Eindhoven University of Technology

MASTER

Business networks and innovation in South Africa

an exploratory study on innovative partnerships of South African firms

Clerx, R.

Award date:
2005

[Link to publication](#)

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Date   March 31, 2005

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Summary

According to several economists, innovation is the engine of the growth of contemporary economies. In 2001, a large-scale survey was conducted in South Africa and this survey examined various aspects of innovation in South Africa. The present study focuses on one remarkable result of that particular survey, namely South African innovative firms have relatively few innovative partnerships with each other compared to firms from other countries. Only 17% of South African innovative firms have innovative partnerships with another South African firm, compared to 64% in Finland, 49% in Sweden, 30% in France and 24% in the Netherlands. This research consists out of an quantitative part and a qualitative part. In the quantitative research differences are examined in terms of culture, business atmosphere, government and resources between the Netherlands and South Africa. The qualitative part of this study has explored explanations for the large amount of innovative partnerships between South African firms and foreign firms and on the relatively small amount of innovative partnerships between South African firms. Four explanations have been found; the South African business atmosphere, culture, government and a lack resources in South Africa. The conclusions of this study concerning these four explanations will be discussed in this summary. Subsequently, a brief discussion of the interviews and the conclusions will be presented. This summary will be finalized by presenting the main recommendations.

First of all, the business atmosphere in South Africa provides firms with incentives to form foreign partnerships. The conclusions based on both the Dutch as well as the South African survey are fourfold. The first conclusion is that the perceived reliability of Dutch firms by employees of these Dutch firms is higher than the perceived reliability of South African firms by South African employees. Secondly, several features of the South African culture provide some interesting insights. The only difference found in the quantitative research between the Netherlands and South Africa regarding culture was that South African respondents think that their firms can compete better with the best firms in the world than the Dutch respondents think their firms can. This is an interesting result, because the expectations were that Dutch firms would perceive their firms to be more competitive than South Africans would. Thirdly, the opinion of the South African respondents about the South African government is less positive than the opinion of the Dutch respondents about the Dutch and EU governments. The somewhat negative attitude of South African employees towards some policies of their government has also been confirmed by the interviews, where most interviewees disapproved affirmative action as it is implemented in South Africa currently. The interviews indicated that affirmative action is one of the key issues in South Africa currently and that affirmative action may hamper the formation of innovative partnerships between South African firms. Finally, the lack of resources in South Africa provides a fine explanation why South African innovators tend to form innovative partnerships with foreign firms. According to the surveys, South African respondents consider the level of education in their firms to be lower than Dutch respondents. Since properly educated personnel is an important resource of a country and is important to all forms of business transactions including innovative partnerships, this may contribute to the small amount of domestic innovative partnerships between South African innovative firms. Another resource that is on a lower level in South Africa than in the Netherlands is the marketing department of South African firms. A marketing department that is not functioning adequately could be a reason why another firm decides not to engage in an innovative partnership with the focal firm.

The conclusions presented above are based a low number of responses and are therefore preliminary. In my opinion, which is partly based on the interviews that were conducted in

South Africa, two of the most important points that distort business networks in South Africa are the lack of educated, skilled personnel and a low level of trust between South African firms. This low level of trust is also related to the low level of some resources. As some interviewees and literature point out, there is a lack of qualified, educated personnel in South Africa. Therefore, many firms do not have skilled personnel, are thus incompetent and it is likely that this incompetence decreases the level of trust that South African firms have in each other. An interesting theory is that South African firms do as much as possible by themselves and only have a small group of South African firms with which they have strong relationships. One interviewee did indicate that South African firms want to do as much as possible by themselves and some pieces of information from the interviews indicated that South African firms only have a small group of South African firms with whom they have relationships. Based on this study, it is difficult to assess whether the aforementioned theory is correct, but the interviews indicated that there is some truth in it. Another point, which is not a conclusion of this study but more of a recommendation for future research and an issue worth discussing, is the hesitance of people belonging to a certain culture, e.g. white people, to cooperate with people belonging to another cultural group, e.g. black people. Based on this study it is not possible to assess to what extent this reluctance, in terms of cooperating with each other, is present in South Africa, but the interviews indicated that it present to some extent and is likely to have an influence on business networks.

There are some recommendations that need to be made resulting from this study. Firstly, the business atmosphere in South Africa requires additional research. This study shows that the business atmosphere in South Africa has an impact on business networks and it explores the South African business atmosphere. However, the South African business atmosphere needs to be mapped more comprehensively in order to find additional and more detailed explanations for small amount of innovative partnerships between South African innovative firms. Secondly, the lack of resources that is shown in this research requires additional research. The present study has made a comparison between some skills of South African and Dutch employees. A comparison of the skills of South African employees with skills of the employees of other nations or regions could provide more detailed insights. Furthermore, the focus of future research should be the influence of government policies, especially affirmative action, on business networks, because it is likely that these policies have an influence on business networks. Finally, a study that researches whether foreign firms initiate innovative partnerships with South African firms or whether South African innovating firms initiate innovative partnerships with foreign firms is recommended. It would provide the answer to the question whether South African innovating firms have a large number of innovative partnerships with foreign firms because South African firms prefer having innovative partnerships with foreign firms or whether foreign firms prefer having innovative partnerships with South African firms.

