aspect is that TWS deviates from the other companies. They have the lowest means for exploration and exploitation, no separation between exploratory and exploitative activities; they score very high on the reactor strategy (6) and the lowest on the prospector and analyzer strategy. It is also stated in the questionnaire that they have a R&D Intensity of 0.5%. The deviation can be explained by the fact that this firm is not a classical production company. It offers a variety of services. The major strength lies in its project oriented organization. These project teams do client specific projects whereby they consult and manage projects based on knowledge. This was illustrated by the fact that only 30% of their turnover is located into trade activities and 70% into projects teams. The major innovative strength of this company is not located into creating new products or services but mainly into the knowledge this company has. Because of this knowledge they can act as a consultancy for other companies within projects. The intangible nature of their activities makes it difficult to assess it in terms of exploration and exploitation. The results on the other variables do not correspond well with the stable exploration pattern.

From the literature could be derived that firms can have a dip in their exploratory activities after they have launched their first product or service because of resource constrains. Looking at the different exploration patterns of the firms this dip is noticeable for four of the firms. After they have launched their first product or services they did not have the resources to keep this level high. This process was excellently described by the respondent from IFGL. He noticed a drop after their first launch because they first had to survive and make money, but at the same time keep in the back of your mind that you are making money because you entered the market with a new product or service. Therefore the exploratory activities have to increase again in order for long-term survival. This corresponds very well with the literature.

Comparing the types of ambidexterity with the exploration patterns for the different firms leads to mixture of results. TWS is disregarded in this respect because it is regarded as an outlier. The relationships are shown in figure 4.1. One firm *with structural ambidexterity* has a *stable exploration pattern*. And one firm with *structural ambidexterity* has a *recovery pattern*. Both exploration patterns currently have a high amount of exploratory activities. Two firms with the *recovery pattern* are structured through *contextual ambidexterity*. By one respondent this was explained by the 'professional' employees located in this firm. The manager of this firm did acknowledge that he thought they are at a point now where separate managers for exploration and exploitation should be implemented. The other respondent indicated that they are too small for structurally separating their exploratory and exploitative activities. The last respondent with *contextual ambidexterity* has a *non-recovery* pattern. This was caused by the fact that they have sold a part of their exploratory activities. The results show that structurally separating exploratory and exploitative activities leads to high amounts of exploration. On the other hand can also be noticed that contextual ambidexterity can be useful for high levels of exploration if it is used in the right context. These results support the scientific literature which indicates that different forms of ambidexterity can lead to high exploratory activities.

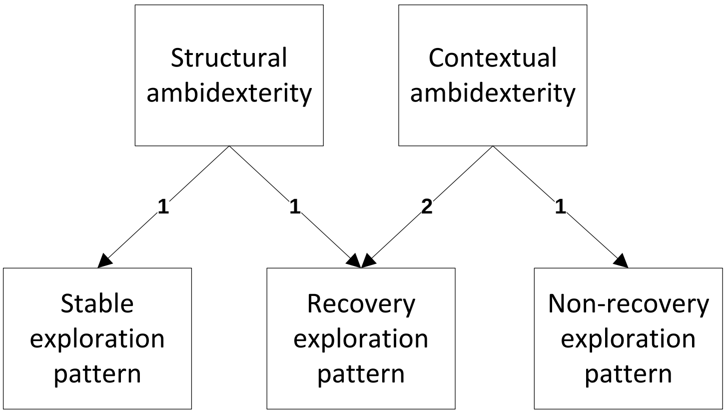

Figure 4.1. Relationship between ambidexterity and exploration patterns

The innovation strategies show interesting outcomes. TWS scores very high on the reactor strategy. This could explain their relatively low scores on exploration and exploitation. By comparing the other firms it becomes apparent that they all score relatively low on the reactor strategy. This seems logical because they have large growth percentages and score high on exploratory and exploitative activities. This indicates they want to be innovative and don't want to follow other companies. What also becomes apparent is that from these five companies Design Ltd. and IFGL score very high on the defender strategy. They both score high on this construct because they operate in a niche with a limited line of products. This can be explained by the fact that these are the smallest companies who have co-operated. Their small size can indicate that they have to defend their position within the market in order to survive.

