MASTER THESIS

Strategy and Focus of the Firms: a study of their relationship in networks

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EXECUTIVE SUMMARY

In this thesis, the research question is "*How does the relationship between the strategic orientation and explorative or exploitative focus of spin-offs influence the way these firms use their networks?*" The motivation for this research has been that there is a need to better understand the way in which spin-offs can more efficiently use their relationships given the scarce resources new spin-offs have. In addition to this, keeping multiple relationships and not knowing how the network can help spin-offs to get information, support and resources can be very time and money consuming for new established firms.

This research aims to be the first step to investigate how spin-offs can make a more efficient use of their networks by including what information is more important for spin-offs, and who can provide them the information they require depending on their strategy and focus.

The research, first, explores two different strategies: market and entrepreneurial orientation. By studying these strategies it will be possible to identify what these strategies are about and how firms pursue their objectives. For example, firms that adopt a Market Strategic Orientation can be seen as firms that put the customer first in business planning. On the other hand, firms that a adopt an Entrepreneurial Strategic Orientation can be seen as firms that emphasize aggressive innovation, risky projects, and pioneer innovations that preempt competition.

Second, the explorative and exploitative focus of the firms is analyzed. This analysis helps to identify the way in which firms attempt to get advantages from the current market conditions and changes or from their research activities. For example, firms that try to become more efficient in their daily activities and get profits in the short term can be seen as exploitative firms. On the other hand, firms that try to develop new technologies or services that will bring future profits can be considered explorative.

Third, the previous two steps lead to an overview about how each strategic orientation is influenced by the focus of the firms.

Fourth, the research analyzes the business and social networks characteristics. These two types of networks provide different advantages such as market environment information and immediate access to resources, respectively. Moreover, the research also analyzes the different topics that spin-offs discuss with the members of their networks. In this sense, external and internal topics to the firms are studied. For example, external and internal topics provide information about market opportunities and efficient internal firm organization, respectively.

The combination of the previous steps provides guidance to answer the research question. According to the theoretical expectations, the main findings suggest that within the market orientation strategy, explorative firms gather more information about the firm's environment or context. This kind of information allows spin-offs to identify market opportunities. On the other hand, the results indicate that within the entrepreneurial orientation strategy, explorative firms use their business contacts to get the most relevant information they require from the network.

However, not all the theoretical expectations are supported by the tests results in this research. It interesting to highlight that, in the tests, external topics and business contacts do not seem to be related, although theoretically they seem to be logically related.

In practice, we base our advice on what the firms in this study did. However, we do not have any performance indicators to check which spin-offs performed better. But, all the spin-offs included in the analysis are still operating. Thus, the findings suggest that it might advisable for spin-offs to keep a balance between the type of contacts they have, but paying special attention to business contacts if they are entrepreneurial and explorative oriented. In addition, it is also recommended for spin-offs to discuss about all the possible topics, but discussing more external topics if the spin-offs are market and explorative oriented.

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1 INTRODUCTION

Over the last years there has been an increasing interest about networks[1] and how entrepreneurial firms[2] have used them in the past. It is accepted that entrepreneurial firms solve their lack of information and resources through their networks, which make networks essential for entrepreneurial firms' survival. The access to these resources and information through networks does not require any investment by recently established firms. Consequently, we can affirm that these firms gain the benefits of being part of a network without extra costs or investments. All of these concepts arise from the Social Capital theory (Seibert et al., 2001), and the Resource-Based view (Peteraf, 1993).

The mentioned interest about networks and entrepreneurial firms has been the main point of interest to produce an increasing number of studies that analyze the use of networks by firms. These studies mainly discuss the effects of strong and weak ties in organizational learning (Honig and Davidsson, 2000), the effects of a central position within a network to control access to information and knowledge (Powell et al., 1996; Johannisson et al., 1994), and the effects of the size and density of the network (Baum et al., 2000) to access resources. However, despite of the extensive literature about networks and entrepreneurial firms we do not find evidence indicating how firms can make a more efficient use of their networks.

[1] A network can be seen as a set of actors and some set of relationships that link them (Hoang and Antoncic, 2003).
[2] Entrepreneurial firms can be described as firms willing to accept a high level of personal, professional or financial risk to pursue market opportunities.

In addition, we have to take into account that it has been studied the different ways by means of explorative or exploitative[3] networks (Koza and Lewin, 1998; Rothaermel, 2001) help networked firms to gain the information or support needed. In this sense, several studies (Zahra et al., 2009; Litrico and Lee, 2008) show the importance of exploration and exploitation[4] for firm performance.

On the other hand, from the weak ties concept (Granovetter, 1973) it is accepted that having multiple weak ties (the more the better) is beneficial for firm growth and survival. Nevertheless, we consider that not all the ties (or contacts) are equally important because different contacts also provide different resources or information. It is in the search of these resources and information when firms start using networks (Baum, 1996).

Finally, strategic orientation[5] is required to achieve and balance competitive advantage and long term success. Many studies (e.g., Wiklund and Shepherd, 2003) talk about how the strategic orientation (market or entrepreneurial) of the firms influences on the decision firms make between focusing their activities on the exploitation of their current business, and looking for new market opportunities. Thus, we can see that not only networks are important to analyze exploration and exploration within firms, but also the strategy.

As it is discussed, there are several studies that independently focus on the importance of networks, strategy, and exploration or exploitation for entrepreneurial firms. But, these concepts have never been put together. During this research, we are going to address this gap by analyzing the relationship between the strategy and focus of spin-offs[6], and how this relationship influences on the way in which spin-offs use their networks. In other words, during this research we are going to try to answer the following research question:

> *How does the relationship between the strategic orientation and explorative or exploitative focus of spin-offs influence the way these firms use their networks?*

[3] Explorative and exploitative networks can be seen as networks that favour firms' exploration and exploitation respectively.
[4] Firms focus on exploitation when they get profits from their current activities. On the other hand, firms focus on exploration when they try to develop new services or products that can bring them future profits.
[5] The market orientation is meant to achieve sustainable competitive advantage. The entrepreneurial orientation is meant to achieve long-term success.
[6] Spin-offs can be defined as "new firms created to exploit commercially some knowledge, technology or research results developed within a university" (Pirnay et al., 2003).

In order to answer this question, we consider what Fombrun said: "The aggregate network can be viewed as an overlapping set of networks of different transactional content. The only conceptually meaningful strategy of analysis is to distinguish each network by its content, [and] analyze it separately" (Fombrun, 1982, p.280). Besides, we also take into account what Burt observed, "network content is rarely a variable in the studies—analysts agree that informal coordination through interpersonal networks is important as a form of social capital, but their eyes go shifty like a cornered ferret if you push past the network metaphor for details about how specific kind of relations matter" (Burt, 1997, p. 357).

Thus, these points of view mean a different and innovative approach because we consider the content of the discussions and who provides each type of information as the most relevant network characteristics, and we analyze them skipping other characteristics that have already been analyzed in other researches such as the strength of ties (Honig and Davidsson, 2000) or the network structure (Baum et al., 2000).

Besides, the answer to this research question can help spin-offs to understand how they can manage their relationships depending on what they need to get from them. This is interesting due to the limited experience and knowledge about how to make use of the contacts the firms have. In fact, we believe that this information may be crucial to show new spin-offs how spin-offs that were launched several years ago and are still operating, used their contacts. By so doing, new spin-offs can learn about the use of networks during their first years of operation depending on their strategy and focus, and without keeping non-valuable relationships, which can be time and money consuming.

In order to study all of it, we carry out an analysis where we study 72 young technology-based spin-offs established between 1998 and 2004 within The Netherlands. These firms provided information about their contacts regarding how they made each contact[7], and the topics[8] they discussed. With these data we make two groups regarding the type of contacts (social and business contacts) and the topics discussed (external and internal topics). Then, we take these groups to the firm level and we classify the 72 firms as explorative or exploitative within each strategic orientation.

[7] personal, academic, previous work, and business contacts (See p.33)
[8] 1) market, clients and competitors, 2) technology and development, 3) collaboration, 4) organizational and legal, 5) personal and accommodation, and 6) finance (See p.33)

In this research we perform t-tests because this tool allow us to study, within each strategic orientation, whether there are differences between explorative and exploitative firms regarding the type of contacts (social or business) that is more likely to be part of the spin-offs' networks. T-tests are also used to check, for each strategic orientation, whether explorative and exploitative firms differ on the type of information (external or internal to the firm) they get from their network.

In summary, from a scientific point of view, this analysis is important because it links several concepts that have never been put together: the strategic orientation of the firms, the focus of the firms on exploration or exploitation, and network characteristics like the content of the discussions among the members of the network, and the contacts that provide spin-offs the information or resources they need during their first years of operation.

Moreover, there is scarce literature regarding how the strategic orientation and focus of entrepreneurial firms affect the networking activities of the firms (with whom they discuss and about what they discuss). This research will shed some light on this area.

From a managerial point of view, this research may help new spin-offs to identify how they can effectively use their networks in order to be successful in their business. Therefore, the project will basically provide deeper insight on how spin-offs can use their networks depending on their explorative or exploitative focus and strategic orientation.

In this report we will develop all the ideas and concepts introduced in the Introduction chapter. Chapter 2 explores the research framework by explaining the concepts that are used in the empirical part in more detail. Besides, in Chapter 2, we formulate the hypotheses that will be tested in the analysis. In Chapter 3, we explain the operationalization of concepts that are used during the analysis in Chapter 4. As it has already been mentioned, we carry out the analysis per se and we describe the results in Chapter 4. Finally, in Chapter 5, we explain the conclusions and limitations of this research, and we also provide guidance and recommendations for future research on this area.

2 THEORY AND HYPOTHESES

2.1 INTRODUCTION

As we have seen during the Introduction, the main objective of this research is to analyze how the relationship between the strategic orientation and the focus of the firms on exploration or exploitation influences the way spin-offs use their networks.

Figure 2.1 shows the general research model. In the figure, we see that we take into consideration the strategy together with the focus of the firms and we study the effects of this relationship on firms' networking activities.

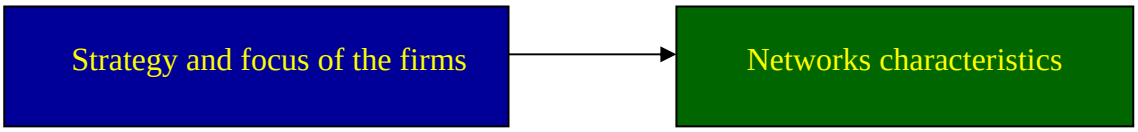


Figure 2.1General Research Model

In order to answer the main research question, we need to get a deeper understanding of the concepts we use in this research. For this purpose, we study researches that analyzed those concepts independently. This chapter is organised as follows:

1. The concepts of market and entrepreneurial strategic orientation and their differences are explained.
2. The exploration and exploitation concepts are defined and related with the strategic orientation.
3. The concept of networks is explained. In addition, we give a brief overview about why networks are so important for entrepreneurial firms.
4. The network characteristics that are used in the research are explained.

5. Finally, we formulate the hypotheses that will be tested in the empirical part by relating the network characteristics with the strategy and focus of the firms.

2.2 THEORY

2.2.1 MARKET AND ENTREPRENEURIAL STRATEGIC ORIENTATION

A. The market strategic orientation

Market orientation (MO) was first defined within the marketing literature as an organization-level culture comprising values and beliefs about putting the customer first in business planning (Renko et al., 2009). Based on this definition many studies strongly advocate that firms adopt a market orientation to achieve competitive advantage.

At its core, MO places the highest priority on the profitable creation and maintenance of superior customer value, and thus endorses the classic tenet of staying close to the customer (Slater and Narver, 1998).

In the effort to create superior customer value continuously, MO emphasizes the need to understand target customers and existing and potential competitors thoroughly, as well as the interfunctional coordination of firm resources and activities. Empirical evidence also indicates that MO enhances firm performance (Renko et al., 2009).

Market oriented firms exploit their current business, but they also develop new products. In this sense, Mavondo, Chimhanzi, and Stewart (2005), discovered that market orientation is positively related to process and product innovation, as well as administrative innovation. Moreover, Lukas and Ferrell (2000) showed that a greater emphasis on customer orientation increases the introduction of new-to-the-world products, and reduces the number of me-too products launched by a firm.

Im and Workman (2004) found that customer orientation influences new-product novelty significantly but negatively. From Im and Workman's (2004) study, it appears that enhancing customer orientation is less likely to help a firm create truly innovative, novel products because current customers may not approve novel product ideas because of their inertia toward existing products in the market.

To sum up, market oriented firms' efforts concentrate on the current customer or market needs. In order to satisfy these needs firms develop new products or processes.

However, the innovations might not be break through inventions because customers are afraid of changes. Thus, these radical innovations can jeopardize firm performance.

B. The entrepreneurial strategic orientation

Miller (1983) describes entrepreneurial orientation (EO) as one that emphasizes aggressive innovation, risky projects, and a proclivity to pioneer innovations that preempt competition.

Covin and Slevin (1989) have developed a scale for the measurement of the three components of entrepreneurial orientation, namely innovativeness, proactiveness, and risk taking.

- Innovativeness reflects a tendency to support new ideas, novelty and creative processes, thereby departing from established practices and technologies. Hence, innovativeness, as conceptualized in entrepreneurial orientation, is akin to explorative learning in organizational learning literature (March 1991).
- Proactiveness refers to a posture of anticipating and acting on future wants and needs in the marketplace.
- Risk taking is associated with a willingness to commit large amounts of resources to projects where the likelihood and cost of failure may be high (e.g., Wiklund and Shepherd 2003). It largely reflects the organization's willingness to break away from the tried-and-true and venture into the unknown.

The above suggests that organizations that have an EO are more prone to focus attention and effort towards opportunities. EO likely has positive performance implications for the firm. The shortening of product and business model lifecycles makes future profit streams from existing operations uncertain and businesses need to constantly seek out new opportunities (Hamel, 2000). An EO can assist companies in such a process.

Innovative companies, creating and introducing new products and technologies, can generate extraordinary economic performance and have even been described as the engines of economic growth (Brown and Eisenhardt, 1995).

Proactive companies can create first-mover advantages, target premium market segments, and 'skim' the market ahead of competitors. They can control the market by dominating distribution channels and establish brand recognition.

While tried-and-true strategies may lead to high mean performance, risky strategies leading to performance variation may be more profitable in the long run (McGrath, 2001). Previous empirical results provide support for a positive relationship between EO and performance (Wiklund and Shepherd 2003).

A firm's EO is typically decided from the perspective of its CEO. This is an accepted approach (cf. Covin and Slevin, 1989). But, in large firms CEOs might be separated from 'how a firm operates' by layers of middle managers. This is less likely a problem for small and medium-sized businesses. Thus, this paper follows this approach because the research deals with spin-offs where the CEOs already decided the EO of their firms.

C. Differences between market and entrepreneurial orientation

At an extreme, entrepreneurial orientation has been represented as a complete opposite to market orientation; traditional market orientation has been described as an adaptive capability by which firms react or respond to conditions in the market environment (Renko et al., 2009).

On the other hand, Atuahene-Gima and Ko (2001) explicitly state that entrepreneurial orientation is ". . . akin to technological orientation because it increases the firm's ability and will to acquire new technical knowledge to build new technical solutions to meet new and latent needs of users." This technological orientation ". . . refers to a firm's value system that promotes technology in new products at the expense of customer news or market orientation" (Atuahene-Gima and Evangelista 2000).

Instead of generating, disseminating and responding to market intelligence, entrepreneurially oriented firms generate, disseminate and respond to technological knowledge themselves.

However, it is argued that most of firms have an inherent tendency toward either market or entrepreneurial orientation. Nevertheless, firms pursue strategies where they balance the market and entrepreneurial orientation.

In summary, the differences between entrepreneurial and market orientation make it possible to study both strategies independently. These two strategies make firms with opposite strategies to be interested in different topics that provide them diverse information from various sources. Therefore, the strategy affects on how firms use their networks because their needs or interests are different.

But, as it is mentioned, firms pursue strategies that balance their market and entrepreneurial orientation. Due to this, the strategy is not the only characteristic that influences on what the firms discuss, or from whom they gather the information.

This research considers that the explorative or exploitative focus of the firms contributes to make the distinction in the type of information required from the network, or the contacts that provide such information.

2.2.2 THE EXPLORATIVE OR EXPLOITATIVE FOCUS OF THE FIRMS

Firms, in general, try to get profits from their current activities (exploitation) or try to develop new services or products that can bring future profits to the firms (exploration). Based on these simple ideas the exploration and exploitation concepts can be distinguished.

However, there are definitions about these concepts in the literature. March (1991) defined exploration within firms as 'things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation', and exploitation as 'such things as refinement, choice, production, efficiency, selection, implementation, execution'. To put it differently, exploration entails radical innovation in the sense that it changes fundamental architectures, logics or principles, of technology, organization, or markets. In addition, there is uncertainty about which technical standards will later yield the 'dominant design', there is much volatility of prototyping, the emphasis in competition lies on technical feasibility and a 'race to the market', there is a great deal of trial and error, and knowledge is often highly tacit.

On the other hand, exploitation entails improvements, in fine-tuning or increased efficiency, within basic logics or structures. Moreover, technical development has consolidated in a dominant design, uncertainty in supply and demand has subsided, knowledge becomes more codified and diffused, new players and consumers enter into the emerging market, competition shifts to efficient production and distribution, and the emphasis shifts to a new dominant design in organisation (Nooteboom & Gilsing, 2004).

Although it is out of the scope of this research, it is useful to give a general idea about what happens if firms focus too much on exploration or exploitation.

When firms focus on exploitation, they pay special attention to the efficient employment of current assets and capabilities. Thus, exploitation is needed to survive in the short term.

On the other hand, when firms focus on exploration, they seek the development of novel capabilities, meaning that exploration is needed to survive in the long term.

By putting the previous ideas together, it can be derived that to survive in the short and long term, firms must combine these two targets. However, most of the companies do not know how to balance their efforts in these objectives. For example, firms that engage in exploration to the exclusion of exploitation are likely to find that they suffer

the costs of experimentation without gaining many of its benefits. They exhibit too many undeveloped new ideas and too little distinctive competence. On the other hand, firms that engage in exploitation to the exclusion of exploration are likely to be stagnant.

As a result, maintaining an appropriate balance between exploration and exploitation is a primary factor in system survival and prosperity. Thus, since long term survival depends on sustaining a reasonable level of exploration; the tendencies to increase exploitation and reduce exploration make adaptive processes potentially self-destructive (March, 1991).

After describing the strategic orientation and the focus of the firms on exploration or exploitation, it is the moment to put these concepts together.

In general, entrepreneurial oriented firms look for new technological knowledge and developments (Atuahene-Gima and Ko, 2001), and market oriented firms react to changes in the market environment (Schindehutte et al., 2008).