Preface

Conducting Master thesis research is the final stage of the Technology, Science and Society course of the Eindhoven University of Technology. This report is the result of a Master thesis research that has been conducted mostly in South Africa, from the 19th of January until the 31st of July. I had the privilege to go to South Africa and carry out an important part of my research at the University of Pretoria, South Africa.

The topic of the thesis has changed in a number of occasions due to unforeseen factors. The resulting topic, however, does not differ much from the initially-proposed topic. South African business networks are influenced by a number of factors and this study examines some of the factors that are likely to be important in a business networks context. Therefore the focus of the present study is not only on business networks and innovation, but also on the South African business atmosphere, resources and culture. Furthermore, the influence of the South African government on business networks and innovation has been explored. One of the instruments used in this research to get a grasp of the opinion of South African employees in high-tech firms is the interview. In order to make comparisons between South Africa and another country, an additional survey is done in the Netherlands.

Without the support I had of various people this research would have been much more difficult or even impossible. First of all, I would like to thank all three of my tutors for the time and effort they spent in advising me and correcting my documents. My first tutor, Dr. G. Rooks supported and motivated me during the difficult process of the research and writing this report, both in South Africa as well as in the Netherlands. My second tutor, Prof. T. Pretorius, facilitated the practical side of work in South Africa considerably. Furthermore, my third tutor, Prof. L. Oerlemans, assisted me when the response rate in South Africa turned out to be much lower than expected. It was his idea to carry out interviews in order to gain in-depth insight in the business atmosphere and culture in South Africa. In addition, I would like to thank the secretary of Prof. Pretorius, Ms. Marlene Mulder, and the secretary of the Department of Technology Management at the University of Pretoria, Ms. Mariette Stirk. Finally, I would like to thank Ms. F. Aggad for reviewing this thesis, especially concerning the English language and phrases.

With kind regards,
Roy Clerx

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1 Innovation and cooperation in South Africa – an introduction

1.1 Research questions of this study

The country that is known worldwide for its beautiful nature and game parks, for its famous people like Nelson Mandela and FW de Klerk, but also the country with one of the highest numbers of HIV/AIDS infected inhabitants and one of the highest crime rates worldwide. South Africa is all that and much more. It has a turbulent history in which oppression, colonization and freedom were key issues. Currently, South Africa is the biggest African economy, but welfare is distributed unequally in South Africa. More on the South African economy and welfare can be found in paragraph 3.2. According to many recognized economists (e.g. Schumpeter and Porter), innovation is the key to economic and social prosperity and progress. By monitoring and measuring innovation in a nation, comparisons with other nations and regions can be made, which provides insights in that particular nation and gives it a place in the world of technology. Measuring and monitoring innovation on a national and regional level has become quite common in the last two decades. Europe has set the standard for measuring innovation by conducting the Community Innovation Surveys (CIS), of which three have been carried out so far. Other surveys have used the structure of the CIS and among them is the South African Innovation Survey 2001 (SAIS 2001). SAIS 2001 (Oerlemans, Pretorius, Buys & Rooks, 2003) used the structure of the second CIS, with data from 1996-1998. A total number of 617 firms in the manufacturing and services sector were involved in SAIS 2001 and the survey is the result of a cooperation between the University of Pretoria and the Eindhoven University of Technology. SAIS 2001 researched various topics related to innovation in South Africa in the period 1998-2000. The main conclusion of the SAIS 2001 survey is that "South African firms are able to produce innovation outcomes that are comparable to European levels with innovation efforts that are lower than those of their counterparts" (Rooks, Oerlemans, Buys & Pretorius, 2005). An interesting observation resulting from SAIS 2001 is that South African innovating firms cooperate relatively much with foreign firms and relatively little with domestic firms. Innovative partnerships can be defined as the cooperation of two or more firms in research, development and commercialization of a product or process. In South Africa, 17 percent of innovative firms has an innovative partnership with another South African firm, whereas 26 percent of South African innovators has an innovative partnership with a foreign firm. The present study focuses on the small amount of innovative partnerships between South African innovative firms. Figures of domestic innovative partnerships between firms in other countries are available, which makes comparisons possible. A comparison of South Africa with other countries concerning domestic cooperation in innovation can be found in figure 1.
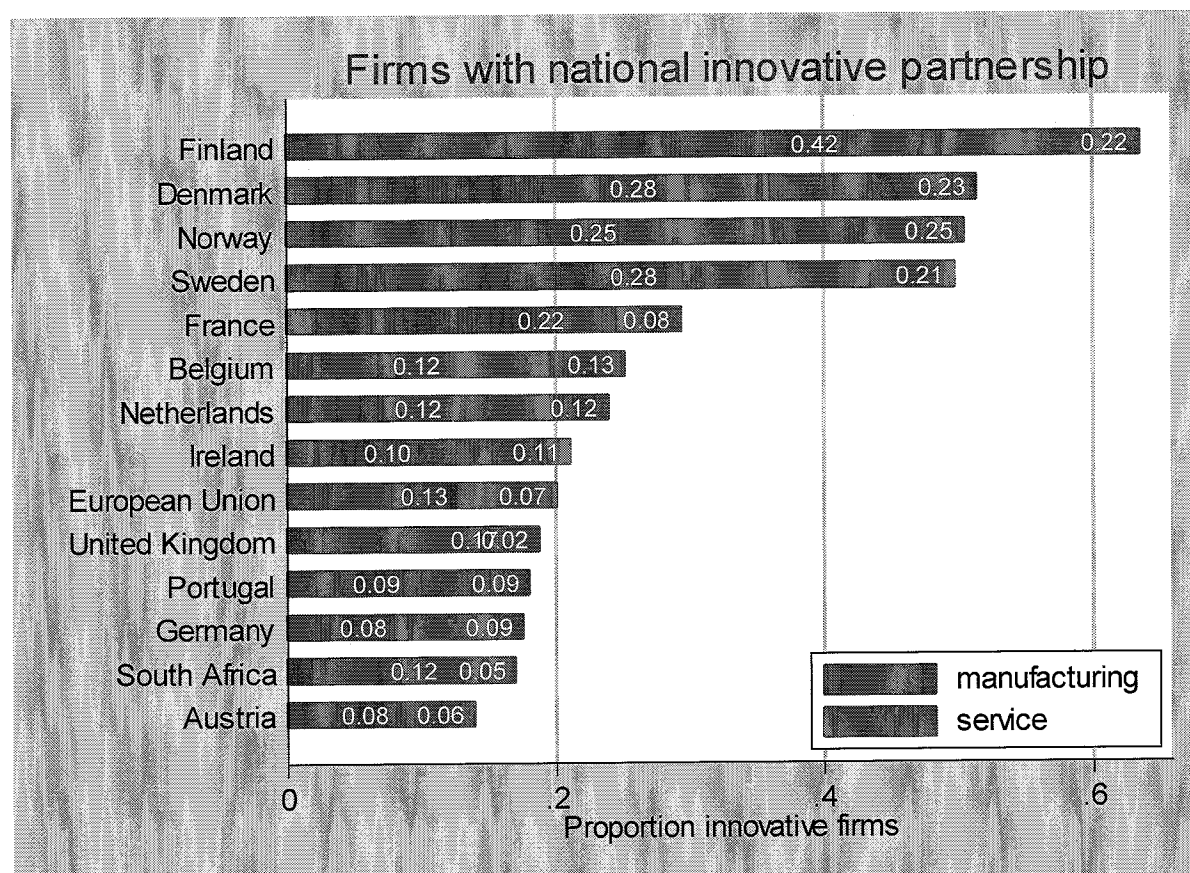
Figure 1: Comparison between various nations of percentages of innovative firms, active in manufacturing or services, with domestic innovative partnerships (source: Rooks and Oerlemans, 2005)