Faems et al. (2005) indicated that collaborations with suppliers and customers are of an exploitative nature, while collaborating with research institutes and universities would lead to exploratory activities. This was only partly supported by this research. ERP did support this because the respondent indicated that their collaboration with the University of Utrecht is mainly focused on scientific information. The respondent from Design Ltd. also supported this by saying that they collaborate extensively with customers in order to improve current products. On the other hand the interviewee from Blood Inc. explained that they collaborate with universities and research institutes in order to improve current processes. The interviewee from DESI was also a bit cautious and said that universities are not so up to date. And that therefore the collaborations with them are not really focused on exploration. This does not correspond entirely with existing literature which indicates that exploratory collaborations are engaged in with universities and research institutes, while exploitative partners are suppliers and customers. It should be kept in mind of course that the number of participating firms is only six; this could also explain the deviation from the literature.

5. Conclusion and recommendations

This chapter contains the conclusion in paragraph 5.1. The conclusion includes insights about the questionnaire itself and about the content. The limitations and recommendations of this research are described in paragraph 5.2.

5.1 Conclusion

The aim of this research was to create a tool with which quantitative research on the topic exploration patterns of gazelle firms can be performed. This resulted into the following research question: *How can a tool be developed which provides valid and reliable data in order to perform quantitative research on the topic of factors influencing the exploration pattern of gazelle firms?*

In order to test the validity of the questionnaire several pre-tests have been carried out. During these tests it became apparent that there are some questions regarding the validity of the variables *ambidexterity* and *exploration patterns*. For the variable *ambidexterity* no clear conclusions could be drawn regarding the type of ambidexterity present at the firms. Therefore it was decided to replace the construct *organizing for innovation* after three tests. The new construct lead to better results but it can't be stated that the validity is high because it has only been tested at three firms. The construct of the variable *exploration patterns* also had some trouble regarding the validity. Several respondents indicated that the exploration patterns did not fit exactly with the development of their exploratory activities. This could have been the result of a mistake in the questionnaire. Although it only affected the results negatively for one respondent, the outcome could have been different.

Although it is hard to assess the validity of the variable performance, because it includes both subjective and numeric constructs, several respondents indicated that they had some trouble with completing it. An item and an image were deleted after the first three tests. For the other variables, *innovation strategy* and collaboration, there were little troubles regarding the validity. Taking this into account it can't be stated that the validity of the overall questionnaire is high. The tests performed do not provide evidence for a high assessment of the validity. This was first of all caused by the fact that the constructs *organizing for innovation* and *exploration* patterns were created by the research, and no prior tests had been performed on these constructs. Secondly, the validity assessment can be caused by the low amount of tests that have been performed. If more tests were performed the latest version of the questionnaire could have been tested. This could have resulted into a better assessment of the validity of the questionnaire.

Next to the validity assessment it became apparent that the questionnaire is not applicable for all types of firms. For this research several different firms, from different kinds of industries, have participated. Most of the participants created products or delivered services to customers. But there was one company which was primarily concerned with client specific projects. Within these projects this firm participated based on their knowledge or acted as a consultant, typical intangible activities. This type of activities did not correspond well with the items from the questionnaire. The respondent indicated that they have a stable exploration pattern. This was contradicted by other data retrieved from the questionnaire. Their R&D intensity is only 0.5% which was the lowest of all participating firms and their score on exploratory activities was also the lowest of all firms. This indicates that the questionnaire does not provide valid outcomes for firms who rely mostly on intangible activities such as consultancy. Therefore such firms should be excluded from the research because their exploration pattern does not match well with reality.

The information gained from the different cases also lead to several insights about the content of organizing for innovation. This research shows that companies use different ways to organize for innovation. From the participants two firms structurally separated exploratory and exploitative activities into different units. These firms currently have high stable levels of exploratory activities. The exploration patterns determined at these firms are the *recovery* and *stable exploration* pattern. This corresponds well with existing literature (March, 1991; Auh & Menguc, 2005) which indicates that a balance can be achieved through structurally separate exploratory and exploitative activities in order for an organization to survive. Other firms were successful by applying *contextual ambidexterity*. This also is alignment with the results from Faems et al. (2011) and Krabbenbos (2010). These showed that firms with the *recovery* or *stable* exploration pattern achieved this through structural or contextual ambidexterity.