Regarding the focus of the firms, explorative firms look for new and radical innovations that create new knowledge, while exploitative firms focus on the improvement of existing technologies that adapt to market changes (Nooteboom & Gilsing, 2004). Thus, in general, entrepreneurial oriented firms focus more on exploration, and market oriented firms focus more on exploitation.

A more detailed analysis of the differences between the two strategies and the focus of the firms will be done during the development of the hypotheses.

2.2.3 THE ROLE AND IMPORTANCE OF NETWORKS

After describing the strategic orientation of the firms and their focus we move to the network level.

However, before we study the characteristics of the networks, we introduce the Social Capital Model and the Resource Based View. These concepts are crucial to understand why we include networks in this research.

A. The Social Capital Model

The Social capital model is based on the belief that a network provides value to its members by allowing them access to the social resources that are embedded within the network (Seibert et al., 2001).

This theory helps to explain different outcomes like firm growth (Ostgaard & Birley, 1994), and career success (Seibert et al., 2001).

This model is specially useful to explain a venture's success from three concepts:

- Burt's (1992) structural holes concept, according to which it is advantageous for a unit to be linked to other units that are themselves unconnected.
- Granovetter's (1973) weak tie concept, according to which it is advantageous to have many narrowly defined links.
- Lin's (1999) social resource theory, according to which advantages stem from the nature of the resources embedded in a network.

For example, high-growth entrepreneurial ventures are generally run by a small number of colleagues who act like a social clique (all members are interconnected by emotionally intense links), and therefore can lack the requisite diversity of reference frames about best practices, customer needs, competitor moves, and so on.

Thus, it is advantageous for a venture to form many links with high-status (credible and competent) external partners who have a diverse set of experience (Burt, 1992). Through these contacts, entrepreneurs have access to useful, reliable, exclusive, and less redundant information, which, in turn, improves a venture's likelihood of success (Brüderl and Preisendorfer, 1998).

However, the network not only provides information, but also brings financial support. For example, the social resources embedded in the networks can signal potential stakeholders that a venture's business concept is legitimate, like human resources are thought to signal legitimacy. Therefore, the social capital explanation is based on the credentials of the team's social contacts.

In addition to this, social capital serves as both a product of the entrepreneurial network and an enabler of continued network development, facilitating coordination and co-operation of network ties by bonding the parties involved (Anderson and Jack, 2002).

Moreover, the social capital leads to the relational view. The relational view focuses more on information and resources leveraged from personal and direct relationships the entrepreneur has developed with others through a history of interactions (Granovetter, 1992). This view, thus, includes many aspects of the social context, such as social interactions and the degree of trust in the relationships (Nahapiet and Ghoshal, 1998). For example, investors are more likely to invest in new ventures when they have a

previously established direct tie to the entrepreneur than when they do not because these ties generate a sense of obligation and trust.

In summary, the social capital model suggests that the external networks of a firm form a major contributor to its performance. This implies that start-ups should pursue strategies focusing on the development of valuable networks with external resource holders in order to succeed.

B. The Resource-Based View

The *Resource-Based View (RBV)* regards the firm as a bundle of resources and suggests that their attributes significantly affect the competitive advantage of the firm and, by implication, its performance (Barney, 1986, 1991; Peteraf, 1993). Most conspicuous among these resources are those that are valuable, scarce, imperfectly tradable, and hard to imitate (Barney, 1991; Peteraf, 1993). The RBV suggests that start-ups pursue entrepreneurial strategies that focus on the accumulation of intangible resources for survival and/or growth.

By following the Social capital Model and the Resource-based view, we try to better understand how the use of networks by entrepreneurial firms helps them to gain the necessary resources they lack to be more competitive within their business environment.

C. ENTREPRENEURIAL NETWORKS DEFINITION AND ITS IMPORTANCE

After these two definitions, we introduce the concept of entrepreneurial networks that is used in the research, and the role that networks play in an entrepreneurial context.

Despite all the definitions and type of networks, we follow the model by Birley[9] (1985) and Hansen[10] (1989) and we study two types of networks: social and business networks.

In general, we can define social networks as those comprising mainly family, kin, and friends, and business networks as consisting of ties that spring mainly from business activities of entrepreneurial firms (Aegean Leung, 2003). However, the characteristics of these networks will be explained later.

[9] Birley (1985) realized that entrepreneurial networks link to the relations between new ventures creators and external environment.

[10] Hansen (1989) figured that entrepreneurial networks focus on the social resources, which not only include the relations between new business founders and their networks members, but comprise the relations between different networks members.

Regarding the importance of networks for entrepreneurial firms, strategy and entrepreneurship scholars agree on the fact that networks play a central role in successful firm emergence and growth (e.g., Birley, 1985). From both, the relational view and the resource-based view; the firm's network relationships represent critical avenues for the acquisition of resources necessary for firm survival and growth.

In new established firms, networks are vital to the discovery of opportunities, to the testing of ideas, and to gain resources for the formation of the new organization (Aldrich and Zimmer, 1986). Potential partners are often very reluctant to put their reputation, capital, or other resources at risk in a start-up, whose financial prospects, if not its longevity, are uncertain.

One of the main characteristics of networks is that networks bring information to the firm. As networks provide information benefits, a focal firm with higher level of social capital is better positioned to find entrepreneurial opportunities. Other firms having ties with the focal firm provide information regarding new technological and market opportunities, and solicit collaboration in exploiting new entrepreneurial opportunities.

These firms also make referrals on behalf of the focal firm to third parties that are in search of strategic alliances to exploit or explore new entrepreneurial opportunities. Therefore, keeping a good relationship with the members of the network provides competitive advantage to the firm.

In this study, we consider the exchange of knowledge as the key resource to networking activities.

In this sense, inter-organizational learning is critical to competitive success, because organizations learn by collaborating with other firms as well as by observing and importing their practices (Dyer et al., 2000). Indeed, some authors have emphasized that the exposure to many different external contacts is essential to learning in the new competitive environment (Dyer et al., 2000; Zahra et al., 2000). In fact, this exposure to a variety of contacts enhances young technology-based firms' ability to assess and value the knowledge that is already available within the network. Indeed, Zahra et al. (2000) see diversity of contact as the key to increasing the breadth, depth, and speed of an entrepreneurial firm's learning: exposure to a variety of external contacts increases the firm's 'learning by doing;' increasing new knowledge integration skills, and, thereby, the speed and depth of subsequent technological learning.

Although it will be explained later, it is interesting to note that entrepreneurial firms' efforts to seek for new knowledge through inter-organizational learning are reduced if the members of the firms belong to a social network. Powell (1990) supports this view by stating that social networks are the most efficient organizational arrangement for sourcing information because information is difficult to price (in a market) and to communicate through a hierarchical structure.

Thus, firms whose employees are members of a social network would learn more effectively than firms whose employees are not members of such a social network, because the quality of the information for the members of the social network would be higher.

Apart form this; we can also say that social networks play an important role regarding opportunity recognition because it implies access to private information. This information can be easily shared among the network members, while others cannot foresee this information flow. Therefore, social networks have a large influence on who knows what, and when they know it. When the information is available is important because timing is also crucial for opportunity recognitition.

As a final remark, it is necessary to mention that there are studies like those by Koza and Lewin (1998) and Rothaermel (2001) that analyzed the focus of the networks on exploration or exploitation.

They characterized exploration networks as aiming at experimentation with novel combinations and having new technology as its key outcome. The associated learning process is one of 'broadening', i.e. broad searches for technologies that are new to the firms involved (Rowley et al., 2004). While exploitation networks were characterised as aiming at the joint maximization of complementary assets, in view of commercialising newly explored technology, with new products and services as its key-outcome. The associated learning process is one of 'deepening', i.e. refining and strengthening of the existing technology. As we can see, the characteristics of exploration and exploitation networks are very similar to the characteristics of the firms that focus on exploration or exploitation.

However, in this research we take the exploration and exploitation characteristics to the firm level and, together with the strategy, we analyze how these concepts interact and affect firms' networking activities.

As it is shown in the Theory development, the activities or characteristics that are part of this study are the information firms require from the network and the contacts that provide the most valuable information to the firms. By so doing, this research adds strategy and organizational learning literature with entrepreneurial networks theory.

Therefore, this research brings more and new knowledge on how firms can use their networks. This means that depending on the strategy and focus of the firms, they will better know what they can discuss and who is going to provide them the information or resources they need.

This is especially useful because entrepreneurial firms may be advised about how to use their networks more efficiently. In this sense, keeping multiple non valuable contacts might be very time and money consuming.

2.3 HYPOTHESES

Until now, we have studied the importance of networks for entrepreneurial firms, the concepts of exploration and exploitation applied to the firm level and the market or entrepreneurial strategic orientation of the firms.

However, we have not discussed yet the relationship that the exploration or exploitation focus and the strategic orientation of the firms have with the different network characteristics. From now on, we explain these relationships and we hypothesize about the direction of the relationships.

From previous researches we are aware of several characteristics about the networks configuration like centrality (the position of the firm in the global network; it shows the ability of a firm to reach resources through direct or indirect links), size (the number of links between a focal firm and other firms), density (how interconnected the contacts of a firm are among them) or the strength of ties (how well and for how long you know the contact, and how often you meet the contact) (Hoang and Antoncic, 2003).

However, this research focuses our interest in the information flows within the network and who provides this information. Due to this, we study in what kind of networks the firms are involved and the content of the discussions the firms have with their contacts.

From the theory we have seen that, normally, entrepreneurial oriented firms focus on exploration while market oriented firms focus on exploitation. However, there are entrepreneurial oriented firms whose focus is on exploitation (i.e., firms that need to

improve the efficiency of a process that has recently been developed), and market oriented firms whose focus is on exploration (i.e., firms that adapt to market changes and have to develop a new product).

This happens because firms within each dimension have to make profits in the short and long term. Thus, there are explorative and exploitative firms in each strategic dimension. Therefore, we analyze the differences between explorative and exploitative firms for each dimension. However, as it was already explained, the characteristics of the explorative or exploitative focus of the firms for each dimension are the same.

The following figures show the expected relationships between the strategy and focus of the firms with the different network characteristics, and the hypotheses they represent.

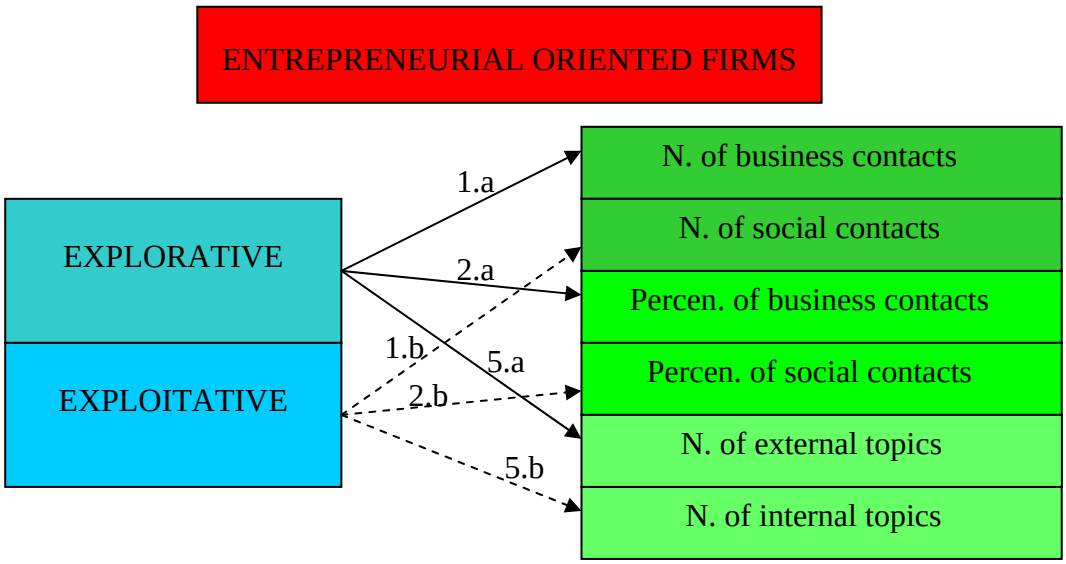


Figure 2.2 Entrepreneurial Oriented firms expected relationships and hypotheses

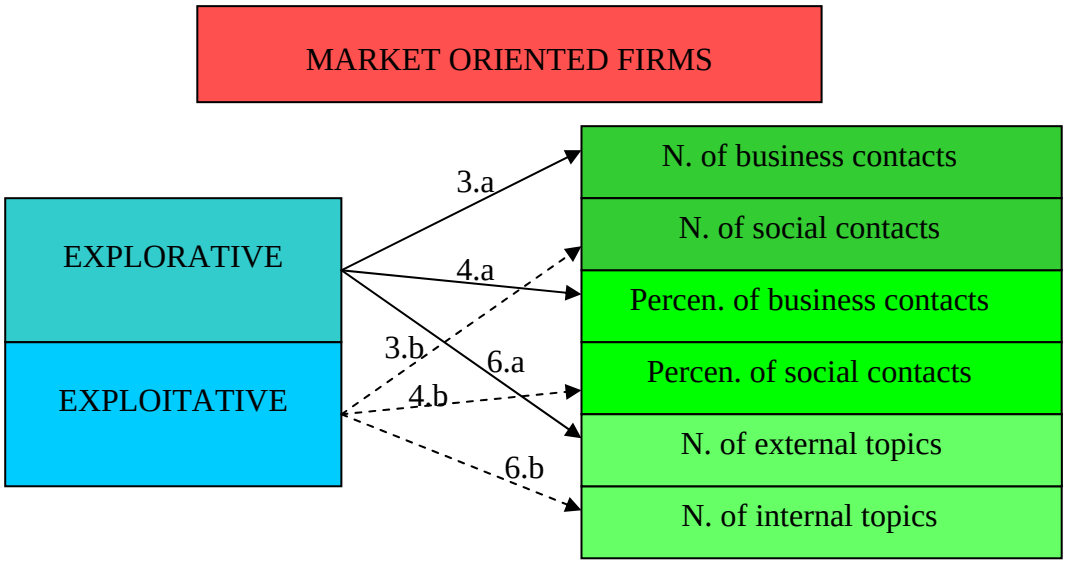


Figure 2.3 Market Oriented firms expected relationships and hypotheses

As we said in Chapter 1, we study social and business networks. Social network contacts advice entrepreneurial firms to be profitable in the short term, while business network contacts help firms to look for new opportunities and future profits. Nevertheless, we give a definition and explanation about what these networks are.

2.3.1 CONTACTS THEORY AND HYPOTHESES

A. Social networks

We define social networks as strong and active relationships with other individuals that existed before the creation of the firm. These networks include family (non-business), friends, and former colleagues. Family and friends (i.e., non-business networks) are considered to be part of the start-up resources of the firm (Johannisson, 2000).

The entrepreneurs' social networks are regarded as an important resource for the start-up firm (Ostgaard and Birley, 1994; Johannisson, 1995). These strong ties have various benefits for the entrepreneur at the start of the firm by providing access to resources.

Social networks help entrepreneurs to avoid opportunism and uncertainty through trust, predictability, and voice. Because the entrepreneur can trust the other party, it is easier to predict his/her behavior, avoid problem in the relationship, but better deal with them when they do occur (Aldrich, 1999). Therefore, resource access is immediate and the working relationship does not need a "warm-up period" in which the two partners get to know each other. As a consequence, such networks should allow entrepreneurs to achieve performance targets faster (Davidsson and Honig, 2003).

The more social relationships the start-up possesses, the faster the entrepreneurs should be able to access necessary resources. Large family and friends networks should therefore affect firm performance positively (Johannisson, 2000). Thus, social network contacts help entrepreneurial firms to get more profits in the short term.

B. Business Networks

Business networks involve relationships with direct competitors.

The management literature generally considers industries to be collections of firms bound together by rivalry, therefore questioning the value of relationships with competitors (Dollinger, 1985). However, it has been argued that relationships with competitors can help entrepreneurs towards a better understanding of their firm context and opportunities, thus influencing firm performance (Dollinger, 1985).

Co-opetition (i.e., cooperation between competitors) seems to be a widespread phenomenon of entrepreneurial firms (Dowling et al., 1998). Firms can use competitors as subcontractors in times where the firm has temporarily reached full capacity. This cooperative behavior, especially with regional competitors, will increase the likelihood of the favor being returned. Moreover, firms can form alliances with competitors in order to handle large projects.

Overall, relationships with competitors can give access to temporarily needed resources or lead to the temporary pooling of resources, which should positively influence firm performance especially in the years after foundation, when sales tend to grow discontinuously (Lechner and Dowling, 2003).

While it has been argued that business networks at foundation might be harmful because such relationships could lead to the disclosure of competitive information (Baum et al., 2000), lack of business networks can also constraint firm development in the years following foundation.

Entrepreneurial firms that view competitors not only as pure rivals but also as a potential resource should therefore be more successful (Lechner and Dowling, 2003). Thus, business network contacts help entrepreneurial firms to get more profits in the long term.

After explaining the differences between social and business networks we describe how we expect the strategy and focus of the firms determine how spin-offs use these contacts.

As we argue during the Theory development, we think that the strategic orientation of a firm influences on what a firm require from the network. However, we also argue that these needs are also determined by the explorative or exploitative focus of the firms. This is why we make groups of hypotheses for each strategy where we discuss the effects of exploration and exploitation on the network characteristics.

Now, we look at the entrepreneurial strategic orientation. As a reminder, this strategy emphasizes aggressive innovation, risky projects, and a proclivity to pioneer innovations that preempt competition (Miller, 1983). Firms that follow this strategy are more prone to focus attention and effort towards opportunities.

From the theory, we can also see that explorative firms look for new and radical innovations that create new knowledge (Nooteboom & Gilsing, 2004). We expect that having multiple business contacts will help explorative firms to get a better understanding of the firm context and opportunities (Dollinger, 1985). In addition, firms can form alliances with competitors in order to handle large projects (Lechner et al., 2006).

On the other hand, exploitative firms mainly adapt to market changes (Nooteboom & Gilsing, 2004) and the information about the firm context and opportunities that business contacts offer are less important for them. Moreover, exploitative firms focus on the improvement of existing technologies that adapt to market changes leading to efficient employment of current assets and capabilities (Nooteboom & Gilsing, 2004). In order to make these changes, exploitative firms need immediate access to resources.