Several conclusions can be based on figure 1. First of all, South Africa is among the countries with the smallest percentage of domestic innovative partnerships. The contribution of the South African services sector to the total percentage of firms with innovative partnerships, only 5% in a total of 17%, is even the smallest of the nations in figure 1. Secondly, compared to the leading Scandinavian countries, who are known for their good innovative performance, South Africa only has a fraction of the percentage of domestic innovative partnerships these countries have. About 17% of South African firms have innovative partnerships with other South African firms, which is a small percentage compared to the Scandinavian countries, but also small compared to for example the Netherlands (24%), Belgium (25%) and France (30%). Why do South African firms cooperate relatively little with each other? That question is the focus of this research and therefore, the main research question is:

Why do South African innovative firms have relatively few domestic innovative partnerships?

To answer this question first a comparison will be made between the structure of business networks of South African firms and Dutch firms. This comparison will be made by using the results of a survey that was carried out first in South Africa and later in the Netherlands. Additionally, the question why South African firms have relatively few domestic partnerships was researched by means of a more qualitative, explorative study. Six interviews were carried out in South Africa in four firms, active in electronics or telecommunications. In the survey and the qualitative research four factors, all likely to influence the tendency of South African

firms to collaborate with other firms, were the focus: the South African culture, 'business atmosphere', government and resources.

A culture can be defined as "the collective programming of the mind which distinguishes members of one group from another" (Hofstede, 1998). Some aspects of South Africa's business culture may inhibit cooperation between business firms. For instance, firms may be habituated to do as much by themselves and only have a small group of firms in South Africa with which they have close relationships. Furthermore, there is a possibility that predominantly white firms are reluctant to cooperate with predominantly black firms and the other way around.

Does the culture inhibit the formation of domestic innovative partnerships in South Africa?

The second factor that may influence the tendency of firms to enter into innovative partnerships is something I call the 'business atmosphere'. I define business atmosphere as the 'collective mood of all members of a certain group that distinguish them from another group'. Important to the business atmosphere of a nation is the collective level of trust between firms. A low level of trust between South African firms could provide reasons for South African firms to look for innovative partnerships with foreign firms instead of domestic firms.

Does the business atmosphere inhibit the formation of domestic innovative partnerships in South Africa?

A third factor that may influence cooperative behaviour of firms are governmental policies and regulations. The South African government may, for instance, devote less subsidies to innovative partnerships. Affirmative action policies may influence domestic South African business networks as well.

Do governmental policies and regulations inhibit the formation of domestic innovative partnerships in South Africa?

The fourth factor that may influence formation of domestic partnerships is the availability of internal resources in South Africa. South Africa may have a lack of internal resources, which may force the country's firms to form partnerships with foreign firms instead of domestic firms. An example of an important resource for innovation is human capital, i.e. educated personnel. Absence or shortage of educated personnel, for instance, may be a reason why South African firms search for skills and expertise abroad.

Does a lack of internal resources inhibit the formation of domestic innovative partnerships in South Africa?