Faems et al. (2011) indicate that all patterns can be viable for fast growing organizations, except for the *non-recovery* pattern. One firm has been classified with a *non-recovery* pattern in this research and is still a gazelle firm. This can be explained by the fact that the performance of a firm is the result of the activities. The exploratory activities have decreased substantially and this could affect the growth percentages of this firm negatively in the future. This can already be noticed because their growth percentage has decreased from 40% in 2009 to 10% in 2010. This decrease in performance can be a signal that this is not a viable pattern for a gazelle firm on the long-term.

A second contribution of this research is the insight that the educational level of the employees could influence the type of ambidexterity which is present at a firm. The CEO of a firm with more than 250 employees stated that he does not want to separate exploration and exploitation structurally because his employees are highly educated people who work on a high level. He reasons that they are capable enough to divide their own time and to prioritize. This means that contextual ambidexterity, used within the right context, can lead to high levels of exploratory activities.

A third contribution of this research is found by linking the strategy of an organization with the exploration pattern. Faems et al. (2011) indicated that the *steady exploration* pattern fits the *prospector* strategy and that the *recovery* pattern fits the *analyzer* strategy. Such a clear link is not found in this research but it does show that the five firms score high on the *analyzer* and *prospector* strategy. That they score high for multiple strategies can be explained by the fact that firms can use different strategies for different products.

It is also remarkable that it seems that the size of a firm influences the type of strategy a firm uses. The two smallest companies from the participants score very high on the *defender* strategy. Their small size can indicate that they first have to defend their positions within the market in order to survive. Although Gimenez (2000) shows that different small firms use different strategies the outcome of this research indicates that the two smallest firms do have defending aspects within their strategy.

A final contribution is concerned with collaboration. Faems et al. (2005) showed that collaborating with research institutes and universities are for exploratory purposes, while collaborations with customers and suppliers indicate an exploitative nature. This was not fully supported, because during the interviews respondents have indicated that they also collaborate with universities and research institutes for exploitative activities.

5.2 Limitations and recommendations

The first limitation of this study is that this is a multiple case study. Although it leads to a deep understanding of how firms operate, the amount of organizations studied is very small. The small size of participating firms is a large limitation because it did not lead to a high judgment of the validity of the questionnaire. This has implications for further research. It is recommendable for several reasons to perform another string of tests before using the questionnaire for actual quantitative research. First of all, even for a pre-test the amount of participating firms is rather low. Only six firms have been studied while other scholars (Jansen et al., 2006; Gibson & Birkinshaw, 2004) use in-depth interviews with ten or more top executives. Second of all, no statistical evidence can be presented to validate the questionnaire. The amount of participating organizations was too low to perform these tests. Furthermore the questionnaire has been adjusted after the last couple of tests. In order to see whether the modifications work in practice and to test the validity statistically additional tests are recommended.

The focus of the tests should be especially on the variables *ambidexterity* and *exploration patterns*. These are the constructs created by the researcher and need further testing before these can be used in the actual questionnaire. To possibly overcome these problems it is recommendable to search for scientific literature in which other constructs have been created to measure these variables. A literature review has been done within this research, but research on this topic is growing. This can indicate that meanwhile other constructs have been developed to measure these variables in a different way. The tests in this research have been done in two phases, divided into two groups of three. This enabled the researcher to perform adjustments after three tests and test these adjustments at the following three firms. For further research this is a good approach of testing because adjustments can be tested to increase the validity of the questionnaire.

A second limitation regards the data collection. Pre-tests are carried out with the use of in-depth interviews with managers at gazelle firms. Because the conclusions of the validity are based on these interviews it is crucial that these lead to accurate insights about the organization. In order to avoid socially acceptable answers and brighter representations of the reality it is recommendable to perform interviews with both the CEO and the CTO or the head of the R&D department. With the use of a second interview the information about the organization can be verified, in turn this leads to a better judgment of the validity. A rather similar limitation regards the fact that the data gained from a questionnaire is based on the judgment of the respondents. For some variables this is the best way to obtain that data. For the variable *performance* it is however recommendable to use annual reports of the firms. The figures in the annual reports give a less subjective view about the performance.