Through social contacts resource access is immediate. In fact, the more social relationships the start-up possesses, the faster the entrepreneurs should be able to access necessary resources (Davidsson and Honig, 2003). Thus, we hypothesize:

> **Hypothesis 1.a:** *Within the dimension of entrepreneurial oriented firms, firms that focus on exploration have more business contacts (in number) than firms whose focus is on exploitation.*

> **Hypothesis 1.b:** *Within the dimension of entrepreneurial oriented firms, firms that focus on exploitation have more social contacts (in number) than firms whose focus is on exploration.*

In the same line of reasoning, we expect that explorative firms will have a higher percentage of business contacts than exploitative firms, while exploitative firms will have a higher percentage of social contacts.

> **Hypothesis 2.a:** *Within the dimension of entrepreneurial oriented firms, firms that focus on exploration have more business contacts (in percentage) than firms whose focus is on exploitation.*

> **Hypothesis 2.b:** *Within the dimension of entrepreneurial oriented firms, firms that focus on exploitation have more social contacts (in percentage) than firms whose focus is on exploration.*

From now on, we move to the market strategic orientation. Market orientation has been described as an adaptive capability by which firms react or respond to conditions in the market environment (Renko et al., 2009).

These characteristics are similar to the characteristics of explorative firms.

Business contacts can help entrepreneurs towards a better understanding of their firm context and opportunities (Dollinger, 1985). Thus, having multiple business contacts benefits the explorative orientation of the firms.

On the other hand, market oriented firms need to exploit their current business in order to survive in the short term. This characteristic is akin to exploitation within firms. In addition, social contacts should allow entrepreneurs to achieve performance targets faster (Davidsson and Honig, 2003). Thus, having multiple social contacts benefits the explorative orientation of the firms.

Thus, we hypothesize:

> **Hypothesis 3.a:** *Within the dimension of market oriented firms, firms that focus on exploration have more business contacts (in number) than firms whose focus is on exploitation.*

> **Hypothesis 3.b:** *Within the dimension of market oriented firms, firms that focus on exploitation have more social contacts (in number) than firms whose focus is on exploration.*

Hypothesis 4.a: *Within the dimension of market oriented firms, firms that focus on exploration have more business contacts (in percentage) than firms whose focus is on exploitation.*

Hypothesis 4.b: *Within the dimension of market oriented firms, firms that focus on exploitation have more social contacts (in percentage) than firms whose focus is on exploration.*

2.3.2 CONTENT THEORY AND HYPOTHESES

In order to study what kind of knowledge is shared within the networks, we take the firm point of view and we analyze whether the topics they discuss are internal or external to the firms and their influence in the focus of the firms.

A. External topics

Knowledge about markets, technology and collaboration with competitors represent resources that potentially have strong performance implications, because, we argue, they increase the ability to discover and exploit opportunities.

Market knowledge can increase a firm's ability to discover and exploit opportunities because: (1) awareness of customer problems may have great generality and thus constitute real market opportunities; (2) it is easier to determine the market value of new scientific discoveries, technological change etc.; (3) the locus of innovation often lies with users of new technologies who cannot easily articulate their needs for not-yet-developed solutions to problems, and therefore the organization must share some of the same tacit knowledge as its users (Cohen and Levinthal, 1990; Shane, 2000).

In support of this, Shane (2000) found that prior knowledge of customer problems and ways to serve the market influenced the discovery of solutions to customer problems. Those who lack customer familiarity (Shane, 2000) and knowledge of ways to serve the market (Shane, 2000) will find it difficult to recognize solutions to customer needs and to formulate an effective marketing strategy to introduce and sell the new product/service.

Technological knowledge can also enhance the discovery and exploitation of opportunities. Sometimes knowledge can lead to a technological breakthrough that represents an opportunity despite its market applicability not being readily apparent (cf. Abernathy and Utterback, 1978). Technological knowledge can also enhance a firm's ability to effectively exploit an opportunity by, for example, determining the product's

optimal design to optimize functionality, cost, and reliability (Rosenberg, 1994) and ultimately the economic impact of exploiting the opportunity (McEvily and Chakravarthy, 2002). Therefore, technological knowledge provides a firm with the ability to rapidly exploit opportunities, or to be able to respond quickly when competitors make advancements (Cohen and Levinthal, 1990).

However, in the development of break-through technologies it is beneficial for firms to collaborate with other firms or competitors because this collaboration reduces the cost of the research and large projects can be handled easier.

From the above we argue that market, technological knowledge and collaboration with competitors, taken together, represent important knowledge-based resources applicable to a firm's ability to discover and exploit opportunities.

B. Internal topics

In the firm level context we understand internal topics as topics related to the organization of the firm, the administrative practices and finance. These topics can be considered as knowledge-based resources that are sources of competitive advantage (Lytras and Ordóñez de Pablos, 2008).

In a similar way, these topics help entrepreneurial firms to understand how they can be better internally organized, how to deal with the administrative problems or the finances which will bring immediate and long term returns. In this sense, these topics provide valuable information because they show how an effective organization can help to increase firm performance.

After explaining the differences between external and internal topics, we describe how we expect the strategy and focus of the firms determine the topics spin-offs discuss with their contacts.

As we have done for the type of contacts, in the discussion about what topics firms discuss we analyze the entrepreneurial and market orientation independently.

Within the entrepreneurial orientation we expect that explorative firms in their efforts to look for new and radical innovations that create new knowledge (Nooteboom & Gilsing, 2004) keep more discussions about external topics because external topics represent important knowledge-based resources applicable to a firm's ability to discover and exploit opportunities.

On the other hand, exploitive firms, that are concerned about how to make efficient employment of current assets and capabilities (Nooteboom & Gilsing, 2004), may also discuss external topics as customer problems (Shane, 2000) because it may lead to market changes.

However, we argue that exploitative firms discuss more internal topics than explorative firms because these topics show how an effective organization can help to increase firm performance in the short term. Enhancing firm performance in the short term is an important characteristic of exploitative firms. Thus, we hypothesize:

> **Hypothesis 5.a:** *Within the dimension of entrepreneurial oriented firms, firms that focus on exploration have more discussions related to external topics than firms whose focus is on exploitation.*

> **Hypothesis 5.b:** *Within the dimension of entrepreneurial oriented firms, firms that focus on exploitation have more discussions related to internal topics than firms whose focus is on exploration.*

Although the market orientation differs from the entrepreneurial orientation, we expect the same relationship between explorative firms and external topics and between exploitative firms and internal topics than we argued for the entrepreneurial orientation. Therefore:

> **Hypothesis 6.a:** *Within the dimension of market oriented firms, firms that focus on exploration have more discussions related to external topics than firms whose focus is on exploitation.*

> **Hypothesis 6.b:** *Within the dimension of market oriented firms, firms that focus on exploitation have more discussions related to internal topics than firms whose focus is on exploration.*

Figure 2.4 shows a more detailed research model. The figure also indicates how we develop the research. First, we analyze the firm level. In this sense, the strategy and focus of the firms is explained. Second, we analyze the network characteristics that are part of this research (the content of the discussions and who the contacts are). Third, we develop the hypotheses that relate the previous concepts.

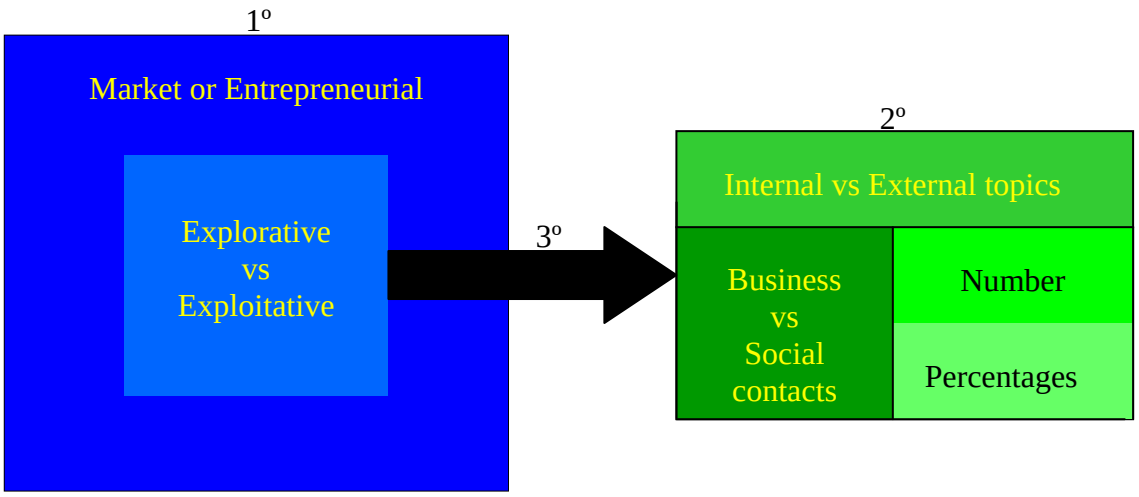


Figure 2.4 Detailed Research Model

In the following section, Chapter 3, the operationalization of the concepts described in this chapter is made. The variables that will be used in the analysis are also described.

3 METHODOLOGY

The methodological part of the research is analyzed and explained in this section.

3.1 PROCEDURE

The steps that are followed in the analysis are presented in the following scheme:

- Introduction to the sample that is used in the research.
- Operationalization of the strategic orientation and focus of the firms:
    + Operationalization of market strategic orientation.
    + Operationalization of entrepreneurial strategic orientation.
    + Operationalization of the focus of the firms on exploration and exploitation.
- Contacts operationalization:
    + Operationalization of social contacts.
    + Operationalization of business contacts.
- Topics operationalization:
    + Operationalization of external topics.
    + Operationalization of internal topics.
- Variables

Each step is explained in detail in this chapter.

3.2 SAMPLE

This research focuses its interest on young technology-based spin-offs within The Netherlands. By young, it is meant firms that are no older than 5 or 6 years. The term

technology-based spin-offs refers to firms that arose within universities or incubators due to academic research that is related to new technologies or new technology-based services, or firms that offer their services to technology-based companies. In this study, the firms that are analyzed were launched between 1998 and 2004. The information about the spin-offs is included in databases[11] that belong to the Technology, Strategy and Entrepreneurship (TSE) department of the Faculteit Techniek Bestuur en Management (TBM).

3.3 OPERATIONALIZATION

The databases that are used in this research contain raw information. This information was straightforward introduced in the database containing the answers to the questionnaire that the respondents gave. Therefore, it was necessary to modify and classify the data into new and different variables that fit within the research framework.

Figure 3.1 shows the data in the alter level database. This figure shows that for each spin-off (respond) there are several contacts (alter). Each contact is classified as personal, previous work, academic and business. It can be seen that each firm indicates the topics it discussed with each contact (topic1, topic2, topic3, topic4, topic5, topic6).

Alter Level database.sav [DataSet1] - SPSS Data Editor

File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help

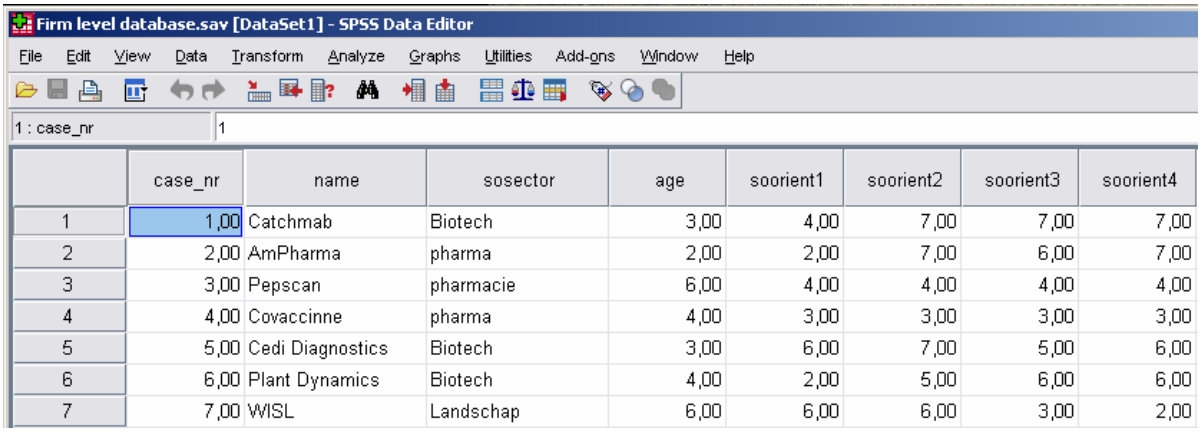
1 : respond 1

	respond	alter	personal	prewwork	academic	business	topic1	topic2	topic3	topic4	topic5	topic6
1	1	5,00	0	0	1	0	0,00	0,00	0,00	0,00	1,00	1,00
2	1	4,00	1	0	0	0	0,00	0,00	0,00	0,00	1,00	1,00
3	1	3,00	0	1	0	0	1,00	1,00	0,00	0,00	0,00	0,00
4	1	6,00	0	0	0	1	0,00	0,00	0,00	1,00	0,00	0,00
5	1	2,00	0	0	0	1	1,00	0,00	0,00	0,00	0,00	0,00
6	1	1,00	0	0	1	0	1,00	0,00	1,00	0,00	0,00	0,00
7	2	1,00	0	1	0	0	1,00	0,00	1,00	0,00	1,00	0,00
8	2	2,00	0	0	0	1	1,00	0,00	0,00	1,00	0,00	1,00
9	2	4,00	0	0	1	0	0,00	1,00	0,00	0,00	0,00	0,00
10	2	5,00	0	0	1	0	0,00	1,00	0,00	0,00	0,00	0,00
11	2	3,00	0	0	0	1	1,00	1,00	0,00	0,00	0,00	0,00
12	3	4,00	0	1	0	0	0,00	0,00	0,00	0,00	1,00	0,00
13	3	1,00	0	0	1	0	0,00	1,00	1,00	0,00	0,00	0,00
14	3	2,00	0	0	0	1	0,00	1,00	1,00	0,00	0,00	0,00
15	3	3,00	0	0	0	1	1,00	0,00	0,00	1,00	0,00	0,00
16	4	4,00	1	0	0	0	0,00	0,00	0,00	1,00	0,00	0,00
17	4	1,00	0	1	0	0	1,00	1,00	0,00	0,00	0,00	1,00
18	4	2,00	0	1	0	0	0,00	1,00	0,00	1,00	0,00	0,00
19	4	3,00	0	1	0	0	1,00	0,00	0,00	0,00	0,00	0,00

Figure 3.1 Alter Level Database

[11] The database was part of a study carried out within the TSE department of TBM.

Figure 3.2 shows the data in the firm level database. Each column shows for each spin-off: the name (name), the sector where they operate (sosector), the age (age), and the answers to the different questions that the respondents gave regarding the orientation of the spin-off (soorient1, soorient2, soorient3, soorient4).



	case_nr	name	sosector	age	soorient1	soorient2	soorient3	soorient4
1	1,00	Catchmab	Biotech	3,00	4,00	7,00	7,00	7,00
2	2,00	AmPharma	pharma	2,00	2,00	7,00	6,00	7,00
3	3,00	Pepscan	pharmacie	6,00	4,00	4,00	4,00	4,00
4	4,00	Covaccinne	pharma	4,00	3,00	3,00	3,00	3,00
5	5,00	Cedi Diagnostics	Biotech	3,00	6,00	7,00	5,00	6,00
6	6,00	Plant Dynamics	Biotech	4,00	2,00	5,00	6,00	6,00
7	7,00	WISL	Landschap	6,00	6,00	6,00	3,00	2,00

Figure 3.2 Firm level database

3.3.1 THEORY OPERATIONALIZATION

In order to make the constructs for this study, we look at the firm level database[12]. This database contains the answers[13] to the following questions:

1. The coming years, a lot of investments must be done in marketing activities.
2. The coming years, the customers must be approached intensively.
3. The coming years, a lot of investments must be put in R&D activities.
4. The coming years, many employees will stay in R&D.

In order to know if we could use the previous questions to measure and analyze the concepts of strategic orientation and exploration/exploitation, we perform factor analysis using SPSS. For the factor analysis we use Principal Component Analysis (PCA) with an orthogonal rotation[14].

The result of the factor analysis shows that, indeed, the questions represent two factors (the factor loadings are shown in Table 3.1). This means that the strategic orientation can be analyzed with these two factors: market orientation (factor 1) and entrepreneurial (factor 2). The eigenvalues of these factors are 1.790 and 1.491: together this is 82 per cent explained variance.

[12] For more information about the database see Appendix C.
[13] The answers are measured in a 7 point Likert scale (1="Completely disagree", 7="Completely agree")
[14] Varimax rotation.

	Factors	
	1	2
Question 1	-0.127	0.885
Question 2	0.046	0.898
Question 3	0.914	-0.040
Question 4	0.913	-0.038

Table 3.1 Questions PCA with orthogonal rotation output

Now, we describe how we made the constructs for market and entrepreneurial orientation

A. Market orientation

As we have seen after the factor analysis, questions 1 and 2 can be put together to measure the concept of market orientation. In addition to this, we performed a reliability analysis (Cronbach's alpha = 0.745) with questions 1 and 2 that indicated that, indeed, these questions can be put together to produce one factor.

Besides, these questions represent the willingness of the firms to approach clients and promote their activities with marketing initiatives in the coming years. These concepts are in line with the characteristics of market oriented firms explained in 2.2.1.

Therefore, the construct for the market orientation was made by adding the scores of questions 1 and 2 and dividing them by 2. From now on, this concept is the spin-off market orientation.

B. Entrepreneurial orientation

In a similar way, the factor analysis showed that questions 3 and 4 can be put together to measure the concept of entrepreneurial orientation. Moreover, the reliability analysis (Crobanch's alpha = 0.80) supports the idea that these concepts can be put together to produce one factor.

Indeed, these questions measure the investment and employees that will be part of R&D activities from the perspective of the founder (or CEO) of the spin-off. Investment and employees in R&D activities are good indicators of the willingness of the firms to

engage in innovative and risky projects. Therefore, we see how the questions summarize the characteristics of entrepreneurial oriented firms explained in 2.2.1.

Therefore, the construct for the entrepreneurial orientation was made by adding the score of questions 3 and 4 and dividing them by 2. From now on, this concept is the spin-off entrepreneurial orientation.

C. The classification into explorative or exploitative oriented firms

At this moment, we have identified the market and entrepreneurial strategic orientation of the spin-offs. However, we have not made any distinction between the explorative and exploitative focus of the firms. To do this, we take the spin-off market and entrepreneurial orientation constructs and we study their values.

In order to make the distinction between explorative and exploitative firms within each dimension, we take into account the following criteria:

- We consider that firms whose score is higher than the Median in the spin-off market orientation focus on exploitation and those whose score is smaller than the median focus on exploration.
- Similarly, we consider that firms whose score is higher than the Median in the spin-off entrepreneurial orientation focus on exploration and those whose score is smaller than the median focus on exploitation.