1.2 Structure of the report

The structure of the report will be described in this paragraph. After this introductory chapter, the theory relevant to this study will be described in chapter two. Chapter three is aimed at explaining the method of research used for the research in both South Africa and the Netherlands. The chapter starts with some general information on South Africa and continues with an overview of the Dutch and South African surveys in terms of (non) response. A whole chapter is devoted to this method of research in order to highlight the interesting and sometimes unexpected events that were faced during the research period. Subsequently,

chapter four presents the results the quantitative part of this study, which are the surveys in South Africa and the Netherlands. Chapter five deals with the most interesting quotes and remarks from the qualitative part of this study, which are the interviews in South Africa. Chapter six summarizes the conclusions of this research from both the surveys and the interviews. Furthermore, a discussion of the most interesting issues related to the present study can be found in this final chapter as well as the recommendations.

2 Theoretical framework

The present study focuses on finding explanations for the small amount of innovative partnerships South African innovative firms have with other South African firms. The South African culture, business atmosphere, government and resources are likely to inhibit the formation of innovative partnerships between South African innovators. Therefore, the theoretical framework of this study is aimed at exploring relevant literature dealing with innovation (paragraph 2.1) and the importance of collaboration to innovation (paragraph 2.2). Furthermore the link between business networks and culture (paragraph 2.3), business networks and business atmosphere (paragraph 2.4), business networks and government (paragraph 2.5) and business networks and resources (paragraph 2.6) will be examined by studying literature. The last paragraph of this theoretical framework discusses those differences between Dutch and South African firms that could contribute to the relatively small number of innovative partnerships between South African innovative firms compared to Dutch firms.

2.1 Innovation

Change is central to human life from its very beginning until the end. Whole societies change in the course of a lifetime. One of the aspects of society that has changed most during his lifetime is the impact technology has on society. Eighty years ago there were no computers or internet, no cell phones, only a small number of cars, electricity was not available everywhere, no washing machines as we know them existed and no fridges or freezers were available. This is only a tiny part of the vast number of technological changes that occurred during this period. Nowadays these products are common and most people in developed countries are used to them as much as they are used to the earth and the sun. These new technological products are the results of innovations. Contemporary life would look completely different without these innovations. Most economists recognize innovation to be essential for contemporary economies. Michael Porter, a well known Harvard Business School professor, once said: *"Innovation is the central issue in economic prosperity"*. Theodore Levitt, another professor from Harvard Business School, puts it even more strongly by claiming *"Just as energy is the basis of life itself, and ideas the source of innovation, so is innovation the vital spark of all human change, improvement and progress"*.

The introductory section of this paragraph stressed the importance of innovation on a society level. However, on an organizational level, innovation is also essential. Harold R. McAlindon, president of the Cambridge Philosophy Institute, claimed that: *"The world leaders in innovation and creativity will also be world leaders in everything else."* This is also supported by John Kao, yet another former Harvard Business School professor, who stated: *"There is nothing more important today for businesses — whether they be Fortune 500 companies or ecommerce start-ups — than innovation. What could be more important than to be able to reinvent yourself, to be more in touch with your environment, more aligned with your opportunities, more effective in using your talent so you can be constantly moving forward to create value?"* Innovations can provide technological and organizational change in organisations and, if exploited properly, can make a small firm a world leader (e.g. Microsoft, IBM and Philips). However, innovation can also be the cause of the decline or even bankruptcy of firms if they do not adapt and change along with new important innovations. In a completely different context, namely evolutionary biology, Charles Darwin acknowledges the importance of changes and adaptation to changes in his famous work "The Origin of Species", by writing *"It is not the strongest of the species that survive, not the most intelligent, but the one most responsive to change"*. This quote is not only applicable in a biological

context, but also in a business context. Schumpeter supports this by stating: *"Während es mit dem Strom schwimmt im allseits wohlbekannten Kreislauf, schwimmt es gegen den Strom, wenn es dessen Bahn verändern will. Was dort Stütze war, wird hier Hindernis. Was vertrautes Datum war, zu einer Unbekannten. Wo die Grenze der Routine aufhört können deshalb viele Leute nicht weiter und der Rest kann es nur in sehr verschiedene Maß."* (Schumpeter 1935, p.118)[1]

Numerous articles have been written about innovation and yet it is difficult to define it adequately. Freeman (1986) and Porter (1990) use the following definition: *"Innovation - the introduction of new and/or improved products, services and production processes - is the driving force behind a nation's economic development and the improvement of the competitiveness of its firms."* This definition covers the concept of innovation quite well. One aspect of innovation that is not clear in this definition is that innovation is a process that starts with an invention or recombination of a product/process or a feature of a product/process and ends with the commercialization of that innovative product/process. This may not even be the end, because feedback and improvements to a product are possible. However, it is important to observe that innovation is a dynamic process and not an event that happens at one certain moment.