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7. Appendices

Appendix A: The questionnaire

Questionnaire Exploration Patterns

In the questionnaire you will find instructions for each set of questions. We understand that in some cases you may find that the particular question does not entirely fit your case. Whenever such situations happen, please use your best judgment to answer the question and try not to skip it. We sincerely appreciate your efforts in completing all questions.

This questionnaire regards how an organization organizes for innovation. This can be done through various channels. First, this questionnaire contains the internal organization for innovation. Second, collaboration for innovation will be dealt with. Third, the strategy for innovation is included. The last part of the questionnaire contains the innovation performance of your firm. The results for the questionnaire will be used to test the influence of these factors on the evolution of the exploration pattern of a firm.

Please note that individual responses will be strictly confidential and only known by the research team.

Thank you very much for your cooperation!

Please indicate your contact details below	
Name of the organization	
Your name	
Your position within the organization	
Your e-mail address	

Part A - General

Company Description

1. In which year was the company established? _____

2. In which industry does your company operate? _______________

3. How many employees (FTE) are present in the total organization? Please cross **one** answer.

- □ Less than 10
- □ 10 – 49
- □ 50 – 249
- □ 250 – 500
- □ More than 500

4. What is the financial size of your firm? Please cross **one** answer.

Annual turnover

- □ Less than €2m
- □ €2m - €30m
- □ More than €30m

5. What is the turnover growth percentage of your firm…

…in 2008?	…in 2009?	…in 2010?
__%	__%	__%

Part B – Organizing for innovation

This part of the questionnaire is about organizing for innovation. These propositions are about the exploratory and exploitative activities of your organization. For this questionnaire the following definitions are used:

Exploration includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation.
Exploitation includes such things as refinement, choice, production, efficiency, selection, implementation and execution.

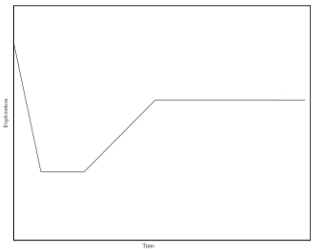
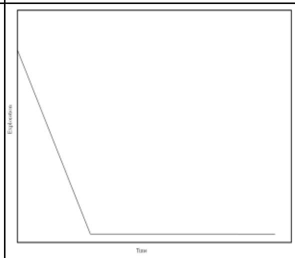
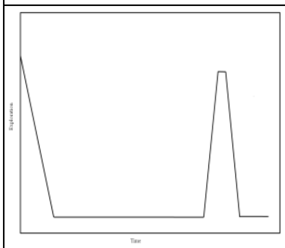
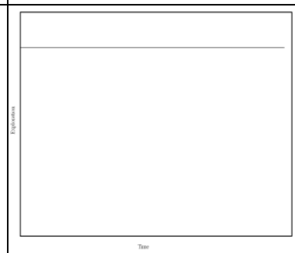
Exploratory activities									
The following propositions are about the exploratory activities within your company. To what extent do you agree with the next propositions? Please cross **one** answer (1 = Strongly disagree, 7 = Strongly agree, n/a = Not applicable).		**Strongly disagree**				**Strongly agree**			**n/a**
		1	2	3	4	5	6	7	8
6	Our firm accepts demands that go beyond existing products and services	□	□	□	□	□	□	□	□
7	We invent new products and services	□	□	□	□	□	□	□	□
8	We experiment with new products and services in our local market	□	□	□	□	□	□	□	□
9	We commercialize products and services that are completely new to our firm	□	□	□	□	□	□	□	□
10	We frequently utilize new opportunities in new markets	□	□	□	□	□	□	□	□
11	Our firm regularly uses new distribution channels	□	□	□	□	□	□	□	□