In this classification we use the Median because we want to compensate the loss of data (extreme values) after putting together questions 1 and 2, and questions 3 and 4. The Median also allows us to make two similar groups in size to perform the statistical analysis.

By following these criteria, we see that within the market orientation there are 42 explorative, and 29 exploitative firms. However, in the entrepreneurial dimension there are 29 explorative, and 42 exploitative firms.

To sum up, for each of the entrepreneurial or market dimensions we make a distinction between explorative and exploitative firms.

Before we explain the operationalization of contacts and content, we give more understanding about how the data was organized in the alter level database.

As it can be observed in Figure 3.1, each firm has a different number of contacts. This number varies from a single contact to a maximum of 7 contacts.

On the other hand, in Figure 3.1, it can also be observed that each contact can discuss up to 6 topics. However, not all the contacts discuss all the topics, but a few of them. Therefore, it is normal to see that there are more discussions about certain topics than number of contacts per firm.

Now, we describe how we made the variables with which we made the analysis in the firm level dataset. We built these variables with the data provided about the networks in the alter level dataset.

3.3.2 CONTACTS OPERATIONALIZATION

As we mentioned in 3.3, the alter level database contains data regarding how the founders of the spin-offs made their contacts. The contacts come from four categories: 1) personal contacts, 2) academic contacts, 3) previous work contacts, and 4) business contacts.

However, we took the number of each type of contacts and its corresponding percentage to the firm level data for each firm. By doing so, we knew how many different contacts each firm had and their relative weight.

Then, we catalogued these contacts depending on the network they belong to. Although we could not use any statistical tool to ensure that this classification is valid and reliable, we followed the theoretical definition of social and business networks. The groups are as follows:

A. Social networks

Following the definition of social networks we include in this group all the relationships that the founders had before the foundation of the firm. Therefore, in this study, social networks are composed of personal contacts, previous work[15] contacts, and academic contacts.

[15] Previous work contacts are classified as social contacts because we assume that the founders of new established spin-offs have not had previous entrepreneurial experience. Thus, previous work contacts have no ties with current business environment.

B. Business networks

Following the definition of business networks we include in this group the direct competitors of the firms. As we study spin-offs and they operate in an environment where they compete for the same market, we can consider that business contacts are direct competitors. Thus, logically, business networks are composed of business contacts.

Finally, we counted the number of social and business contacts per firm and its relative percentage, and we took these groups to the firm level database.

3.3.3 CONTENT OPERATIONALIZATION

As it is mentioned in 3.3, the alter level dataset provides information about the different topics the respondents discussed with their contacts. These topics are: 1) market, clients and competitors, 2) technology and development, 3) collaboration, 4) organizational and legal, 5) personal and accommodation, and 6) finance.

However, in order to know if we could put these topics in groups, we performed a factor analysis using SPSS. For this factor analysis we use Principal Component Analysis (PCA) with an orthogonal rotation[16].

The results show that the six topics represent two factors (the factor loadings are shown in Table 3.2). This means that the topics can be grouped in two different groups: external (factor 2) and internal topics (factor 1). The eigenvalues of these two factors are 1.865 and 1.393: together this is 54.3 per cent explained variance.

	Factor	
	1	2
Topic 1	0.019	0.666
Topic 2	-0.116	0.710
Topic 3	0.377	0.679
Topic 4	0.770	-0.235
Topic 5	0.671	0.205
Topic 6	0.738	0.086

Table 3.2 Topics PCA with orthogonal rotation output

[16] Varimax rotation.

A. External topics

After the factor analysis was performed, we put the external related topics in a group. External topics group is composed of the following topics: 1) market, clients and competitors, 2) technology and development, 3) collaboration. We can see that these topics also fit within the definition about external networks that was explained in 2.3.2.

B. Internal topics

As we did with external topics we put the internal topics in group. In this case, the Internal topics group is composed of: 4) organizational and legal, 5) personal and accommodation, and 6) finance. This classification is also aligned with the theoretical expectations explained in 2.3.2.

Finally, we added the number of external and internal topics discussed per firm and we took them to the firm level database.

3.3.4 VARIABLES

After the explanation about how the different concepts were operationalized, the variables are presented as follows:

- *soMarketO*: This variable represents the strategic market orientation dimension that was explained in 3.3.1. As it has been already explained, within this variable we make a distinction between the explorative and exploitative focus of the firms. The firms that scored higher than the Median are considered exploitative oriented, while those of which scored lower are explorative oriented. Thus, we create a dichotomous variable (0=explorative, 1=exploitative) for the market orientation dimension that represents explorative and exploitative firms. By doing so, we can identify (Table 4.3) 42 explorative, and 29 exploitative firms.
- *soEntrepO*: This variable is similar to soMarketO, but it represents the entrepreneurial strategic orientation. In this case, the firms that scored higher than the Median are considered explorative oriented, while those of which scored lower are exploitative oriented. Therefore, we also create a new variable that only represents explorative and exploitative firms (0=exploitative, 1=explorative) within this dimension. Now, we distinguish (Table 4.1) 42 exploitative firms, and 29 explorative firms.

- *SocialN*: This variable represents the total number of social contacts that a firm has. As it was explained in 3.3.2 this variable includes personal, academic, and previous work contacts. Table 3.3 shows that most of the firms have, on average, 2.67 social contacts. But, including the standard deviation (Sd=1.2), this result rounds down to 1 and rounds up to 4 social contacts.
- *SocialPer*: This variable measures the same concept as SocialN, but instead of the number, it measures the percentage of social contacts. In table 3.3 we can see that the number of social contacts discussed in SocialN represents, on average, 75% of the total number of contacts. The standard deviation (Sd=0.26) says that, in some cases, all the contacts come from the social network, and the number of social contacts may decrease to 50% in some other cases.
- *BusinessN*: As it can be derived from 3.3.2, this variable includes the number of business contacts per firm. Table 3.3 shows that most of the firms have, on average, 1.03 business contacts. But, taking the standard deviation (Sd=1.13) into consideration, the number of business contacts rounds down to 0 and rounds up to 2 business contacts.
- *BusinessPer*: Like BusinessN, but it includes the percentage of business contacts. Table 3.3 shows that, opposite to SocialPer, on average, 25% of the contacts come from a business relationship. But, taking the standard deviation (Sd=0.26) into account, this percentage may vary from 0% (no business contacts at all), to 50% (half of the contacts are business contacts, while the other half are social contacts).
- *ExternalTop*: This variable measures the number of external topics that each firm discusses with its contacts. As it is explained in 3.3.3 we understand external topics as topics related to 1) market, clients and competitors, 2) technology and development, and 3) collaboration. Table 3.3 shows that there are, on average, 5.47 external topics discussed per firm. This value is greater than the number of contacts per firm (88.9% of the firms have 5 or less contacts). Moreover, this result may rise up to 8.58 (rounding up to 9) when we look at the standard deviation (Sd=3.11) or may decrease by rounding down to 2.
- *InternalTop*: This variable is similar to ExternalTop, but it includes the number of internal topics that the firms discuss with their contacts. Section 3.3.3 explains that we understand the following topics as internal: 1) organizational and legal, 2) personal and accommodation, and 3) finance. As it happens with ExternalTop, it is common to see (Table 3.3) more Internal topics per firm, 4.40, than number of contacts (75% of the firms have 4 or less contacts). When we include the standard

deviation (Sd=3.25) this number may increase to 7.65 (we can assume 8) or may decrease to 1.

Table 3.3 illustrates the most relevant characteristics of the variables[17]:

Variable	Mean	Sd
SocialN	2.67	1.2
BusinessN	1.03	1.13
SocialPer	0.75	0.26
BusinessPer	0.25	0.26
ExternalTop	5.47	3.11
InternalTop	4.40	3.25

Table 3.3 Descriptive data of the variables used

[17] We do not include the variables for the entrepreneurial or market orientation because they will be shown during the analysis of the tests.

4 ANALYSIS

In this chapter, we describe the data that is included in the databases we use in this research, we perform the analysis per se, and we comment the results.

We base this research on an existing database that was built based on the answers to a questionnaire that was sent to spin-offs in The Netherlands. These questionnaires were answered by the founders (in this research this is the same as the CEOs) of the different spin-offs. The database contains information about the firm level and the respondent or contact level. In the contact level there are 266 contacts that belong to the 72 firms that responded the questionnaire. From the set of firms, 73.6% have from 3 to 5 contacts, while 15.3% have 1 or 2 contacts, and only 11.1% have 6 or 7 contacts.

Moreover, the firms that are analyzed were launched between 1998 and 2004. From the sample we see that 50 firms (69.4%) are 5 or less years old, and 70 firms (97.2%) are no older than 6. Thus, we can conclude that the firms in the sample are young or new established firms.

In addition to this, we can also say that the firms are mostly technology-based or they are related to technology-based services. From the sample of 72 firms, 47 (65.3%) operate in ICT, Media, Telecommunications, Biotechnology or Pharmacology, and 25 (34.7%) are consultancy companies that offer their services to technology-based firms.

In the contact or alter level data there is information about how the respondents made their contacts and the topics they discussed with them.

Regarding how they made their contacts, the respondents chose one among four categories of contacts: 1) personal contacts, 2) academic contacts, 3) previous work contacts, and 4) business contacts.

Based on the definition of contacts (2.3.1) and its operationalization (3.3.2), we assume that we can classify personal, academic and previous work contacts as social contacts. On the other hand, business contacts constitute the other group. Figure 4.1 shows the classification of contacts scheme:

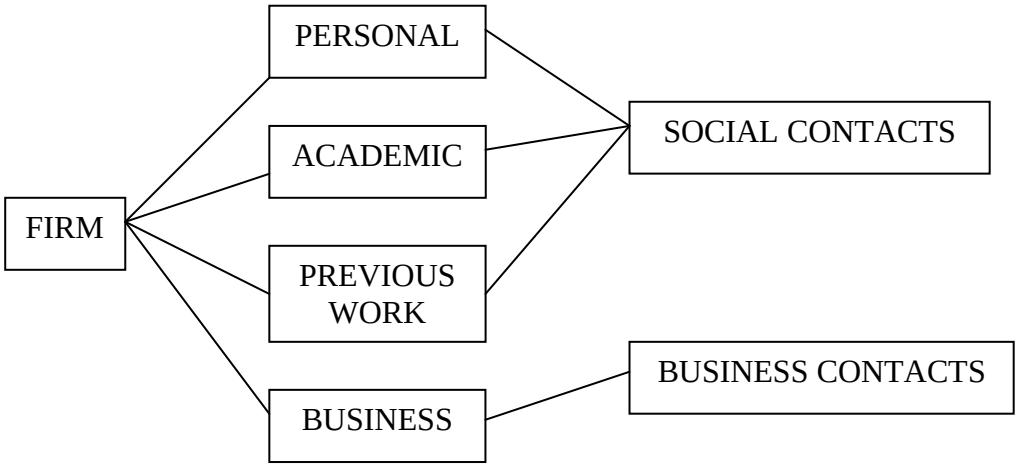


Figure 4.1 Classification of contacts scheme

On the other hand, among the six kinds of topics[18], the respondents chose those of which they discussed with each of their contacts. Thereby, some of the contacts only discussed one of the topics while other contacts discussed two, three, or even all the six topics.

As it is explained before the operationalization of contacts and content[19], not all the respondents have the same number of contacts in their network. The size of the network for each firm varies from one single contact to a maximum of 7 network contacts. In this way, each respondent could discuss from 0 to 3 internal topics and from 0 to 3 external topics with each member of the network. For example, each firm could discuss from a minimum of 0 to a maximum of 21 internal and external topics if the firm had 7 contacts, or from 0 to 9 internal and external topics if the firm only had 3 contacts.

As we have seen in 3.3.3, we classify the six topics as external[20] o internal[21]. Therefore, for each firm we can apply the following scheme:

[18] 1) market, clients and competitors, 2) technology and development, 3) collaboration, 4) organizational and legal, 5) personal and accommodation, and 6) finance.
[19] See p.31-32
[20] External topics are: 1) market, clients and competitors, 2) technology and development, 3) collaboration.
[21] Internal topics are: 4) organizational and legal, 5) personal and accommodation, and 6) finance.

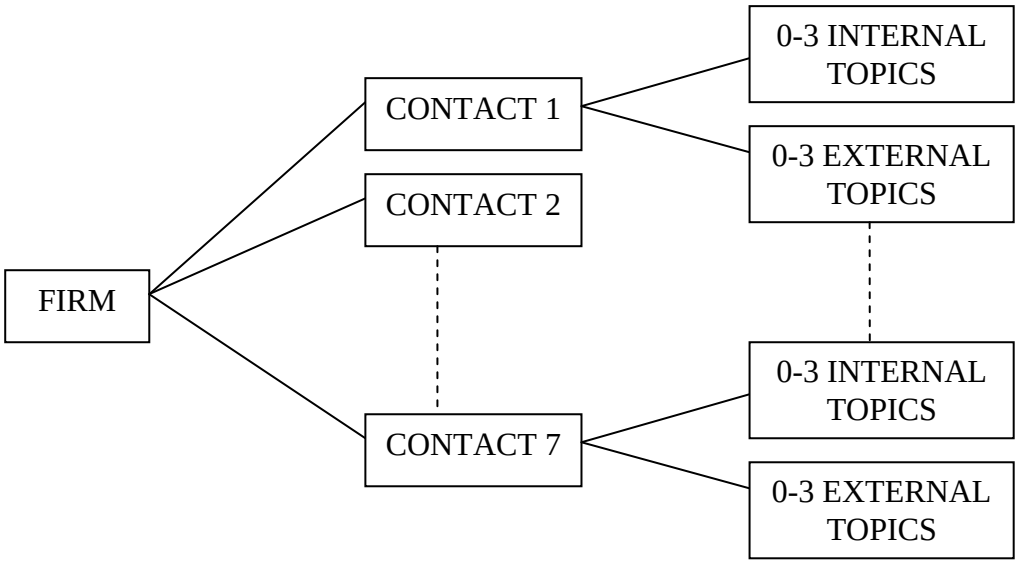


Figure 4.2 Contacts and topics scheme

In the firm level data the respondents gave answers about how they perceived the market or entrepreneurial strategic orientation of their firms. How we proceed with these questions is explained in 3.3.1.

4.1 CORRELATIONS

Table 4.1 presents the most relevant characteristics of the variables under study and the correlations among them.

Correlations

Variable	SocialN	BusinessN	SocialPer	BusinessPer	ExternalTop	InternalTop
SocialN	1.00	-0.33**	0.54**	-0.54**	0.24*	0.15
BusinessN		1.00	-0.91**	0.91**	0.28*	0.31**
SocialPer			1.00	-1.00**	-0.20	-0.20
BusinessPer				1.00	0.20	0.19
ExternalTop					1.00	0.60**
InternalTop						1.00

Table 4.1 Correlation Matrix
*.Correlation is significant at the 0.01 level
**. Correlation is significant at the 0.05 level

In this section we analyze and comment the most interesting correlations for the research[22].

- 1) SocialN and ExternalTop (r=0.24)

[22] We do not include the variables for the entrepreneurial or market orientation because they will be shown during the analysis of the tests.

- 2) BusinessN and ExternalTop (r=0.28)

  These results are interesting because in our set of hypotheses (Hypothesis 1.a, Hypothesis 2.a, Hypothesis 3.a, Hypothesis 4.a, Hypothesis 5.a, and Hypothesis 6.a), we hypothesize that explorative firms will have more business contacts and discussions about external topics than exploitative firms. In this sense, Table 4.1 shows that these variables are correlated.

- 3) BusinessN and InternalTop (r=0.31)

  It is also noticeable that Table 4.1 shows that BusinessN is correlated with InternalTop when the hypotheses (Hypothesis 1.b, Hypothesis 2.b, Hypothesis 3.b, Hypothesis 4.b, Hypothesis 5.b, and Hypothesis 6.b) suggest that exploitative firms have more social contacts and more discussions about internal topics than explorative firms. This result is interested because it was not expected according to the theoretical development.

In summary, from the analysis of these correlations, we can expect that there will be significant results for BusinessN, ExternalTop, and InternalTop in each dimension.

4.2 TESTS

During the description of the variables (3.3.4), we have given an overview of the different variables that are included in the study, but we have not mentioned their measurement level and the techniques we use to test our hypotheses.

1. The classification we have made about explorative or exploitative firms means that for each strategic dimension (market or entrepreneurial) we have a categorical (dichotomous) variable[23]. The other variables[24] are numerical.
2. The statistical tool we use to perform an analysis is the t-test because we compare categorical variables (explorative vs exploitaive firms) with numerical variables (the number of social and business contacts, their percentages and the number of external and internal topics discussed).

Based on these data, we check whether the assumptions we made for each strategic orientation are confirmed or not. These assumptions are listed for each dimension:

- Hypotheses within the entrepreneurial orientation dimension:

[23] soMarketO and soEntrepO.
[24] SocialN, BusinessN, SocialPer, BusinessPer, ExternalTop, and InternalTop

The number of business contacts is higher for explorative than for exploitative firms (Hypothesis 1.a) and the number of social contacts is higher for exploitative than for explorative firms (Hypothesis 1.b).

The percentage of business contacts is higher for explorative than for exploitative (Hypothesis 2.a) firms and the percentage of social contacts is higher for exploitative firms than for explorative firms (Hypothesis 2.b).

The number of external topics discussed is higher for explorative than for exploitative firms (Hypothesis 5.a) and the number of internal topics discussed is higher for exploitative than for explorative firms (Hypothesis 5.b).

- Hypotheses within the market orientation dimension:

The number of business contacts is higher for explorative than for exploitative firms (Hypothesis 3.a) and the number of social contacts is higher for exploitative than for explorative firms (Hypothesis 3.b).

The percentage of business contacts is higher for explorative than for exploitative (Hypothesis 4.a) firms and the percentage of social contacts is higher for exploitative firms than for explorative firms (Hypothesis 4.b).

The number of external topics discussed is higher for explorative than for exploitative firms (Hypothesis 6.a) and the number of internal topics discussed is higher for exploitative than for explorative firms (Hypothesis 6.b).