2.2 The importance of collaboration for innovation

The focus of this study is on innovative collaborations of South African firms. South African firms cooperate relatively much with foreign firms and relatively little with domestic firms in comparison to Dutch firms. But why is collaboration necessary at all? This section explores the advantages and disadvantages of innovative collaborations. Innovative collaborations between firms are common and have several advantages compared to innovations carried out by only one firm. Tidd et al (2001) summarize the advantages of innovative collaborations:

1. *Reduction of cost of technological development or market entry.* This implies that the costs of the research and development of the products are lowered because of the collaboration between two or more firms.
2. *Reduction of the risk of development or market entry* because the risks are shared between the collaborating firms.
3. *Achievement of scale economies in production.* This is not valid for all products. The fundamental idea behind scale economies is that an increase in the number of products produced by one single firm leads to a decrease in the price/product. More on this topic can be found in Case et al (1999).
4. *Reduction of time-to-market.* Due to the collaboration of two or more firms, products can be launched on the market in less time.

The economic advantages that are listed above are generally recognized and are important to firms because each of these advantages can give these firms a leading edge over competition. However, there are other advantages attached to innovative collaboration. Tracey & Clark (2003) list the potential benefits, most of them sociological, of networks of interaction:

1. *Better access to information, knowledge, skills and experience.* In particular, networks provide opportunities for learning about new ways of operating and about new forms of

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[1] The English translation is: "While flowing with the current in a familiar cycle, it must swim against the current if it wishes to alter its course. What used to be supportive then becomes an obstacle. What used to be known facts become unknown. Therefore, where routine ends many people can not go on and the others only in varying degrees."

technology, and can reduce the development time and cost of new products and production processes.

2. *Improved linkages and cooperation between network members*, particularly between users and suppliers. The competence of the leading firms within a network can form a benchmark for others. Effective networks can encourage interactive learning, synergy and complementarity between key specialist groups across participating firms, such as design, production, marketing and finance.

3. *Improved response capacity*. Networks allow participating firms to respond more quickly and to anticipate changing competitive circumstances, and to learn about new forms of technology.

4. *Reduced risk, moral hazards, information and transaction costs*. Networks of firms with complementary assets allow resources to be shared and reduce costs. Risks can also be assessed and shared throughout the networks leading to more informed decisions and further cost reductions.

5. *Improved trust and social cohesion*. Alliances encourage shared values, goals, norms and ways of working, which facilitate problem-solving, collective action and innovative behaviour, often through a complex combination of competition and cooperation.

In order to gain a good overview of innovative collaborations it is also important to mention the disadvantages of innovative collaborations. Besides the advantages listed above, there are also potential risks associated with collaboration like the leakage of information, loss of control or ownership and divergent aims and objectives, resulting in conflict (Tidd et al, 2001). It is important to keep in mind that not all innovative partnerships are successful. On the contrary, innovative collaboration is a risky activity which is confirmed by several studies. These studies show that the success rate is less than 50% (Tidd et al, 2001). However, innovation is inherently an uncertain activity and in innovative collaborations between two or more partners the consequences of these uncertainties are shared among the involved parties. If a firm innovates alone, then the burden of a failure will fall entirely upon that particular firm. The literature on National Systems of Innovation (NSI) recognizes the importance of cooperation between firms to the innovative performance of a nation. According to Lundvall (1992), firms are one group of agents active in a NSI and he focuses on the relations and interactions between agents. From that perspective, innovative cooperation is important to the innovative performance of a nation because it is one of the interactive learning processes that are possible between agents. In NSI literature, emphasis is placed on the institutions of a nation. Institutions important in a NSI are the norms, habits and rules that are deeply engrained in a society. This collection of institutions comes close to the concept of culture, which is the topic of the next paragraph. Subsequently, paragraph 2.4 focuses on the business atmosphere of a country. In paragraph 2.5, the focus will be turned to the influence the government can have on business networks. Next, paragraph 2.6 discusses the literature on resources that are likely to have an impact on business networks. The last paragraph of this chapter discusses the differences between South African and Dutch firms that can provide a (partial) explanation for the differences in domestic partnerships and foreign partnerships between these nations.

2.3 Culture

The first possible factor that may hamper the formation of innovative partnerships between South African innovative firms is the South African culture. Before engaging into a discussion on the specifics of the South African culture it is crucial to define the term "culture" first. According to Geertz (1993), culture can be defined as "a historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions

expressed in symbolic forms by means of which men communicate, perpetuate, and develop their knowledge about and attitudes towards life". Tidd et al (2001) state that culture "basically equates to the pattern of shared values, beliefs and agreed norms which shape behaviour – in other words – it is 'the way we do things around here'". There is no paucity of definitions of the term culture. The definition provided by Hofstede is worth mentioning as his work on culture, particularly on measuring cultural differences between countries, is used frequently in literature. Hofstede's definition entails that culture is "the collective programming of the mind which distinguishes members of one group from another" (Hofstede, 1998). Furthermore, in literature at least two types of culture are defined. First of all, there are the cultures as they are known to most of us. These are cultures that are tied to a distinct group of people or a geographical area, like the Chinese culture, the Russian culture and the ancient Aztec culture. Secondly, there is another type of culture that has been described in literature: the culture that is present in an organization. Jones (1983) distinguishes three types of organizational cultures: the production culture, the professional culture and the bureaucratic culture. According to Jones, a production culture emerges when the production process is routine and the work is standardized. Furthermore, he claims that a bureaucratic culture arises when the tasks of employees include non-routine elements and the process by which inputs are converted into outputs becomes obscure. Additionally, Jones claims that a professional culture emerges when the tasks of employees are very non routine and the work needs to be done by skilled and specialized personnel. A case study by Hofstede (1998) suggested that all three organizational cultures exist in most organizations. Another major contribution of Hofstede to the field of culture is the cultural five dimensions he distinguishes (Hofstede, 1991). These dimensions can be used to measure the culture of a nation and compare the results with other nations. However, these five dimensions are subject to a lot of criticism, e.g. Baskerville (2003), and therefore the dimensions need to be used cautiously. One of these dimensions is labelled individualism, which focuses on the manner society evaluates individual and collective achievements and interpersonal relationships. The other dimensions are not likely to be relevant in the context of this study and will therefore not be discussed. Countries like the US are considered to be individualist societies, whereas Japan is more of a collectivist society. According to Triandis (1995), individualism and collectivism exist in two forms, namely "vertical" and "horizontal". Bhawuk (2001) explains these two forms: "The vertical and horizontal typology of individualism and collectivism suggests that verticals, as opposed to horizontals, consider their self to be different from those of others in their own culture" (p. 156). For example, in a vertical collectivist society the individual has little to say. He is being told what to do, when to do it and how to do it. In such a type of society the individual would consider that to be normal. In a vertical collectivist society, the achievements of the group are more important than individual achievements (collectivist) and individuals consider themselves to be different from other individuals in the society (vertical). Members of horizontal societies consider other members of that society to be more or less equal and will therefore be less inclined to follow up commands. Bhawuk (2001) states that typical vertical collectivist societies are developing countries, whereas typical horizontal individualist countries are Western countries. Möller & Svahn consider most Western countries to be either vertical individualist societies or horizontal individualist societies, which is illustrated in figure 2. Japan is a typical example of a horizontal collectivist society and China and India are the most important vertical collectivist societies.

Vertical - Individualism	*Vertical - Collectivism*
France Germany United Kingdom United States	China India Korea Singapore
Horizontal - Individualism	*Horizontal – Collectivism*
Australia Danmark Sweden	Japan

Figure 2: Cultural patterns (adepted from Möller & Svahn, 2004)

2.3.1 South African culture and business networks

Having discussed literature on culture, the focus now turns to the relationship between South African culture and business networks. Hofstede's five dimensions (Hofstede, 1991) have been measured in numerous countries including South Africa and the Netherlands. Only one dimension can be considered useful in the context of this study and that is individualism, because a large degree of individualism enhances communication with members from other societies. Möller & Svahn (2004) claim that "communication tends to occur primarily with in-group member in collectivist cultures, while individualist cultures people communicate more easily with anyone within the organization, and also across organizational boundaries" (p. 222). This reasoning will be used in the next part of this section.
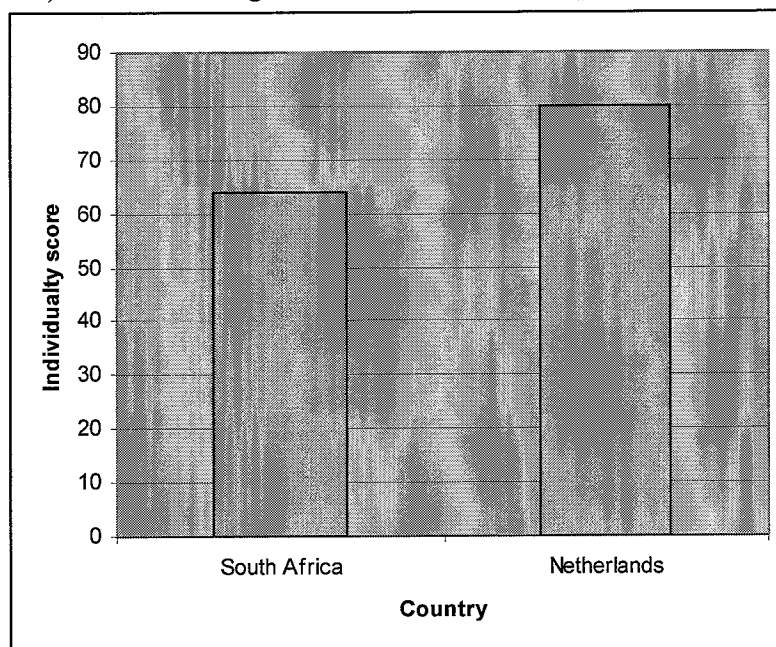
Figure 3: Individuality scores of the South Africa and the Netherlands

The Netherlands score 80 (out of 100) on the individuality scale and South Africa scores 64 (see figure 3). [2] According to the individuality scores of both countries, the Netherlands are a more individualistic society. Because the Netherlands are a more individualistic country, Dutchmen should be able to communicate better with members from other cultures than South Africans. If this logic applies to firms as well, than it is viable that Dutch firms have more partnerships with foreign firms than South African firms have. However, in reality this is far from being true. There is one factor that is not taken into consideration in this logic. This factor is that it is very difficult, maybe even impossible, to speak of a national culture in most countries. For example, O'Leary & Levinson (1991) identify 35 cultures in the Middle-East area, 98 different cultures in 48 African countries and 83 cultures in 32 Western European countries. This implies that on average a country has more than one culture. South Africa in particular is bound to have more than one culture because of its history of tribalism and colonization. Another indication of the multitude of cultures is the fact that South Africa has eleven official languages. Firms, however, are still dominated by white people, which have a more or less similar cultural background. Cooperation between firms, dominated by white people, should cause no major communication problems, because even less individualistic cultures, like the South African[3], have few problems with in-group communication. However, due to black empowerment, there has been a rise in firms dominated by black people in the last decade. Cooperation between firms, dominated by black or coloured people should not be a problem too. But due to the relatively low individuality score of South Africa, in comparison to the Netherlands, firms dominated by white people may have difficulties towards communicating and cooperating with firms dominated by non-white people, which usually have a different cultural background than those white people. This can be one of the explanations for the relatively small number of domestic innovative collaborations, in comparison with the Netherlands. Culture is likely to be important to business networks and therefore, a research question that will be addressed by this study is:

Does the culture inhibit the formation of domestic innovative partnerships in South Africa?