Exploitative activities										
The following propositions are about the exploitative activities within your company. To what extent do you agree with the next propositions? Please cross **one** answer (1 = Strongly disagree, 7 = Strongly agree, n/a = Not applicable).		**Strongly disagree**				**Strongly agree**				**n/a**
		1	2	3	4	5	6	7		8
12	We frequently refine the provision (het voorzien van) of existing products and services	◻	◻	◻	◻	◻	◻	◻		◻
13	We regularly implement small adaptations to existing products and services	◻	◻	◻	◻	◻	◻	◻		◻
14	We introduce improved, but existing products and services for our local market	◻	◻	◻	◻	◻	◻	◻		◻
15	We improve our provision's efficiency of products and services	◻	◻	◻	◻	◻	◻	◻		◻
16	We increase economies of scale in existing markets	◻	◻	◻	◻	◻	◻	◻		◻
17	Our firm expands services for existing clients	◻	◻	◻	◻	◻	◻	◻		◻

Organizing for innovation			
The following propositions are about the organization of exploratory and exploitative activities within your firm. Please circle **one** answer.			
18	Our **firm** simultaneously performs *both* exploratory and exploitative activities at the same time	Yes	No
19	Our **firm** focuses on *either* exploration or exploitation at one point in time	Yes	No
20	Our firm uses distinct **units** that *either* exploit or explore	Yes	No
21	In our firm a **unit** *both* performs exploitative and exploratory activities	Yes	No
22	Employees have the freedom to choose whether they work on exploratory or exploitative activities	Yes	No

Part C - Exploration Pattern

This question concerns the exploration pattern within your firm. The exploration pattern is the development of the amount of exploratory activities within your firm. The line starts when your firm was confronted for the first time with significant growth pressure. The X-axis indicates time. The Y-axis indicates the amount of exploratory activities within the firm. The more exploratory activities in the firm, the higher the line.

Pattern A	Pattern B
 This pattern is characterized by an initial drop of exploratory activities followed by a recovery of the exploratory activities in the next stages of the firm.	 This pattern is characterized by an initial drop of exploratory activities. During the next stages of the firm emphasis stays on exploitative activities.
Pattern C	Pattern D
 This pattern is characterized by shifts between high and low levels of exploratory activities.	 This pattern is characterized by the high steady level of exploratory activities.

23	Please indicate which of the patterns below fits best with the development of your organization. Please cross **one** answer.
□ Pattern A	
□ Pattern B	
□ Pattern C	
□ Pattern D	

Part D – Innovation Strategy

The following propositions are about the innovation strategy of your company. To what extent do you agree with the next propositions? Please cross **one** answer (1 = Strongly disagree, 7 = Strongly agree, n/a = Not applicable).		**Strongly disagree**				**Strongly agree**			**n/a**
		1	2	3	4	5	6	7	8
24	Our firm leads in innovations in its industry	☐	☐	☐	☐	☐	☐	☐	☐
25	Our firm believes that being 'first-in' in the industry is attained through the development of new products/services	☐	☐	☐	☐	☐	☐	☐	☐
26	Our firm responds rapidly to early signals of opportunities in the environment	☐	☐	☐	☐	☐	☐	☐	☐
27	Our firm's actions often lead to a new round of competitive activity in the industry	☐	☐	☐	☐	☐	☐	☐	☐
28	Our firm adopts quickly promising innovation in our industry	☐	☐	☐	☐	☐	☐	☐	☐
29	The innovations which are chosen by our firm are carefully examined	☐	☐	☐	☐	☐	☐	☐	☐
30	Our firm carefully monitors competitors' actions in our industry	☐	☐	☐	☐	☐	☐	☐	☐
31	Our firm tries to locate a safe niche in a relatively stable products / services domain	☐	☐	☐	☐	☐	☐	☐	☐
32	Our firm tries to maintain a safe niche in a relatively stable products / services domain	☐	☐	☐	☐	☐	☐	☐	☐
33	Our firm tends to offer a narrower set of products / services than its principal competitors	☐	☐	☐	☐	☐	☐	☐	☐
34	Our firm concentrates on trying to achieve the best performance in a relatively narrow product-market domain	☐	☐	☐	☐	☐	☐	☐	☐
35	Our firm tries to maintain a limited line of products / services	☐	☐	☐	☐	☐	☐	☐	☐
36	Our firm tries to maintain a stable line of products / services	☐	☐	☐	☐	☐	☐	☐	☐
37	Compared to its competitors in the industry, our firm is aggressive in maintaining its products / services domain	☐	☐	☐	☐	☐	☐	☐	☐
38	Our firm takes many risks	☐	☐	☐	☐	☐	☐	☐	☐
39	Our firm responds to areas in which its environment puts pressure on it	☐	☐	☐	☐	☐	☐	☐	☐