Tables 4.2 and 4.3 show the descriptive statistics and outcomes of the t-tests for the entrepreneurial strategic orientation dimension:

VARIABLE	*CLASSIFICATION*	*N*	*MEAN*	*STD.DEV*
SocialN	**Explorative**	29	2.62	1.47
	Exploitative	42	2.74	0.96
BusinessN	**Explorative**	29	1.28	1.28
	Exploitative	42	0.81	0.94
SocialPer	**Explorative**	29	0.70	0.27
	Exploitative	42	0.79	0.24
BusinessPer	**Explorative**	29	0.30	0.27
	Exploitative	42	0.20	0.24
ExternalTop	**Explorative**	29	5.76	3.30
	Exploitative	41	5.24	3.02
InternalTop	**Explorative**	29	4.83	3.79
	Exploitative	41	4.00	2.80

Table 4.2 T-test descriptive statistics. Entrepreneurial Orientation

VARIABLE	*SIGNIFICANCE*	
	t	P
SocialN	-0.377	0.354
BusinessN	1.769	0.040**
SocialPer	-1.566	0.061+
BusinessPer	1.520	0.066+
ExternalTop	0.675	0.251
InternalTop	0.999	0.161

Table 4.3 T-tests outcome. Entrepreneurial Orientation
+ Correlation is significant at the 0.1 level
**Correlation is significant at the 0.05 level

Before analyzing the results presented in Table 4.3, it is necessary to mention that the results in blue did not satisfy the conditions for equality of variances. However, the results for those variables were not significant.

On the other hand, Table 4.3 shows that in this dimension there are three significant results:

1. Explorative firms have more business contacts than exploitative firms (p=0.04, t=1.769). Table 4.2 shows that explorative firms have, on average, 1.28 business contacts, while exploitative firms have, on average, 0.81 social contacts. This is in line with what we expected in Hypothesis 1.a; the number of business contacts is higher for explorative than for exploitative firms.
2. The percentage of social contacts differs significantly for explorative and exploitative firms (p=0.061, t=-1.566). Table 4.2 shows that exploitative firms have, in general, a higher percentage of social contacts than explorative firms (79% of the exploitative firms' contacts come from their social network, while 70% of the explorative firms' contacts come from their social network). This supports Hypothesis 2.b; the percentage of social contacts is higher for exploitative firms than for explorative firms.
3. Explorative firms do have a higher percentage of business contacts than exploitative firms (p=0.066, t=1.520). Table 4.2 shows the following relationship: 30% of the explorative firms' contacts come from their business network, while 20% of the exploitative firms' contacts come from their social network. This result gives support for Hypothesis 2.a; the percentage of business contacts is higher for explorative than for exploitative firms.

Finally, the tests do not provide more significant results that support that the number of social contacts is higher for exploitative than for explorative firms (Hypothesis 1.b), the number of external topics discussed is higher for explorative than for exploitative firms (Hypothesis 5.a) and the number of internal topics discussed is higher for exploitative than for explorative firms (Hypothesis 5.b). Thus, we can reject them.

Tables 4.4 and 4.5 show the descriptive statistics and the outcomes of the t-test for the market strategic orientation:

VARIABLE	*CLASSIFICATION*	*N*	*MEAN*	*STD.DEV*
SocialN	**Explorative**	42	2.74	1.15
	Exploitative	29	2.62	1.27
BusinessN	**Explorative**	42	1.07	1.20
	Exploitative	29	0.90	0.98
SocialPer	**Explorative**	42	0.74	0.25
	Exploitative	29	0.76	0.27
BusinessPer	**Explorative**	42	0.25	0.25
	Exploitative	29	0.23	0.27
ExternalTop	**Explorative**	42	5.93	3.15
	Exploitative	28	4.75	3.01
InternalTop	**Explorative**	42	4.45	3.38
	Exploitative	28	4.18	3.09

Table 4.4 T-test descriptive statistics. Market Orientation

VARIABLE	*SIGNIFICANCE*	
	t	p
SocialN	0.406	0.343
BusinessN	0.651	0.258
SocialPer	-0.329	0.371
BusinessPer	0.297	0.383
ExternalTop	1.560	0.061^{+}
InternalTop	0.343	0.366

Table 4.5 T-tests outcome. Market Orientation
+ Correlation is significant at the 0.1 level

Table 4.5 shows the T-test outcomes for the market orientation dimension, where we can see that there is one significant result:

1. Explorative firms discuss more external topics than exploitative oriented firms (p=0.061, t=1.560). Table 4.4 shows that explorative firms discuss, on average, 5.93 external topics, while exploitative firms discuss, on average, 4.75 external topics. This result gives support for Hypothesis 6.a; the number of external topics discussed is higher for explorative than for exploitative firms.

The tests do not show any extra significant result. This means that the tests support neither that the number of business contacts is higher for explorative than for exploitative firms (Hypothesis 3.a), nor that the number of social contacts is higher for exploitative than for explorative firms (Hypothesis 3.b), nor that the percentage of business contacts is higher for explorative than for exploitative (Hypothesis 4.a), nor that firms and the percentage of social contacts is higher for exploitative firms than for explorative firms (Hypothesis 4.b), nor that the number of internal topics discussed is higher for exploitative than for explorative firms (Hypothesis 6.b). Thus, these hypotheses for the market orientation dimension are rejected.

In summary, in Chapter 4 the t-tests are performed, and they show that the following hypotheses are confirmed:

- Within market orientation, explorative firms discussed more external topics than exploitative firms with their contacts (Hypothesis 6.a).
- Within entrepreneurial orientation, explorative firms have more business contacts regarding the total number of contacts and the percentage of business contacts than exploitative firms (Hypotheses 1.a and 2.a).
- Within entrepreneurial orientation, exploitative firms have a greater percentage of social contacts than explorative firms (Hypothesis 2.b).

On the other hand, we cannot confirm the rest of hypotheses (1.b, 3.a, 3.b, 4.a, 4.b, 5.a, 5.b, 6.b) because from the results of the tests, it seems there is no significant difference between explorative and exploitative firms within each strategic dimension regarding these hypotheses.

Finally, the results obtained in Chapter 4 are the basis for the conclusions, limitations and recommendations we draw in Chapter 5.

5 CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

The increasing interest about networks over the last years has made that more and more studies analyzed the use of networks by firms. This research tries to shed some light on this area by analyzing how the relationship between the strategy (market or entrepreneurial orientation) and focus of the firms on exploration or exploitation influences on spin-offs network characteristics such as which the network contacts are, and what information is required from the networks by spin-offs. The results of this research could help spin-offs to identify how to make a more efficient use of their networks.

This analysis is done by performing t-tests that test whether there are differences between explorative and exploitative firms within each strategy regarding the type of contacts the firms had (social or business contacts), and the nature of the topics they discussed (internal or external).

This chapter explains the tests results, answers the research question, explains the limitations of the research, and provides guidance for future research.

5.1 CONCLUSIONS

The main objective of this research is to identify how the relationship between the strategy and the focus of the firms on exploration on exploration influences in the way spin-offs use their networks. Therefore, this research attempts to answer the following research question:

How does the relationship between the strategic orientation and explorative or exploitative focus of spin-offs influence the way these firms use their networks?

Now, it is interesting to keep in mind the concepts of strategy and focus of the firms.

When we use the term strategy we take into account that in this research there is a distinction between entrepreneurial oriented firms and market oriented firms. It is possible to describe them in a few words. Firms that adopt Market Orientation as their strategy can be seen as firms that put the customer first in business planning (Renko et al., 2009). On the other hand, firms that a adopt Entrepreneurial Orientation as their strategy can be seen as firms that emphasize aggressive innovation, risky projects, and pioneer innovations that preempt competition (Miller, 1983).

In a similar way, it is possible to briefly describe the concepts of exploration and exploitation. Firms that try to become more efficient in their daily activities and get profits in the short term can be seen as exploitative firms. On the other hand, firms that try to develop new technologies or services that will bring future profits can be considered explorative.

In addition, the use of networks by spin-offs is understood from the point of view of the type of contacts (social or business) that bring information to the spin-offs and the type of information (external or internal) these spin-offs require from the network.

In order to answer the research question, we developed the following set of hypothesis regarding each strategic orientation:

- Entrepreneurial orientation:

  The number of business contacts is higher for explorative than for exploitative firms (Hypothesis 1.a) and the number of social contacts is higher for exploitative than for explorative firms (Hypothesis 1.b).

  The percentage of business contacts is higher for explorative than for exploitative (Hypothesis 2.a) firms and the percentage of social contacts is higher for exploitative firms than for explorative firms (Hypothesis 2.b).

  The number of external topics discussed is higher for explorative than for exploitative firms (Hypothesis 5.a) and the number of internal topics discussed is higher for exploitative than for explorative firms (Hypothesis 5.b).

- Market orientation:

The number of business contacts is higher for explorative than for exploitative firms (Hypothesis 3.a) and the number of social contacts is higher for exploitative than for explorative firms (Hypothesis 3.b).

The percentage of business contacts is higher for explorative than for exploitative (Hypothesis 4.a) firms and the percentage of social contacts is higher for exploitative firms than for explorative firms (Hypothesis 4.b).

The number of external topics discussed is higher for explorative than for exploitative firms (Hypothesis 6.a) and the number of internal topics discussed is higher for exploitative than for explorative firms (Hypothesis 6.b).

In summary, the hypotheses suggest that explorative and exploitative firms use their networks in a different way depending on who the contacts are, and the information they can get from the network.

However, before answering the research question we, first, analyze the t-tests outcomes because they will give us some conclusions concerning the hypotheses and guidance about how to answer the research question. We explain these conclusions for each strategic orientation.

- *Entrepreneurial orientation*: the t-tests show that explorative firms have, in general, more business contacts (in absolute terms and in percentage) than exploitative firms. As it is explained in chapter 4, these findings give support for Hypotheses 1.a and 2.a. Besides, exploitative firms have more social contacts (in percentage) than explorative firms. This result supports Hypothesis 1.b.

On the one hand, explorative firms seem to have more business contacts (in absolute figures and percentage) than exploitative firms[25].

One reason could be that the focus on the development of new technologies and risky projects of explorative firms (March, 1991) make them more prone to keep relationships with their business contacts because they provide a better understanding of the firm context (Dollinger, 1985). In addition, another reason could be that business contacts give access to temporarily needed resources (Lechner and Dowling, 2003). Or, it might be that explorative firms keep business

[25] See Table 4.2

contacts because the lack of business networks can constraint firm development in the years following foundation (Baum et al., 2000).

On the other hand, exploitative firms seem to have more social contacts (in percentage) than explorative firms (Hypothesis 2.b). Although explorative and exploitative firms have the same number of social contacts, the proportion of social contacts for exploitative firms is higher than for explorative firms[26].

This might happen because young exploitative firms trust their already established and well-known ties because they can provide immediate resources that will help firms to achieve their performance targets faster (Davidsson and Honig, 2003). At the same time, explorative firms avoid the disclosure of their implementation and execution plans, thus they prevent their competitors' opportunism.

However, the tests do not show that explorative or exploitative firms discuss internal and external topics in a different proportion (Hypotheses 5.a and 5.b). Therefore, we cannot say that having more business or more social contacts bring firms the opportunity to discuss either more external or more internal topics. These findings are counter intuitive because from the correlation table 4.1 we expected external topics to be discussed with business contacts. But, after the analysis, it seems that these concepts do not influence each other.

- *Market orientation*: the t-tests show that explorative firms discuss more external topics than exploitative firms. As we said in section 4.2, this result gives support for Hypothesis 6.a.

Explorative firms seem to be more interested in external topics than exploitative firms[27].

One reason for this could be that explorative firms in their efforts to look for new and radical innovation that create new knowledge (Nooteboom & Gilsing, 2004), pay more attention to market knowledge because knowing the customer and their needs help them to find new solutions (Shane, 2000) and new market needs.

However, there is no evidence that allow us to say that exploitative firms are more interested in internal topics than explorative firms (Hypothesis 6.b).

[26] See Table 4.2
[27] See Table 4.4

This might happen because explorative and exploitative firms need their contacts to help them to gain more understanding about the firms' context and internal and efficient organization because they are young firms with no previous business experience. Therefore, all the contacts can provide spin-offs with useful, reliable, and less redundant information (Brüderl and Preisendorfer, 1998). This variety of contacts increases spin-offs organizational learning potential by observing or collaborating with competitors (Dyer et al., 2000).

In addition to this, it might be that this set of young firms has not had yet administrative, finance or organizational problems. Thus, they may not be interested in what they can change in the short-term. But, they can learn how to improve or solve the internal problems that might occur in the long-term.

For market oriented firms, it seems that it is not important for spin-offs to distinguish to whom they ask or who provides them the information (Hypotheses 3.a, 3.b, 4.a, 4.b). This could mean that, in practice, there might not be differences between social and business contacts for explorative and exploitative firms.

To sum up, the content about what firms discuss seems to significantly differ for explorative and exploitative firms. In this sense, the difference between explorative and exploitative firms relies on the discussions about external topics; explorative firms seem to have more discussions about external topics with their network contacts than exploitative firms.

After the analysis we have made in this research, we are able to answer the main research question. As it has been done for the analysis of the tests, we briefly answer this question depending on the strategic orientation of the firm:

Entrepreneurial Oriented Firms: In this dimension we have analyzed that explorative firms seem to have more business contacts than exploitative firms, while exploitative firms seem to have more social contacts than explorative firms. Therefore, we may say that depending on the focus on exploration or exploitation firms keep more business or social contacts respectively. However, this differentiation would not be related to the topics the firms discuss because all the contacts seem to provide information about external and internal topics.

Market Oriented Firms: In this dimension we have analyzed that explorative firms seem to be more interested in external topics because they keep more discussions about external topics than exploitative firms. Therefore, we could say that firms whose focus is on exploration use their networks to get information external to the firms. However, this might be the only difference between explorative and exploitative firms because it seems that they all keep a similar number of internal discussions and their contacts equally come from their social and business environment.

Therefore, we can give the following answer to the research question:

Market oriented firms seem to be more interested in the content of the discussions, especially explorative firms whose main interest seems to rely on external topics, and not in who provides them this information. Explorative and exploitative firms seem to have a similar number and percentage of business and social contacts.

On the other hand, it seems that Entrepreneurial oriented firms keep more business contacts if they are explorative, or they keep more social contacts if they are exploitative. In this dimension, the content of the discussions might not matter because explorative and exploitative firms seemed to ask their contacts about external and internal topics in a similar way.

Finally, in this project we have analyzed how the strategic orientation and the focus on exploration or exploitation influence the way spin-offs use their networks.

We have studied the differences and similarities between explorative and exploitative firms in two different strategic dimensions.

By showing that there seem to be, indeed, differences between explorative and exploitative firms in each strategic dimension, this research constitutes the first step to investigate how spin-offs can make a more efficient use of their networks by including what information is more important for spin-offs, and who can provide them the information they require depending on their strategy and focus.

Therefore, this research adds a new point of view to the entrepreneurial network literature by linking the concepts of strategy, firms' focus, and networks.

Besides, it also has management relevance because it may give advice to spin-offs about how to manage their social and business relationships.

5.2 LIMITATIONS

This study has several methodological weaknesses that also bring an opportunity to provide guidance and direction for future research.

1. Our sample size is not large enough to allow us to study the effects of all the variables in detail. A larger sample could help to get more significant results with the same variables we study in this research.
2. The data were collected using a single questionnaire. This could imply that the results can be subject to common method bias (e.g., incomplete questionnaires, low response rate).
3. We used data from Dutch spin-offs to test our hypotheses. As a result, we cannot ensure the generalizability of the results to other countries.

   In addition to the generalizability, this study includes technology-based spin-offs or spin-offs that offer their services to other technology-based firms. Thus, we do not know if spin-offs in different sectors/industries have a different behaviour.

Regarding these three points, and the collection method in particular, it is advisable to send the questionnaires to spin-offs that were supported by the university because they would feel the commitment to fill-in the questionnaire.

In addition, it would also be interesting to have access to spin-offs in other countries and sectors/industries and include them in the same analysis. By doing so, the analysis would be more general. For example, TU Delft could collaborate with other universities within The Netherlands or in Europe where the universities make academic research investments, and offer support for young entrepreneurs. By doing this, there would be a higher sample that would also include different countries and sectors. Therefore, the generalizability would increase.

4. When building the constructs, we put the questions in two groups of two questions. Each group measured the same concept but, in some cases, firms scored high in one question and low in the other.

   This means that we lost extreme cases and if we had followed a different approach some firms would have not been classified as explorative or exploitative.

   The operationalization includes the fact that the variables are categorical. This influences the results because we could not perform other analysis that

could inform us about the effect of the variables within a model and how that model would have changed if we had added or removed a variable.

5. We used the same sample to classify firms depending on their strategic orientations. This influences the results because as some scholars argue, entrepreneurial and market orientations are opposite strategies (Renko et al., 2009).

In order to solve these two problems I would ask the respondents to explicitly classify the spin-offs, from their point of view, as entrepreneurial or market oriented following the model by Covin and Slevin (1989). In this sense, the respondents would classify their firms depending on their innovative capacity, their proactiveness in anticipating future wants or needs in the market place, and the risks they consider their companies take. After this, they would fill-in the questionnaire regarding how they consider the exploration or exploitation in each spin-off.

Moreover, I would include the network characteristics that were analyzed here and more traditional variables in the entrepreneurial networks literature (firms' performance or growth, ties strength, the nature of the resources, network size, etc) because these variables might influence the processes by which firms interact and share information, thus, influencing they way spin-offs use their networks.

But, not only the data collection method can be further developed.

This research also brings an opportunity to increase the theoretical and empirical research about spin-offs and how these firms can get more benefits from their context. It could be very interesting to know what practices spin-offs use to increase their knowledge about their competitors. It might be that spin-offs use other techniques, that are not considered in this research, in order to gather the information that is interesting for them.

There could be another concept that lies behind the contacts and topics distinction that makes it easier to draw conclusions about how networks can favour the different strategies.

It is also advisable to further research whether the strategy and focus of the firms really matters for spin-offs learning. It could be that either the strategy or the focus of the firms might not be important for knowledge sharing and spin-off learning. In this case, the results of this research would be biased by a concept that is not akin to the research objective.

Finally, this project deals with spin-offs and not with entrepreneurial firms per se. This is not a major problem because the theory that is valid for entrepreneurial firms is also applicable in spin-offs because spin-offs are considered entrepreneurial firms.

5.3 RECOMMENDATIONS

The analyses we have made during this research allow us to give some guidance and advice for practitioners.

From the entrepreneurial orientation point of view, we could advice practitioners to keep a balanced proportion of business and social contacts. However, within this balance, it seems to be advisable for firms to keep half of the social contacts as business contacts. By doing this, both, explorative and exploitative firms might be aware of market changes, customers' needs, or technological developments. At the same time, they can also keep their initial internal organization, access to immediate resources and current business running.

However, it might be advisable for explorative firms to keep a more balanced proportion of business and social contacts because business contacts may favour the research development of the firms.

For exploitative firms it might be better to keep more social contacts because the more social contacts, the faster firms can have access to resources. Besides, social contacts can also affect firm performance positively (Johannisson, 2000).

On the other hand, from the market orientation point of view, we could advise practitioners to keep as many discussions as possible with their network contacts.

However, it would also be recommended to keep a balanced proportion of social and business contacts despite of they seem to provide the same information to market oriented firms.