The roots of most of the cultural explanations for the relatively small number of innovative partnerships between South African innovators lie in the South African history. It is impossible to overlook the Apartheid era in the South African history and it is very likely that this era left its mark on contemporary South African business networks. First of all, South African firms used to have the tendency to do as much as possible by themselves, including innovation. These firms had a small group of "friendly" firms they cooperated with and these firms considered themselves to be highly competitive compared to foreign firms. The isolation of South Africa from the rest of the world in some periods during the Apartheid era has contributed to this "do it yourself" attitude. However, the relationships between these South African firms used to be strong and it is possible that this relationship still exist and are still strong. Due this "do it yourself" attitude, South African firms are not motivated to search for other appropriate partners and are happy with the situation as it is now. It should be noted that this is a hypothetical situation, which is likely to have some truth in it. The second element that can be important, is that South African employees consider their own firms not to be competitive with firms from highly developed countries. South Africans may consider their own firms to be inferior to European and American firms. If this is the case, then it is viable that South African firms search for partnerships with Western firms because "Western"

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[2] These scores can be found on www.geert-hofstede.com
[3] Despite of the fact that South Africa has more than one (sub)culture, the term "South African culture" will be used frequently anyway. This is necessary because the "individuality" country score applies to the whole country and no scores are available for the individual South African (sub)cultures.

has been linked historically with "superior" and these South African firms think that they can benefit from a partnership with such a superior firm. Thirdly, South African firms may not want to cooperate with other South African firms. According to Van Oudenhoven (2001), "many attempts towards international cooperation have not been successful so far. Quite often, a misfit of cultures is mentioned as a cause of the failure". Additionally, he claims that "Managers have indeed a strong preference for culturally similar cooperation partners". That may be an explanation for the fact that South African innovators cooperate a lot with culturally similar foreign firms. The explanation may, once again, lie in the Apartheid era, where the contacts between the various groups were limited. Hypothetically, some white people are still reserved as far as interaction with other non-white races is concerned. The same point can be raised as far as the black population is concerned. If this is the case then it is all but abnormal that South African firms search for either South African firms they can work with or look for foreign alternatives. Although this racial analysis is a sensitive topic in South Africa, it may provide an explanation for the relatively small amount of domestic innovative partnerships between South African innovators. On the other hand, most firms are still dominated by white people at this moment. Due to the affirmative action policies of the South African government, a growing number of firms are dominated by non-white people. Therefore, the reluctance of white and non-white to cooperate with each other may provide a partial explanation for the relatively small number of domestic innovative partnerships of South African innovators. Finally, South African innovators may consider other South African firms to be incompetent, which is why these innovators prefer having skilled foreign innovative partners above South African innovative partners.

2.4 Business atmosphere in South Africa

Business atmosphere is a term that has been used occasionally in literature, but to date no one has ever tried to define it properly. Williamson (1975) used the term "atmosphere" to integrate human attitude in economics. However, Williamson only points out that atmosphere can be important to economic decisions and does not work out the concept of "attitude" adequately. In Williamson (1975) one more statement can be found that is related to the business atmosphere: "*Arrow conjectures that international productivity differences between countries with, or having access to, common technologies are partly to be explained by trust differences which impair or facilitate exchange*" (Williamson, 1975; footnote 22, p. 39). Mutual trust between firms, which will be elaborated on later in this section, is a very important determinant of the business atmosphere of a nation. Where culture can be defined as the "collective programming of the mind which distinguishes the members of one organization from another" (Hofstede, 1998), I would like to define business atmosphere as the collective mood of all members of a certain group that distinguish them from another group. This group can consist out of all inhabitants of a country, but can also consist out of all employees of a certain firm or a group of firms. The collective mood is determined by various factors. One important factor is the extent to which members of a group trust each other, which Claro et al (2003) label "*interpersonal trust*", and to what extent they trust members of other groups, which Claro et al label "*inter-organizational trust*". Trust is generally recognized to be one of the most important attributes of a relation between two or more actors. According to Claro et al (2003), "*...trust reflects the extent to which negotiations are (expected to be) fair and commitments are sustained and a party's belief that its requirements will be fulfilled through future actions undertaken by the other party that form the network...*". Furthermore, according to Rotter (1980), trust counterbalances the need for an expensive safeguard mechanism. The word of actor A is sufficient for a transaction because actor B expects that actor A can be relied upon. This prevents the use of contracts or other similar expensive safeguarding instruments. Another factor influencing the business

atmosphere is to what extent the members of the group are dependent of each other. There is a distinct difference between culture and business atmosphere. Whereas culture changes slowly like the climate of this planet, business atmosphere can change as fast as the weather and adapt to new situations. Tidd et al (2001) acknowledge that changing "...*culture is not likely to happen quickly or as a result of single initiatives...*". For example, if the government of France decides at some point that no oil will be imported anymore from Iraq and other countries follow this stance, then this will have huge consequences on the business atmosphere in Iraq. It may take a couple of weeks or even months before other countries will follow, but if it happens it would have a distinct impact on the business atmosphere in Iraq because one group (France and other countries) stops importing oil from members of another group (oil companies from Iraq). It is viable that this decreases the trust between the two. Subsequently, this will influence the business atmosphere of both groups, although it is plausible that the business atmosphere in Iraq will be affected most. However, it is unlikely that this event will have a large effect on the culture of Iraq and France. The culture of a nation is already established for a long period of time and it will not change rapidly.