Part E – Collaboration for innovation

Collaboration

Please indicate the type of organization and the location of your collaborative partner(s) for innovation. **More than one** option is possible.

Type of partner		Localization of the partner	
		National	International
40	Suppliers	□	□
41	Customers	□	□
42	Research institutes	□	□
43	Universities	□	□

Part F – Performance

Overall performance

The following propositions are about the overall performance of your company. To what extent do you agree with the next propositions? Please cross **one** answer (1 = Strongly disagree, 7 = Strongly agree, n/a = Not applicable).		**Strongly disagree**				**Strongly agree**			**n/a**
		1	2	3	4	5	6	7	8
44	This firm is achieving its full potential	□	□	□	□	□	□	□	□
45	People at my level are satisfied with the level of firm performance	□	□	□	□	□	□	□	□
46	The firm does a good job of satisfying our customers	□	□	□	□	□	□	□	□
47	This firm gives me the opportunity and encouragement to do the best work I am capable of	□	□	□	□	□	□	□	□

New product development function

48. Please estimate the percentage of your organization's total new product development activities accounted for each of the following three types in the last **three** years (the total sums up to 100%)

%	A. Radical breakthrough in core products and processes
%	B. Next generation of core product and / or process
%	C. Enhancements, hybrids, and derivatives of core product and or process
100 %	

49. Please distribute the percentages of your total annual sales originating from the following types of new products which have been introduced the last **three** years (the total sums up to 100%)

%	Breakthrough new products
%	Next generation new products
%	Addition to Product Family and/or Derivatives/Enhancements
%	Non modified products
100 %	

Please would you give some information on the innovation performance of your organization?

R&D Budget		
50	Approximate NPD/R&D spending as % of sales (R&D intensity)	___%
51	How is this divided over the different types of NPD/R&D activities?	
	□ Not divided	
	□ Exploratory activities: ___%	
	□ Exploitative activities: ___%	

NPD/R&D Employees		
52	How many employees are concerned with NPD/R&D	___FTE
53	How is this divided over the different types of NPD/R&D activities?	
	□ Not divided	
	□ Exploratory activities: ___FTE	
	□ Exploitative activities: ___FTE	

This is the end of the questionnaire. Thank you very much for your cooperation!

Appendix B: Difficulties regarding the questionnaire

DESI

Nr.	Question	Explanation
15	We improve our provison's efficiency of products and services	I do not know exactly what "provision" means
33	Our firm tries to locate a safe niche in a relatively stable products / services domain	What is exactly meant with this?
52	Approximate R&D / NPD spending as % of sales (R&D intensity)	The questions starting at 52 are quite difficult to answer. We do not really have a budget for R&D research, but we do have a few people behind their desk doing research about new opportunities in the market. So it is not really a budget but it rather concerns the labor costs of those employees.
53	What is the NPD/R&D budget per year?	I can't say anything useful about question 53, so I do not answer that question.

ERP

Nr.	Question	Explanation
5	What is the turnover growth percentage of your firm?	I don't know them by hard.
16	We increase economies of scale in existing markets	What do you exactly mean with that?
19	Our firm goes through phases of high levels of exploratory activities followed by low levels of exploratory activities	This is difficult
24	Indicate which of pattern below fits best with the development of your organization.	I find question this very difficult. And I'm asking myself whether you should ask this one. Even with visualization. Because I do understand the question. But again it a lot of reading and you have to translate it into the different patterns. I don't think one picture fits exactly with my company.
36	Our firm tries to maintain a limited line of products / services	What do you mean with a "limited line of products"? What is it exactly? Limited with regard to what?
40	Our firm responds to areas in which its environment puts pressure on it	And what do you mean with question number 40?
49	Please estimate the percentage of your organization's total new product development (NPD) activities accounted for by the Core Products of each of the following three types.	Question 49 is very difficult. Where to the activities you have fit in? Are they radical or next generation? How do you judge what it is? It is going to be very inaccurate. The innovations are following each other very fast.
51	Approximate NPD / R&D spending as % of sales (R&D intensity)	I really don't know questions 51 until 53. I need to check the annual reports for that.