These market oriented firms could, therefore, keep as many discussions as possible to keep updated. In particular, we consider that it might be beneficial for explorative firms to pay special attention to external topics because competitors can develop new technologies or services that might leave them out of the market or could make them to loose their competitive advantage.

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Appendix A

The questionnaires that were sent to the spin-offs and from which the data was obtained are as follows:

SURVEY QUESTIONNAIRE

1. The starters team

1. Who are the members of the startersteam?	**You**	**1 ...**	**2 ...**	**3 ...**	**4 ...**	**5 ...**
2. This person is part of the team since (month/ yr)	--/--	--/--	--/--	--/--	--/--	--/--
3. Who has management experience?	❑	❑	❑	❑	❑	❑
4. Who has research experience?	❑	❑	❑	❑	❑	❑
5. Who has worked in the industry of the spin-off?	❑	❑	❑	❑	❑	❑
6. Who has worked in a start-up before?	❑	❑	❑	❑	❑	❑
7. Will you mark those corresponding members that knew each other before they participated in this new company.	**You**	**1**	**2**	**3**	**4**	**5**
You		❑	❑	❑	❑	❑
1			❑	❑	❑	❑
2				❑	❑	❑
3					❑	❑
4						❑

2. The Spin-off

1. When originated the first idea for the spin-off:	_ yr	When is definitely started:	_ yr
2. Who took the initiative for the spin-off	❑ member of the startersteam	❑ the university	
3. In which sector is the spin-off active:			
4. Will you give the division of shares:	Member of the startersteam:		
	University (ex. Via a holding):		
	other:		
	total: 100 %		

Will you fill out how much you agree on the following statements:	*completely agree =1; completely disagree =7*
5. During the start-up, the development process was completely new to us.	1 2 3 4 5 6 7
6. During the start-up, the skills and technology were completely new to us.	1 2 3 4 5 6 7
7. During the start-up, the demands of the customers were completely new to us.	1 2 3 4 5 6 7
8. During the start-up, it was completely new to us how the competition acts.	1 2 3 4 5 6 7
9. It was important to enter the market with a relative simple innovation.	1 2 3 4 5 6 7
10. When we started we could do more then the market needed.	1 2 3 4 5 6 7
11. Only after a few years we could take full advantage of our academic knowledge	1 2 3 4 5 6 7
12. The coming years, a lot of investments must be done in marketing activities.	1 2 3 4 5 6 7
13. The coming years, the customers must be approached intensively.	1 2 3 4 5 6 7
14. The coming years, a lot of investments must be put in R&D activities.	1 2 3 4 5 6 7
15. The coming years, many employees will stay in R&D.	1 2 3 4 5 6 7
16. The spin-off works with the same customers as the parent organisation.	1 2 3 4 5 6 7
17. The spin-off works with the same partners as the parent organisation.	1 2 3 4 5 6 7
18. The spin-off complements to the activities of the parent organisation.	1 2 3 4 5 6 7
19. The spin-off works in the same knowledge field as the parent organisation.	1 2 3 4 5 6 7

3. Support and Co-operation with the Parent Organisation

With parent organisation wee refer to the university or research institute from which the spin-off has originated.

1. What is the name of the parent organisation?	_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Can you give for the following issues whether the parent organisation has supported your spin-off in this issue and consequently how important was the support for the spin-off.

The parent organisation has provided ...	No, we did not receive support but we should have	No, we did not receive support but it could have made things easier	No, we did not receive support but it was not necessary	Yes, we receive support but it was not necessary	Yes, we received support and it made things easier for us	Yes, we received support and it was crucial
1. finance	❑	❑	❑	❑	❑	❑
2. ownership rights or IP	❑	❑	❑	❑	❑	❑
3. start-up orders	❑	❑	❑	❑	❑	❑
4. accommodation or laboratory	❑	❑	❑	❑	❑	❑
5. legal support	❑	❑	❑	❑	❑	❑
6. organisational support	❑	❑	❑	❑	❑	❑
7. technological support	❑	❑	❑	❑	❑	❑
8. administrative support	❑	❑	❑	❑	❑	❑

4. The network and the activities

Will you choose from the pairs of activities below, the activity that has or had the most attention among the members in the starters-team during start-up.

example: The market, customers and competition had a lot more attention during the start-up process then the technology or the development process.

	The market, customers & competition	(++)	+	0	+	++	Technology & development process
1	The market, customers & competition	++	+	0	+	++	Technology & development process
2	The market, customers & competition	++	+	0	+	++	Co-operation with partners
3	The market, customers & competition	++	+	0	+	++	Organisation, legal & financial issues.
4	The market, customers & competition	++	+	0	+	++	Employees, accommodation & equipment
5	The market, customers & competition	++	+	0	+	++	Finding finance
6	Technology & development process	++	+	0	+	++	Co-operation with partners
7	Technology & development process	++	+	0	+	++	Organisation, legal & financial issues
8	Technology & development process	++	+	0	+	++	Employees, accommodation & equipment
9	Technology & development process	++	+	0	+	++	Finding finance
10	Co-operation with partners	++	+	0	+	++	Organisation, legal and financial issues.
11	Co-operation with partners	++	+	0	+	++	Employees, accommodation & equipment
12	Co-operation with partners	++	+	0	+	++	Finding finance
13	Organisation, legal & financial issues	++	+	0	+	++	Employees, accommodation & equipment
14	Organisation, legal & financial issues	++	+	0	+	++	Finding finance
15	Employees, accommodation & equipment	++	+	0	+	++	Finding finance

Most people discuss from time to time important issues with others, for example with family, colleagues etc. We ask you to give a maximum of 7 names of people who were important the start-up of the spin-off. It can involve a discussion on market, competition, finance, equipment and accommodation, etc.

Person	1	2	3	4	5	6	7
How is the contact made? Via your...							
personal network (family, friends)	❑	❑	❑	❑	❑	❑	❑
network of the university or research institute	❑	❑	❑	❑	❑	❑	❑
network of other universities	❑	❑	❑	❑	❑	❑	❑
business network	❑	❑	❑	❑	❑	❑	❑
How well do you know the person? Very well	❑	❑	❑	❑	❑	❑	❑
	❑	❑	❑	❑	❑	❑	❑
Somehow	❑	❑	❑	❑	❑	❑	❑
Very little							
How intensive is the contact? ± 1 x a week	❑	❑	❑	❑	❑	❑	❑
± 1 x a month	❑	❑	❑	❑	❑	❑	❑
± 1 x a half year	❑	❑	❑	❑	❑	❑	❑
How many years do you know this person?	_ _ yr	_ _ yr	_ _ yr	_ _ yr	_ _ yr	_ _ yr	_ _ yr
What did you discuss with this person?							
Market, customers and competition.....	❑	❑	❑	❑	❑	❑	❑
Technology and development process.....	❑	❑	❑	❑	❑	❑	❑
Co-operation and partners.....	❑	❑	❑	❑	❑	❑	❑
Organisation, legal and finance issues.....	❑	❑	❑	❑	❑	❑	❑
Employees, equipment and accommodation...	❑	❑	❑	❑	❑	❑	❑
Finance questions.....	❑	❑	❑	❑	❑	❑	❑

3c Relationships among the contacts in the external network

Can you mark the contacts that know each other.	1	2	3	4	5	6	7
Person 1		❑	❑	❑	❑	❑	❑
Person 2			❑	❑	❑	❑	❑
Person 3				❑	❑	❑	❑
Person 4					❑	❑	❑
Person 5						❑	❑
Person 6							❑

5. Performance

Can you give an indication of the following numbers	End 2000	End 2002	End 2003
1. The total number of full time employees	..... fte	..... fte	..... fte
2. The total number of full time employees working in R&D	..... fte	..... fte	..... fte
3. The cash-flow	€/ fl ..... mln	€/ fl ..... mln	€/ fl ..... mln
4. The R&D expenditures	€/ fl ..... mln	€/ fl ..... mln	€/ fl ..... mln

Appendix B

The following graphs show a summary of the expected hypotheses for each strategic orientation.

Figure B.1 summarizes the hypotheses for entrepreneurial oriented firms. Each red circle contains a more-less relationship indicating how the graph summarizes the hypothesis. For example, if we look at the number of contacts and the column Business, the red circle indicates that the hypothesis is "exploitative firms have more business contacts than exploitative firms".

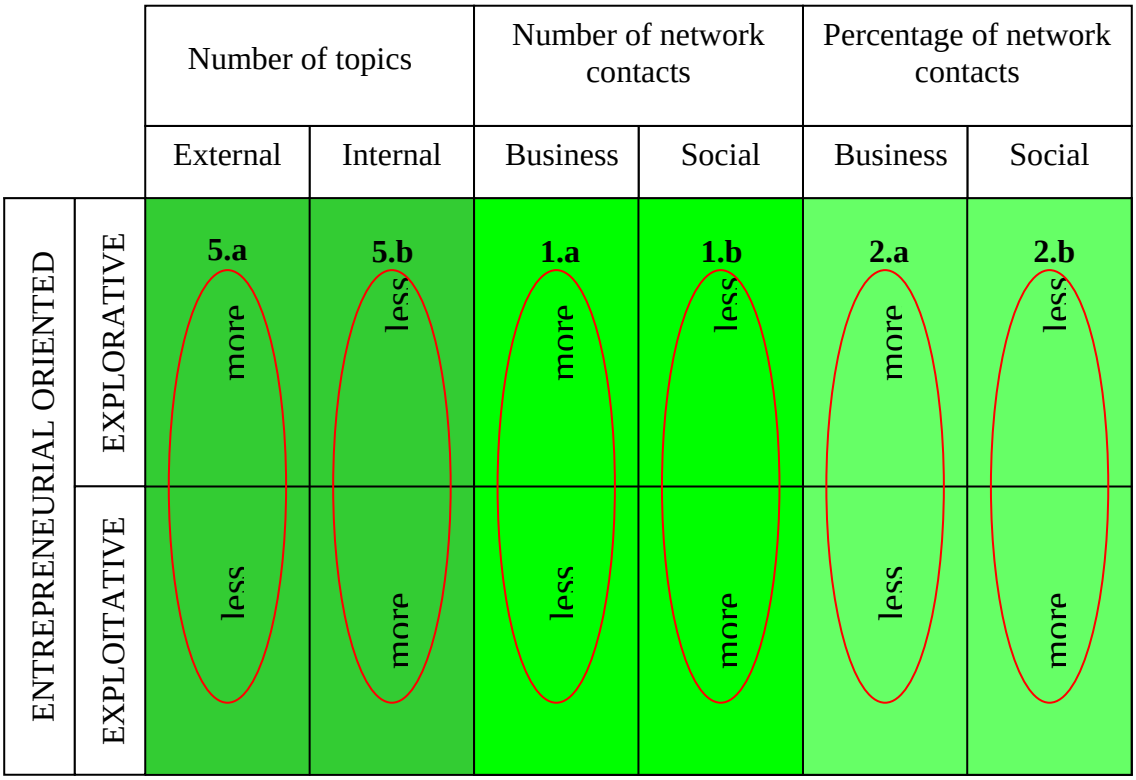

Figure B.1 Hypotheses for Entrepreneurial Oriented Firms

Similarly, Figure B.2 summarizes the hypotheses for market oriented firms.

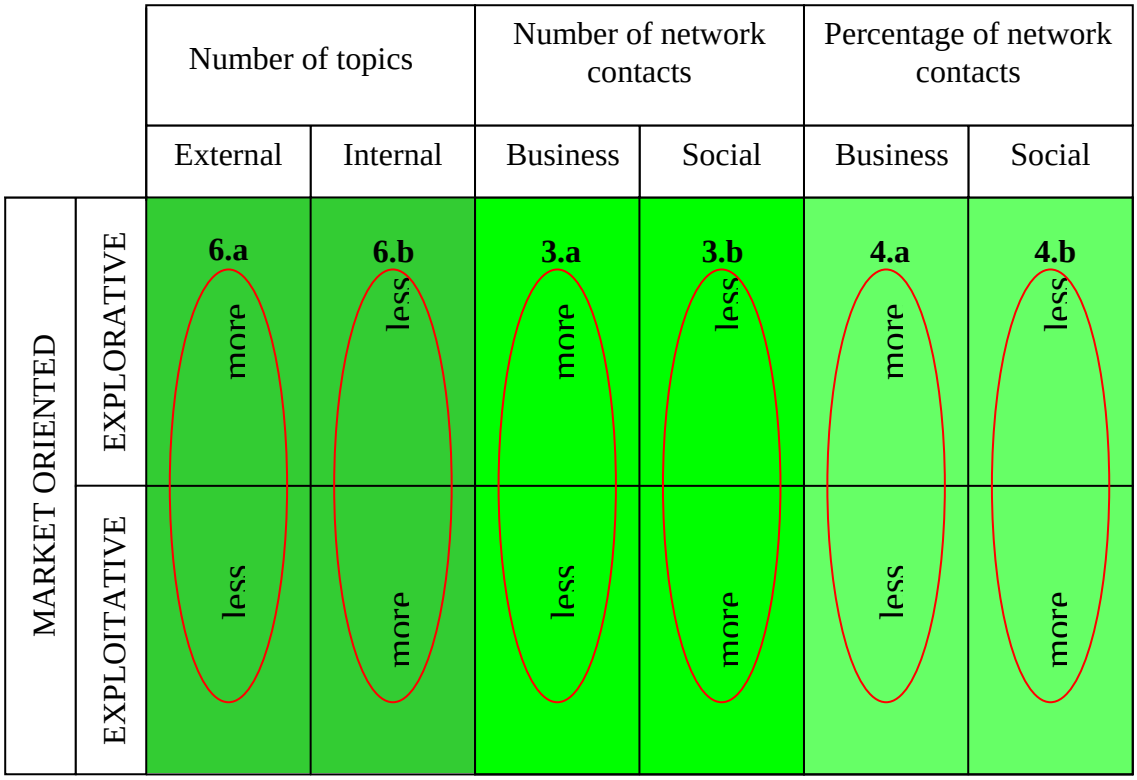

Figure B.2 Hypotheses for Market Oriented Firms

Appendix C

Appendix C shows the data that was included in the firm level database. It also includes the data that was introduced from the alter level database28. The variables in this database are described as follows:

- CASE: this variable indicates the number of the spin-off.
- NAME: this variable indicates the name of the spin-off.
- SOSECTOR: this variable indicates the sector where the spin-off operates.
- AGE: this variable indicates the age of the spin-off.
- SOORIENT1: This variable reflects, in a 7 point Likert scale (1="Completely disagree", 7="Completely agree"), the answer to the following question: The coming years, a lot of investments must be done in marketing activities.
- SOORIENT2: This variable reflects, in a 7 point Likert scale (1="Completely disagree", 7="Completely agree"), the answer to the following question: The coming years, the customers must be approached intensively.
- SORIENT3: This variable reflects, in a 7 point Likert scale (1="Completely disagree", 7="Completely agree"), the answer to the following question: The coming years, a lot of investments must be put in R&D activities.
- SOORIENT4: This variable reflects, in a 7 point Likert scale (1="Completely disagree", 7="Completely agree"), the answer to the following question: The coming years, many employees will stay in R&D.
- SO MARKET ORIENTATION: this variable reflects the result of putting together the variables SOORIENT1 and SOORIENT2.
- SO MARKET CLASSIFICATION: this variable classifies the firms as explorative or exploitative (0=explorative, 1=exploitative) depending on the value of SO MARKET ORIENTATION. This classification is explained in 3.3.1.
- SO ENTREP ORIENTATION: this variables reflects the result of putting together the variables SOORIENT3 and SOORIENT4.
- SO ENTREP CLASSIFICATION: this variable classifies the firms as explorative or exploitative (1=explorative, 0=exploitative) depending on the value of SO ENTREP ORIENTATION. This classification is explained in 3.3.1.
- PERSONAL CONTACTS: this variable show the number of personal contacts per firm. This value is obtained from the alter level database.

[28] The alter level database is explained in Appendix D.

- PREVIOUS WORK CONTACTS: this variable shows the number of previous work contacts per firm. This value is obtained from the alter level database.
- ACADEMIC CONTACTS: this variable shows the number of academic contacts per firm. This value is obtained from the alter level database.
- BUSINESS CONTACTS: this variable shows the number of business contacts per firm. This value is obtained from the alter level database.
- PERSONAL%: this variable shows the percentage of personal contacts regarding the total number of contacts per firm.
- PREVIOUS WORK%: this variable shows the percentage of previous work contacts regarding the total number of contacts per firm.
- ACADEMIC%: this variable shows the percentage of academic contacts regarding the total number of contacts per firm.
- BUSINESS%: this variable shows the percentage of business contacts regarding the total number of contacts per firm.
- TOPIC 1 RESPONDENTS: this variable shows the number of contacts that discussed about market, clients and competitors.
- TOPIC 2 RESPONDENTS: this variable shows the number of contacts that discussed about technology and development.
- TOPIC 3 RESPONDENTS: this variable shows the number of contacts that discussed about collaboration.
- TOPIC 4 RESPONDENTS: this variable shows the number of contacts that discussed about organizational and legal.
- TOPIC 5 RESPONDENTS: this variable shows the number of contacts that discussed about personal and accommodation.
- TOPIC 6 RESPONDENTS: this variable shows the number of contacts that discussed about finance.
- SOCIAL%: this variable reflects the percentage of social contacts. Personal, previous work and academic contacts are considered as social contacts.
- EXTERNAL TOPICS: this variable adds the number of respondents of topics 1, topics 2 and topics 3. There is more information about this process in 3.3.3.
- INTERNAL TOPICS: this variable adds the number of respondents of topics 4, topics 5 and topics 6. There is more information about this process in 3.3.3.
- SOCIAL CONTACTS: this variable adds the number of personal, previous work and academic contacts. There is more information about this process in 3.3.2.
- BUSINESS CONTACTS: this variable takes the number of business contacts as it is explained in 3.3.2.

CASE	NAME	SO SECTOR	AGE	SO ORIENT1	SO ORIENT2	SO ORIENT3	SO ORIENT4
1.0	Catchmab	Biotech	3.0	4.0	7.0	7.0	7.0
2.0	AmPharma	pharma	2.0	2.0	7.0	6.0	7.0
3.0	Pepscan	pharmacie	6.0	4.0	4.0	4.0	4.0
4.0	Covaccinne	pharma	4.0	3.0	3.0	3.0	3.0
5.0	Cedi Diagnostics	Biotech	3.0	6.0	7.0	5.0	6.0
6.0	Plant Dynamics	Biotech	4.0	2.0	5.0	6.0	6.0
7.0	WISL	Landschap	6.0	6.0	6.0	3.0	2.0
8.0	Genetwister	biotech	6.0	5.0	5.0	7.0	7.0
9.0	Osinga	Biotech	2.0	3.0	3.0	5.0	3.0
10.0	Krieken	biotech	2.0	5.0	5.0	2.0	2.0
11.0	BFactory	Biotech/ Farma	2.0	6.0	5.0	5.0	6.0
12.0	IQ Corporation	farma	6.0	5.0	6.0	5.0	4.0
13.0	UC Promotion	Zorg	2.0	5.0	7.0	4.0	2.0
14.0	ARC	Archeologie	4.0	6.0	6.0	3.0	2.0
15.0	KNN	milieuadv	4.0	5.0	6.0	2.0	2.0
16.0	Medusa	grondmeting	4.0	6.0	6.0	3.0	3.0
18.0	Argo	zorg	2.0	5.0	5.0	3.0	3.0
17.0	Enzis	biochemie	6.0	6.0	5.0	3.0	6.0
19.0	Cass Select	biochemie	3.0	6.0	7.0	2.0	2.0
20.0	Macrozyme	biotech	3.0	6.0	2.0	7.0	6.0
21.0	Biodetection	Biotech	5.0	7.0	7.0	5.0	4.0
22.0	Software Improvement Group	ICT Softw	4.0	5.0	7.0	5.0	6.0
23.0	AMT	HH	6.0	3.0	7.0	7.0	7.0
24.0	Nutriscience	Food	4.0	6.0	6.0	2.0	7.0
25.0	Mucovax	Agro	6.0	5.0	7.0	6.0	6.0
26.0	Halotech	Metaal, technisch ontwerp procestechinek	6.0	5.0	5.0	5.0	5.0
27.0	Spierings Medische Techniek BV	HH	2.0	1.0	1.0	4.0	4.0
28.0	Consumer Health Entrepreneurs BV	HH	6.0	4.0	4.0	6.0	6.0
29.0	IBIS	Stat. Wisk	6.0	1.0	1.0	6.0	7.0
30.0	Pro Facto	juridisch adv	4.0	5.0	5.0	5.0	4.0
31.0	Interapy	psychologie	3.0	5.0	7.0	6.0	6.0

32.0	Galapos Genomics	Biotech	6.0	5.0	7.0	7.0	7.0
33.0	MultiSensors	Industr Softw.	3.0	6.0	7.0	4.0	5.0
35.0	Remotica	ICT advies	3.0	5.0	6.0	2.0	2.0
36.0	Lionix	ICT advies	3.0	7.0	7.0	4.0	4.0
37.0	Feat	tno	4.0	5.0	5.0	5.0	5.0
38.0	Vaxinostics	Farma	3.0	5.0	6.0	4.0	4.0
39.0	The Soil Company	landbouw	3.0	5.0	5.0	2.0	2.0
40.0	Skintec	farma	2.0	3.0	3.0	6.0	3.0
41.0	Suprapolix	chemie	2.0	6.0	6.0	6.0	6.0
43.0	Solea	visteelt	3.0	7.0	6.0	5.0	6.0
44.0	Enerdeco	adv energie	5.0	3.0	4.0	3.0	2.0
45.0	POSS	Mngt ICT	3.0	6.0	6.0	5.0	4.0
46.0	Vitak	farma	3.0	5.0	5.0	6.0	7.0
47.0	NedClad Technology	metaal	4.0	4.0	4.0	4.0	3.0
48.0	UCCER	Letteren	6.0				
49.0	Gendika	biotech	6.0	4.0	4.0	2.0	7.0
51.0	Triptic	internet appl	6.0	6.0	7.0	4.0	1.0
53.0	MbdIT	softw	4.0	6.0	6.0	4.0	4.0
56.0	Terreco	bodemsanr	2.0	7.0	7.0	2.0	2.0
57.0	Ovitech		2.0	7.0	7.0	6.0	6.0
58.0	Bsim	advies serv	8.0	6.0	6.0	4.0	4.0
59.0	Tiobe	ict	4.0	5.0	4.0	6.0	6.0
60.0	Suez	ICT	4.0	4.0	6.0	3.0	3.0
61.0	GPX	Milieu adv	4.0	6.0	7.0	7.0	4.0
62.0	mBalance	ict	3.0	3.0	6.0	5.0	6.0
63.0	Innovation Handling		6.0	7.0	7.0	6.0	6.0
64.0	Milabs	biotech	2.0	5.0	6.0	7.0	7.0
67.0	CCS	energie adv.	4.0	7.0	7.0	4.0	4.0
68.0	Bugando	ICT-softw	4.0	7.0	7.0	3.0	4.0
70.0	Twente Solid State Techn.	Fysica	6.0	5.0	6.0	5.0	6.0
71.0	Connex Communications	comm	5.0	6.0	5.0	4.0	3.0
72.0	Concept7	ICT-int.	5.0	7.0	7.0	5.0	5.0
73.0	ISAAC	ICT-internet	5.0	4.0	5.0	3.0	2.0

74.0	Prodrive	Electro	6.0	5.0	6.0	5.0	6.0
75.0	Bitsoft	IT	5.0	4.0	6.0	2.0	3.0
76.0	Aquamarijn	Electro	6.0	4.0	4.0	7.0	7.0
77.0	Mathmetrics	Adv	2.0	5.0	4.0	4.0	5.0
78.0	Keypoint Consultancy	Adv verkeer	6.0	6.0	6.0	5.0	2.0
79.0	Greengrid	Adv-milieu	6.0	5.0	5.0	3.0	2.0
80.0	Grafico de Poost	graf. ontwerp	12.0	5.0	6.0	4.0	3.0
81.0	Acuity	ICT	3.0	5.0	7.0	5.0	4.0

CASE	NAME	SO MARKET ORIENTATION	SO MARKET CLASSIFICATION	SO ENTREP ORIENTATION	SO ENTREP CLASSIFICATION
1.0	Catchmab	5.5	0.0	7.0	1.0
2.0	AmPharma	4.5	0.0	6.5	1.0
3.0	Pepscan	4.0	0.0	4.0	0.0
4.0	Covaccinne	3.0	0.0	3.0	0.0
5.0	Cedi Diagnostics	6.5	1.0	5.5	1.0
6.0	Plant Dynamics	3.5	0.0	6.0	1.0
7.0	WISL	6.0	1.0	2.5	0.0
8.0	Genetwister	5.0	0.0	7.0	1.0
9.0	Osinga	3.0	0.0	4.0	0.0
10.0	Krieken	5.0	0.0	2.0	0.0
11.0	BFactory	5.5	0.0	5.5	1.0
12.0	IQ Corporation	5.5	0.0	4.5	0.0
13.0	UC Promotion	6.0	1.0	3.0	0.0
14.0	ARC	6.0	1.0	2.5	0.0
15.0	KNN	5.5	0.0	2.0	0.0
16.0	Medusa	6.0	1.0	3.0	0.0
18.0	Argo	5.0	0.0	3.0	0.0
17.0	Enzis	5.5	0.0	4.5	0.0
19.0	Cass Select	6.5	1.0	2.0	0.0
20.0	Macrozyme	4.0	0.0	6.5	1.0
21.0	Biodetection	7.0	1.0	4.5	0.0

22.0	Software Improvement Group	6.0	1.0	5.5	1.0
23.0	AMT	5.0	0.0	7.0	1.0
24.0	Nutriscience	6.0	1.0	4.5	0.0
25.0	Mucovax	6.0	1.0	6.0	1.0
26.0	Halotech	5.0	0.0	5.0	1.0
27.0	Spierings Medische Techniek BV	1.0	0.0	4.0	0.0
28.0	Consumer Health Entrepreneurs BV	4.0	0.0	6.0	1.0
29.0	IBIS	1.0	0.0	6.5	1.0
30.0	Pro Facto	5.0	0.0	4.5	0.0
31.0	Interapy	6.0	1.0	6.0	1.0
32.0	Galapos Genomics	6.0	1.0	7.0	1.0
33.0	MultiSensors	6.5	1.0	4.5	0.0
35.0	Remotica	5.5	0.0	2.0	0.0
36.0	Lionix	7.0	1.0	4.0	0.0
37.0	Feat	5.0	0.0	5.0	1.0
38.0	Vaxinostics	5.5	0.0	4.0	0.0
39.0	The Soil Company	5.0	0.0	2.0	0.0
40.0	Skintec	3.0	0.0	4.5	0.0
41.0	Suprapolix	6.0	1.0	6.0	1.0
43.0	Solea	6.5	1.0	5.5	1.0
44.0	Enerdeco	3.5	0.0	2.5	0.0
45.0	POSS	6.0	1.0	4.5	0.0
46.0	Vitak	5.0	0.0	6.5	1.0
47.0	NedClad Technology	4.0	0.0	3.5	0.0
48.0	UCCER				
49.0	Gendika	4.0	0.0	4.5	0.0
51.0	Triptic	6.5	1.0	2.5	0.0
53.0	MbdIT	6.0	1.0	4.0	0.0
56.0	Terreco	7.0	1.0	2.0	0.0
57.0	Ovitech	7.0	1.0	6.0	1.0
58.0	Bsim	6.0	1.0	4.0	0.0
59.0	Tiobe	4.5	0.0	6.0	1.0
60.0	Suez	5.0	0.0	3.0	0.0

61.0	GPX	6.5	1.0	5.5	1.0
62.0	mBalance	4.5	0.0	5.5	1.0
63.0	Innovation Handling	7.0	1.0	6.0	1.0
64.0	Milabs	5.5	0.0	7.0	1.0
67.0	CCS	7.0	1.0	4.0	0.0
68.0	Bugando	7.0	1.0	3.5	0.0
70.0	Twente Solid State Techn.	5.5	0.0	5.5	1.0
71.0	Connex Communications	5.5	0.0	3.5	0.0
72.0	Concept7	7.0	1.0	5.0	1.0
73.0	ISAAC	4.5	0.0	2.5	0.0
74.0	Prodrive	5.5	0.0	5.5	1.0
75.0	Bitsoft	5.0	0.0	2.5	0.0
76.0	Aquamarijn	4.0	0.0	7.0	1.0
77.0	Mathmetrics	4.5	0.0	4.5	0.0
78.0	Keypoint Consultancy	6.0	1.0	3.5	0.0
79.0	Greengrid	5.0	0.0	2.5	0.0
80.0	Grafico de Poost	5.5	0.0	3.5	0.0
81.0	Acuity	6.0	1.0	4.5	0.0

CASE	NAME	PRESONAL CONTACTS	PREWORK CONTACTS	ACADEMIC CONTACTS	BUSINESS CONTACTS	PERSONAL %	PREWORK %	ACADEMIC %	BUSINESS %
1.0	Catchmab	1.0	1.0	2.0	2.0	0.16	0.16	0.33	0.33
2.0	AmPharma	0.0	1.0	2.0	2.0	0.0	0.2	0.4	0.4
3.0	Pepscan	0.0	1.0	1.0	2.0	0.0	0.25	0.25	0.5
4.0	Covaccinne	1.0	3.0	0.0	0.0	0.25	0.75	0.0	0.0
5.0	Cedi Diagnostics	1.0	2.0	0.0	1.0	0.25	0.5	0.0	0.25
6.0	Plant Dynamics	1.0	3.0	1.0	2.0	0.14	0.42	0.14	0.28
7.0	WISL	3.0	1.0	0.0	1.0	0.6	0.2	0.0	0.2
8.0	Genetwister	0.0	0.0	1.0	2.0	0.0	0.0	0.33	0.66
9.0	Osinga	0.0	1.0	0.0	2.0	0.0	0.33	0.0	0.66
10.0	Krieken	0.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0
11.0	BFactory	0.0	1.0	1.0	1.0	0.0	0.33	0.33	0.33

12.0	IQ Corporation	0.0	1.0	1.0	1.0	0.0	0.33	0.33	0.33
13.0	UC Promotion	1.0	2.0	0.0	1.0	0.25	0.5	0.0	0.25
14.0	ARC	0.0	3.0	0.0	1.0	0.0	0.75	0.0	0.25
15.0	KNN	0.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0
16.0	Medusa	1.0	3.0	0.0	2.0	0.16	0.5	0.0	0.33
18.0	Argo	0.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0
17.0	Enzis	0.0	1.0	0.0	1.0	0.0	0.5	0.0	0.5
19.0	Cass Select	0.0	2.0	0.0	0.0	0.0	1.0	0.0	0.0
20.0	Macrozyme	2.0	0.0	0.0	3.0	0.4	0.0	0.0	0.6
21.0	Biodetection	1.0	1.0	1.0	1.0	0.25	0.25	0.25	0.25
22.0	Software Improvement Group	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
23.0	AMT	1.0	4.0	0.0	1.0	0.16	0.66	0.0	0.16
24.0	Nutriscience	1.0	2.0	0.0	0.0	0.33	0.66	0.0	0.0
25.0	Mucovax	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
26.0	Halotech	1.0	0.0	0.0	1.0	0.5	0.0	0.0	0.5
27.0	Spierings Medische Techniek BV	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
28.0	Consumer Health Entrepreneurs BV	2.0	0.0	0.0	3.0	0.4	0.0	0.0	0.6
29.0	IBIS	1.0	2.0	0.0	0.0	0.33	0.66	0.0	0.0
30.0	Pro Facto	2.0	1.0	0.0	1.0	0.5	0.25	0.0	0.25
31.0	Interapy	0.0	2.0	0.0	1.0	0.0	0.66	0.0	0.33
32.0	Galapos Genomics	0.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0
33.0	MultiSensors	2.0	1.0	0.0	1.0	0.5	0.25	0.0	0.25
35.0	Remotica	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
36.0	Lionix	2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
37.0	Feat	0.0	4.0	1.0	0.0	0.0	0.8	0.2	0.0
38.0	Vaxinostics	0.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0
39.0	The Soil Company	2.0	1.0	0.0	0.0	0.66	0.33	0.0	0.0
40.0	Skintec	3.0	1.0	0.0	0.0	0.75	0.25	0.0	0.0
41.0	Suprapolix	1.0	1.0	0.0	1.0	0.33	0.33	0.0	0.33
43.0	Solea	0.0	2.0	0.0	2.0	0.0	0.5	0.0	0.5
44.0	Enerdeco	0.0	2.0	1.0	2.0	0.0	0.4	0.2	0.4
45.0	POSS	1.0	0.0	0.0	1.0	0.5	0.0	0.0	0.5
46.0	Vitak	0.0	5.0	0.0	1.0	0.0	0.83	0.0	0.16

47.0	NedClad Technology	1.0	1.0	0.0	4.0	0.16	0.16	0.0	0.66
48.0	UCCER	1.0	0.0	0.0	3.0	0.25	0.0	0.0	0.75
49.0	Gendika	1.0	1.0	0.0	0.0	0.5	0.5	0.0	0.0
51.0	Triptic	1.0	1.0	0.0	0.0	0.5	0.5	0.0	0.0
53.0	MbdIT	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
56.0	Terreco	0.0	0.0	0.0	3.0	0.0	0.0	0.0	1.0
57.0	Ovitech	2.0	2.0	0.0	1.0	0.4	0.4	0.0	0.2
58.0	Bsim	1.0	1.0	0.0	2.0	0.25	0.25	0.0	0.5
59.0	Tiobe	2.0	0.0	0.0	5.0	0.28	0.0	0.0	0.71
60.0	Suez	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
61.0	GPX	0.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0
62.0	mBalance	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
63.0	Innovation Handling	0.0	0.0	0.0	4.0	0.0	0.0	0.0	1.0
64.0	Milabs	0.0	1.0	1.0	1.0	0.0	0.33	0.33	0.33
67.0	CCS	1.0	2.0	0.0	0.0	0.33	0.66	0.0	0.0
68.0	Bugando	3.0	0.0	0.0	1.0	0.75	0.0	0.0	0.25
70.0	Twente Solid State Techn.	0.0	1.0	0.0	2.0	0.0	0.33	0.0	0.66
71.0	Connex Communications	3.0	0.0	0.0	1.0	0.75	0.0	0.0	0.25
72.0	Concept7	5.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
73.0	ISAAC	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
74.0	Prodrive	2.0	0.0	0.0	1.0	0.66	0.0	0.0	0.33
75.0	Bitsoft	1.0	1.0	0.0	0.0	0.5	0.5	0.0	0.0
76.0	Aquamarijn	4.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
77.0	Mathmetrics	1.0	1.0	0.0	2.0	0.25	0.25	0.0	0.5
78.0	Keypoint Consultancy	1.0	3.0	1.0	1.0	0.16	0.5	0.16	0.16
79.0	Greengrid	2.0	0.0	1.0	1.0	0.5	0.0	0.25	0.25
80.0	Grafico de Poost	3.0	1.0	0.0	1.0	0.6	0.2	0.0	0.2
81.0	Acuity	0.0	4.0	0.0	1.0	0.0	0.8	0.0	0.2

CASE	NAME	TOPIC 1 RESPONDENTS	TOPIC 2 RESPONDENTS	TOPIC 3 RESPONDENTS	TOPIC 4 RESPONDENTS	TOPIC 5 RESPONDENTS	TOPIC 6 RESPONDENTS
1.0	Catchmab	3.0	1.0	1.0	1.0	2.0	2.0
2.0	AmPharma	3.0	3.0	1.0	1.0	1.0	1.0
3.0	Pepscan	1.0	2.0	2.0	1.0	1.0	0.0
4.0	Covaccinne	2.0	2.0	0.0	2.0	2.0	1.0
5.0	Cedi Diagnostics	3.0	2.0	0.0	0.0	1.0	0.0
6.0	Plant Dynamics	4.0	2.0	1.0	3.0	2.0	2.0
7.0	WISL	2.0	0.0	1.0	5.0	0.0	0.0
8.0	Genetwister	2.0	2.0	1.0	0.0	0.0	0.0
9.0	Osinga	3.0	1.0	0.0	1.0	0.0	0.0
10.0	Krieken	3.0	2.0	1.0	1.0	0.0	1.0
11.0	BFactory	2.0	2.0	0.0	1.0	0.0	2.0
12.0	IQ Corporation	1.0	2.0	2.0	0.0	1.0	1.0
13.0	UC Promotion	2.0	0.0	1.0	1.0	1.0	1.0
14.0	ARC	3.0	0.0	0.0	0.0	0.0	1.0
15.0	KNN	3.0	2.0	0.0	1.0	0.0	0.0
16.0	Medusa	3.0	1.0	1.0	4.0	1.0	0.0
18.0	Argo	2.0	0.0	0.0	1.0	1.0	0.0
17.0	Enzis	2.0	2.0	2.0	2.0	0.0	2.0
19.0	Cass Select	1.0	1.0	0.0	1.0	1.0	1.0
20.0	Macrozyme	2.0	3.0	1.0	2.0	2.0	2.0
21.0	Biodetection	0.0	1.0	1.0	2.0	1.0	2.0
22.0	Software Improvement Group	1.0	0.0	1.0	1.0	1.0	1.0
23.0	AMT	3.0	3.0	3.0	2.0	1.0	2.0
24.0	Nutriscience	2.0	1.0	1.0	1.0	1.0	1.0
25.0	Mucovax	1.0	1.0	1.0	1.0	0.0	0.0
26.0	Halotech	2.0	2.0	2.0	2.0	2.0	2.0
27.0	Spierings Medische Techniek BV	0.0	1.0	0.0	1.0	1.0	0.0
28.0	Consumer Health Entrepreneurs BV	3.0	5.0	1.0	1.0	0.0	0.0
29.0	IBIS	2.0	0.0	0.0	3.0	3.0	3.0
30.0	Pro Facto	2.0	2.0	2.0	3.0	1.0	0.0
31.0	Interapy	1.0	2.0	1.0	3.0	1.0	3.0