52	What is the NPD / R&D budget per year?	I really don't know questions 51 until 53. I need to check the annual reports for that.
53	How is this divided over the different types of NPD activities?	I really don't know questions 51 until 53. I need to check the annual reports for that.

Design Ltd.

Nr.	Question	Explanation
5	What is the turnover growth percentage of your firm?	I don't know the amount of growth percentages exactly, I would have to look that up. I do know the estimates.
6	Our firm accepts demand that go beyond existing products and services	"We accept demand that go beyond existing products". How do we accept demand? What do you mean by that?
10	We frequently utilize new opportunities in new markets	What does Utilize mean?
12	We frequently refine the provision of existing products and services	What does refine mean? Provision, what does that mean?
15	We improve our provision's efficiency of products and services	What do you exactly mean with improving efficiency of scale in question 15?
18	In our firm exploratory activities are continuously present	What do you mean with exploratory at question 18? Examaning?
22	In our firm exploratory activities are done by dedicated teams	What are dedicated teams?
24	Indicate which of the patterns below fits best with the development of your organization.	Does question 24 regard the budget or is it the amount of activities? : I can't do anything with that question. The development was very different.
40	Our firm responds to areas in which its environment puts pressure on it	I don't understand anything of question 40. I think that is a difficult question
49	Please estimate the percentage of your organization's total new product development (NPD) activities accounted for by the Core Products of each of the following three types.	Question 49: What kind of model is this? I am trying to understand the model, but there are no subtitles, so I am not sure what it is about. No, I don't know what the image is for. I don't know where you want to go with it. It don't understand the connection between process and product within the model. If I had to complete it by myself I would have skipped it. Yes, such a model without the context included is not understandable. You don't even know whether it is about a company.
50	Please distribute the percentages of your total annual sales originating from the following types of new products which have been introduced the last three years	Question 50 is also difficult to answer because a radical breakthrough is not a radical breakthrough anymore at a certain point in time. The breakthrough is improved continuously, but the competition also has it at a certain point in time.

53	How is the NPD / R&D spending divided over the different types of NPD activities?	At question 53 I forgot the difference between exploratory and exploitative activities again. I know you already explained it.

TWS

Nr.	Question	Explanation
12	We frequently refine the provision of existing products and services	What do you mean exactly with question 12
18	Our firm simultaneously performs both exploratory and exploitative activities at the same time	I thought it was about a single research project
19	Our firm focuses on either exploration or exploitation at one point in time	I thought it was about a single research project
20	Or firm uses distinct units that either exploit or explore	What does that exactly mean?
22	Indicate which of the patterns below fits best with the development of your organization.	I can't find our development back within the patterns.
48	Please distribute the percentages of your total annual sales originating from the following types of new products which have been introduced the last three years	Question 48 is difficult to answer.

IFGL

Nr.	Question	Explanation
5	What is the turnover growth percentage of your firm?	Do you want the growth percentages very explicitly? Because than I will have to look them up.
14	We introduced improved, but existing products and services for our local market	Do you mean the products and services of others at question 14?
24	Our firm believes that being 'first-in' in the industry is attained through the development of products / services	And what do you mean with first-in industry at question 24?
44	People at my level are satisfied with the level of firm performance	What do you mean at question 44 with 'people at my level'?
49	Approximate NPD / R&D spending as % of sales (R&D intensity)	What do you mean with NPD at question 49?

Blood Inc.

Nr.	Question	Explanation
6	Our firm accepts demand that go beyond existing products and services	Is question 6 about the demand from customers?
13	We regularly implement small adaptations to existing products and services	What is the difference between question 13 and 14?
14	We introduce improved, but existing products and services for our local market	What is the difference between question 13 and 14?