32.0	Galapos Genomics	2.0	2.0	1.0	1.0	2.0	3.0
33.0	MultiSensors	2.0	2.0	1.0	2.0	0.0	1.0
35.0	Remotica	3.0	2.0	2.0	3.0	1.0	2.0
36.0	Lionix	1.0	1.0	0.0	0.0	0.0	1.0
37.0	Feat	3.0	5.0	3.0	0.0	0.0	0.0
38.0	Vaxinostics	3.0	0.0	2.0	3.0	2.0	0.0
39.0	The Soil Company	1.0	1.0	0.0	2.0	0.0	1.0
40.0	Skintec	4.0	4.0	4.0	4.0	4.0	4.0
41.0	Suprapolix	2.0	1.0	2.0	1.0	0.0	2.0
43.0	Solea	3.0	3.0	0.0	1.0	1.0	2.0
44.0	Enerdeco	3.0	1.0	2.0	2.0	1.0	1.0
45.0	POSS	2.0	1.0	1.0	1.0	1.0	1.0
46.0	Vitak	1.0	2.0	3.0	2.0	3.0	2.0
47.0	NedClad Technology	5.0	5.0	4.0	4.0	5.0	3.0
48.0	UCCER	2.0	0.0	4.0	2.0	2.0	4.0
49.0	Gendika	1.0	1.0	0.0	0.0	1.0	0.0
51.0	Triptic	1.0	1.0	1.0	1.0	1.0	1.0
53.0	MbdIT	3.0	2.0	1.0	2.0	1.0	2.0
56.0	Terreco	1.0	0.0	1.0	1.0	0.0	2.0
57.0	Ovitech	4.0	2.0	0.0	4.0	0.0	2.0
58.0	Bsim						
59.0	Tiobe	1.0	3.0	2.0	5.0	3.0	3.0
60.0	Suez	3.0	3.0	3.0	1.0	1.0	1.0
61.0	GPX	1.0	0.0	1.0	1.0	0.0	1.0
62.0	mBalance	0.0	0.0	0.0	1.0	0.0	0.0
63.0	Innovation Handling	4.0	4.0	4.0	4.0	4.0	4.0
64.0	Milabs	3.0	3.0	3.0	3.0	3.0	3.0
67.0	CCS	2.0	2.0	2.0	1.0	2.0	0.0
68.0	Bugando	4.0	2.0	1.0	2.0	2.0	1.0
70.0	Twente Solid State Techn.	3.0	1.0	1.0	2.0	1.0	1.0
71.0	Connex Communications	4.0	4.0	4.0	4.0	4.0	4.0
72.0	Concept7	5.0	5.0	5.0	5.0	5.0	5.0
73.0	ISAAC	3.0	2.0	3.0	2.0	2.0	2.0

74.0	Prodrive	0.0	1.0	0.0	2.0	0.0	1.0
75.0	Bitsoft	2.0	2.0	0.0	2.0	0.0	0.0
76.0	Aquamarijn	0.0	4.0	0.0	0.0	0.0	0.0
77.0	Mathmetrics	3.0	1.0	2.0	1.0	1.0	1.0
78.0	Keypoint Consultancy	1.0	1.0	1.0	1.0	2.0	0.0
79.0	Greengrid	4.0	3.0	4.0	2.0	1.0	1.0
80.0	Grafico de Poost	2.0	2.0	1.0	4.0	3.0	2.0
81.0	Acuity	4.0	2.0	2.0	3.0	0.0	0.0

CASE	NAME	SOCIAL %	EXTERNAL TOPICS	INTERNAL TOPICS	SOCIAL CONTACTS	BUSINESS CONTACTS
1.0	Catchmab	0.65	5.0	5.0	4.0	2.0
2.0	AmPharma	0.6000000000000001	7.0	3.0	3.0	2.0
3.0	Pepscan	0.5	5.0	2.0	2.0	2.0
4.0	Covaccinne	1.0	4.0	5.0	4.0	0.0
5.0	Cedi Diagnostics	0.75	5.0	1.0	3.0	1.0
6.0	Plant Dynamics	0.7000000000000001	7.0	7.0	5.0	2.0
7.0	WISL	0.8	3.0	5.0	4.0	1.0
8.0	Genetwister	0.33	5.0	0.0	1.0	2.0
9.0	Osinga	0.33	4.0	1.0	1.0	2.0
10.0	Krieken	1.0	6.0	2.0	3.0	0.0
11.0	BFactory	0.66	4.0	3.0	2.0	1.0
12.0	IQ Corporation	0.66	5.0	2.0	2.0	1.0
13.0	UC Promotion	0.75	3.0	3.0	3.0	1.0
14.0	ARC	0.75	3.0	1.0	3.0	1.0
15.0	KNN	1.0	5.0	1.0	3.0	0.0
16.0	Medusa	0.66	5.0	5.0	4.0	2.0
18.0	Argo	1.0	2.0	2.0	3.0	0.0
17.0	Enzis	0.5	6.0	4.0	1.0	1.0
19.0	Cass Select	1.0	2.0	3.0	2.0	0.0
20.0	Macrozyme	0.4	6.0	6.0	2.0	3.0
21.0	Biodetection	0.75	2.0	5.0	3.0	1.0

22.0	Software Improvement Group	1.0	2.0	3.0	1.0	0.0
23.0	AMT	0.8200000000000001	9.0	5.0	5.0	1.0
24.0	Nutriscience	0.99	4.0	3.0	3.0	0.0
25.0	Mucovax	1.0	3.0	1.0	1.0	0.0
26.0	Halotech	0.5	6.0	6.0	1.0	1.0
27.0	Spierings Medische Techniek BV	1.0	1.0	2.0	3.0	0.0
28.0	Consumer Health Entrepreneurs BV	0.4	9.0	1.0	2.0	3.0
29.0	IBIS	0.99	2.0	9.0	3.0	0.0
30.0	Pro Facto	0.75	6.0	4.0	3.0	1.0
31.0	Interapy	0.66	4.0	7.0	2.0	1.0
32.0	Galapos Genomics	1.0	5.0	6.0	3.0	0.0
33.0	MultiSensors	0.75	5.0	3.0	3.0	1.0
35.0	Remotica	1.0	7.0	6.0	3.0	0.0
36.0	Lionix	1.0	2.0	1.0	2.0	0.0
37.0	Feat	1.0	11.0	0.0	5.0	0.0
38.0	Vaxinostics	1.0	5.0	5.0	3.0	0.0
39.0	The Soil Company	0.99	2.0	3.0	3.0	0.0
40.0	Skintec	1.0	12.0	12.0	4.0	0.0
41.0	Suprapolix	0.66	5.0	3.0	2.0	1.0
43.0	Solea	0.5	6.0	4.0	2.0	2.0
44.0	Enerdeco	0.6000000000000001	6.0	4.0	3.0	2.0
45.0	POSS	0.5	4.0	3.0	1.0	1.0
46.0	Vitak	0.83	6.0	7.0	5.0	1.0
47.0	NedClad Technology	0.32	14.0	12.0	2.0	4.0
48.0	UCCER	0.25	6.0	8.0	1.0	3.0
49.0	Gendika	1.0	2.0	1.0	2.0	0.0
51.0	Triptic	1.0	3.0	3.0	2.0	0.0
53.0	MbdIT	1.0	6.0	5.0	3.0	0.0
56.0	Terreco	0.0	2.0	3.0	0.0	3.0
57.0	Ovitech	0.8	6.0	6.0	4.0	1.0
58.0	Bsim	0.5			2.0	2.0
59.0	Tiobe	0.28	6.0	11.0	2.0	5.0
60.0	Suez	1.0	9.0	3.0	3.0	0.0

61.0	GPX	1.0	2.0	2.0	3.0	0.0
62.0	mBalance	1.0	0.0	1.0	1.0	0.0
63.0	Innovation Handling	0.0	12.0	12.0	0.0	4.0
64.0	Milabs	0.66	9.0	9.0	2.0	1.0
67.0	CCS	0.99	6.0	3.0	3.0	0.0
68.0	Bugando	0.75	7.0	5.0	3.0	1.0
70.0	Twente Solid State Techn.	0.33	5.0	4.0	1.0	2.0
71.0	Connex Communications	0.75	12.0	12.0	3.0	1.0
72.0	Concept7	1.0	15.0	15.0	5.0	0.0
73.0	ISAAC	1.0	8.0	6.0	3.0	0.0
74.0	Prodrive	0.66	1.0	3.0	2.0	1.0
75.0	Bitsoft	1.0	4.0	2.0	2.0	0.0
76.0	Aquamarijn	1.0	4.0	0.0	4.0	0.0
77.0	Mathmetrics	0.5	6.0	3.0	2.0	2.0
78.0	Keypoint Consultancy	0.8200000000000001	3.0	3.0	5.0	1.0
79.0	Greengrid	0.75	11.0	4.0	3.0	1.0
80.0	Grafico de Poost	0.8	5.0	9.0	4.0	1.0
81.0	Acuity	0.8	8.0	3.0	4.0	1.0

Appendix D

Appendix D shows the data that was included in the alter level database. The variables in this database are described as follows:

- RESPOND: this variable indicates to which firm belong each contact.
- ALTER: this variable indicates the number of the contact per firm.
- PERSONAL: this variable indicates whether the contact comes from personal relationships or not (1=the contacts comes from personal relationships, 0=the contact does not come from personal relationships).
- PREWORK: this variable indicates whether the contact comes from previous work relationships or not (1=the contacts comes from previous work relationships, 0=the contact does not come from previous work relationships)
- ACADEMIC: this variable indicates whether the contact comes from academic relationships or not (1=the contacts comes from academic relationships, 0=the contact does not come from academic relationships)
- BUSINESS: this variable indicates whether the contact comes from business relationships or not (1=the contacts comes from business relationships, 0=the contact does not come from business relationships)
- TOPIC1: this variable indicates whether the respondents discussed this topics (market, clients and competitors) with the contact or not (1=discussed, 0=not discussed).
- TOPIC2: this variable indicates whether the respondents discussed this topics (technology and development) with the contact or not (1=discussed, 0=not discussed).
- TOPIC3: this variable indicates whether the respondents discussed this topics (collaboration) with the contact or not (1=discussed, 0=not discussed).
- TOPIC4: this variable indicates whether the respondents discussed this topics (organizational and legal) with the contact or not (1=discussed, 0=not discussed).
- TOPIC5: this variable indicates whether the respondents discussed this topics (personal and accommodation) with the contact or not (1=discussed, 0=not discussed).
- TOPIC6: this variable indicates whether the respondents discussed this topics (finance) with the contact or not (1=discussed, 0=not discussed).

RESPOND	ALTER	PERSONAL	PREWORK	ACADEMIC	BUSINESS	TOPIC 1	TOPIC 2	TOPIC 3	TOPIC 4	TOPIC 5	TOPIC 6
1.0	5.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
1.0	4.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
1.0	3.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
1.0	6.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
1.0	2.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0
1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0
2.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
2.0	2.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	1.0
2.0	4.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
2.0	5.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
2.0	3.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
3.0	4.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
3.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0
3.0	2.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	0.0	0.0
3.0	3.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0
4.0	4.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
4.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	1.0
4.0	2.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
4.0	3.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
5.0	4.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
5.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
5.0	2.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
5.0	3.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0
6.0	4.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
6.0	3.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0
6.0	7.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0
6.0	2.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	1.0
6.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0
6.0	5.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0

RESPOND	ALTER	PERSONAL	PREWORK	ACADEMIC	BUSINESS	TOPIC 1	TOPIC 2	TOPIC 3	TOPIC 4	TOPIC 5	TOPIC 6
6.0	6.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0
7.0	5.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
7.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
7.0	4.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
7.0	3.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0
7.0	2.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0
8.0	3.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0
8.0	2.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0
8.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
9.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
9.0	2.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0
9.0	3.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0
10.0	3.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
10.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0
10.0	2.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0
11.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	1.0
11.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0
11.0	2.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
12.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
12.0	2.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	1.0
12.0	3.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0
13.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0
13.0	3.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
13.0	4.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
13.0	2.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0
14.0	2.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.0	3.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0
14.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
14.0	4.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0
15.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
15.0	2.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0

RESPOND	ALTER	PERSONAL	PREWORK	ACADEMIC	BUSINESS	TOPIC 1	TOPIC 2	TOPIC 3	TOPIC 4	TOPIC 5	TOPIC 6
15.0	3.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
16.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
16.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
16.0	6.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
16.0	3.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0
16.0	5.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0
16.0	4.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0
17.0	2.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0
17.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0
18.0	3.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0
18.0	2.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
18.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0
19.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
19.0	2.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
20.0	4.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
20.0	3.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
20.0	2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
20.0	5.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0
20.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
21.0	3.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
21.0	2.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0
21.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
21.0	4.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
22.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0
23.0	2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0
23.0	6.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0
23.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23.0	3.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0
23.0	4.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0
23.0	5.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0
24.0	3.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0

RESPOND	ALTER	PERSONAL	PREWORK	ACADEMIC	BUSINESS	TOPIC 1	TOPIC 2	TOPIC 3	TOPIC 4	TOPIC 5	TOPIC 6
24.0	2.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
24.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	1.0
25.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0
26.0	2.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
26.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
27.0	2.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
27.0	3.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
27.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
28.0	1.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
28.0	2.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
28.0	3.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
28.0	4.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
28.0	5.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	0.0	0.0
29.0	3.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0
29.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0
29.0	2.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0
30.0	3.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0
30.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	0.0
30.0	2.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
30.0	4.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
31.0	3.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0
31.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0
31.0	2.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0
32.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0
32.0	3.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
32.0	2.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0
33.0	3.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
33.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0
33.0	2.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
33.0	4.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
35.0	2.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0

RESPOND	ALTER	PERSONAL	PREWORK	ACADEMIC	BUSINESS	TOPIC 1	TOPIC 2	TOPIC 3	TOPIC 4	TOPIC 5	TOPIC 6
35.0	3.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0
35.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
36.0	2.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
36.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0
37.0	2.0	0.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0
37.0	4.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
37.0	3.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0
37.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0
37.0	5.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
38.0	2.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
38.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	0.0
38.0	3.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	0.0
39.0	1.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
39.0	3.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
39.0	2.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
40.0	2.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
40.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
40.0	3.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
40.0	4.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
41.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0
41.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0
41.0	2.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0
43.0	4.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
43.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	1.0
43.0	2.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0
43.0	3.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
44.0	1.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
44.0	5.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
44.0	3.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0	0.0
44.0	4.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0	0.0

RESPOND	ALTER	PERSONAL	PREWORK	ACADEMIC	BUSINESS	TOPIC 1	TOPIC 2	TOPIC 3	TOPIC 4	TOPIC 5	TOPIC 6
44.0	2.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
45.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
45.0	2.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0
46.0	2.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0
46.0	4.0	0.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0
46.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0
46.0	5.0	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
46.0	6.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0
46.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0
47.0	5.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0
47.0	3.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
47.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
47.0	6.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0
47.0	4.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
47.0	2.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
48.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0
48.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0
48.0	4.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0
48.0	2.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0
49.0	2.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
49.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
51.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0
51.0	2.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0
53.0	2.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
53.0	3.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0
53.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0
56.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0
56.0	2.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0
56.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0
57.0	1.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
57.0	4.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0

RESPOND	ALTER	PERSONAL	PREWORK	ACADEMIC	BUSINESS	TOPIC 1	TOPIC 2	TOPIC 3	TOPIC 4	TOPIC 5	TOPIC 6
57.0	3.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
57.0	5.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0
57.0	2.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0
58.0	1.0	1.0	0.0	0.0	0.0	99.0	99.0	99.0	99.0	99.0	99.0
58.0	2.0	0.0	0.0	0.0	1.0	99.0	99.0	99.0	99.0	99.0	99.0
58.0	3.0	0.0	0.0	0.0	1.0	99.0	99.0	99.0	99.0	99.0	99.0
58.0	4.0	0.0	1.0	0.0	0.0	99.0	99.0	99.0	99.0	99.0	99.0
59.0	4.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0
59.0	7.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0
59.0	6.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
59.0	5.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0
59.0	2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
59.0	3.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
59.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0
60.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0
60.0	3.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0
60.0	2.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0
61.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
61.0	3.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
61.0	2.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
62.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
63.0	3.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
63.0	4.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
63.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
63.0	2.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
64.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
64.0	3.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
64.0	2.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
67.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0
67.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0

RESPOND	ALTER	PERSONAL	PREWORK	ACADEMIC	BUSINESS	TOPIC 1	TOPIC 2	TOPIC 3	TOPIC 4	TOPIC 5	TOPIC 6
67.0	3.0	0.0	1.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0
68.0	3.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0	0.0
68.0	4.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
68.0	2.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
68.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
70.0	3.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0	1.0
70.0	2.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0	0.0
70.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0
71.0	4.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
71.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
71.0	2.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
71.0	3.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
72.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
72.0	2.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
72.0	3.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
72.0	4.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
72.0	5.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
73.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0
73.0	3.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
73.0	2.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
74.0	1.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
74.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
74.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0
75.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0
75.0	2.0	1.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0
76.0	1.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
76.0	4.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
76.0	2.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
76.0	3.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
77.0	1.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
77.0	2.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77.0	3.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0

RESPOND	ALTER	PERSONAL	PREWORK	ACADEMIC	BUSINESS	TOPIC 1	TOPIC 2	TOPIC 3	TOPIC 4	TOPIC 5	TOPIC 6
77.0	4.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0	0.0
78.0	4.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
78.0	6.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
78.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
78.0	2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
78.0	5.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
78.0	3.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
79.0	4.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
79.0	2.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0
79.0	3.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	0.0
79.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	0.0
80.0	5.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
80.0	3.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
80.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0
80.0	4.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0
80.0	2.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	1.0
81.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
81.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
81.0	2.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0
81.0	4.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0
81.0	5.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	0.0