There are two certain business atmospheres I would like to emphasize. These are the business atmosphere of trust and the business atmosphere of distrust. The main characteristic of a business atmosphere of trust in a nation is that firms in that nation trust each other a lot, which would also lead to relatively many partnerships between these firms. On the other hand, the main characteristic of a business atmosphere of distrust is that firms in a nation do not trust each other sufficiently. This lack of trust is bound to lead to a relatively small amount of partnerships between firms in that nation. It is noteworthy to mention that not only firms are actors in a business atmosphere, but other institutions like the government, universities and NGO's (Non-Governmental Organisations) are also actors in a business atmosphere. Furthermore, a business atmosphere is not necessarily limited to a nation, but it can also be a big region, like Western-Europe, or a small region, for example a city like Paris.

Because of the impact business atmosphere can have on the number of innovative partnerships between South African innovating firms, the following question will be addressed by means of this study:

Does the business atmosphere inhibit the formation of domestic innovative partnerships in South Africa?

The first attribute that may be of large importance is whether South African firms are trustful. If South African firms usually are trustful, then it is easier for a South African firm to form a partnership with another South African firm. If not, then it is possible that the South African firm will search a partnership abroad. Secondly, the extent to which South African firms find each other trustworthy may provide an explanation for the relatively small amount of innovative partnerships South African innovators have with other South African firms. Furthermore, if South African innovators find other South African firms to be insufficiently flexible, then it is likely that these South African innovators will search for adequate partners abroad. Hence, it is very interesting to gain insight in the opinion of contemporary South Africa regarding business atmosphere.

2.5 South African government and innovative partnerships

National and supra-national governments, like the European Union, can influence business networks in various ways. One method is innovative collaboration between a government and one or more firms. Chang (2003) found that firms that participate in government projects are

more likely to innovate than firms that participate in partnerships with other firms. According to him it is easier for firms that participate in a government project to employ highly skilled scientists, which improves the chances for an innovation. The second method for the government to influence business networks is funding. An example is the Business Networks Program in Australia, where business networks were created by means of government funds (Fullop, 2000). Networks were funded by a department of the Australian government to *"employ accredited and trained network brokers or consultants for the initial three years of operation. Networks were to become self-funding by 1998, when funding was to cease"* (Fullop, 2000). Currently, there is no such program running in South Africa. The third method for influencing business networks is the creation of policies that influence these networks. It is unlikely that a government wants to create a policy with the sole intention to influence a business network, because it is difficult to think of any clear advantages of such a policy. However, it is possible that the distortion of business networks is a side-effect of a policy which has a different purpose.

Governments are able to influence business networks and therefore the next research question reads:

Do governmental policies and regulations inhibit the formation of domestic innovative partnerships in South Africa?

The South African government does not use any policies to influence business networks directly, but some other policies may have a distinct impact on business networks in general the relatively small amount of domestic innovative partnerships in particular. Affirmative action is a hot topic in South Africa and it is very likely to have a influence on business networks. However, this influence may be indirect. One of the objectives of the affirmative action policy is to increase the share of previously disadvantaged people (e.g. black people and women) in higher positions in firms, for example in the board of directors. One of the results of this is that a growing number of firms are controlled by black people. If that fact is combined with the reluctance of white people to cooperate with white people, which has been discussed in paragraph 2.3, and the other way round, then it is likely that only few predominantly white firms cooperate with predominantly black firms and the other way round. In effect, this will contribute to the relatively small amount of domestic innovative partnerships South African innovators have. Due to the importance of affirmative action in South Africa and because of the influence affirmative action is likely to have on business networks, Appendix A contains more information on affirmative action in general and black empowerment in particular.

2.6 Resources and absorptive capacity in South Africa

The fourth motive for South African firms that may hamper the formation of innovative partnerships between South African innovators is a possible lack of resources in South Africa. The resource-dependency model, as described by Pfeffer and Salancik (1978), suggests that because organizations cannot generate all necessary resources internally, they have to gain them externally through exchange with other organizations. Since resources are scarce, competition between organizations is sometimes inevitable. The resource-dependency theory tries to explain how organizations can take control and gain power over crucial resources and how they can minimize threats to the autonomy of the organization. But if the necessary resources are not available in South Africa it is necessary to search for resources abroad.

Very important to firms that are involved in innovative partnerships is the capacity of these firms to recognize the value of new, external information, assimilate it and apply it to commercial ends. Cohen and Levinthal (1990) refer to this ability as absorptive capacity, which can be regarded as an internal resource of a firm. If it is small, valuable new information will not be treated accordingly. If it is big, valuable new information will be recognized and used. According to Cohen and Levinthal, there are sources that argue that absorptive capacity may be created as a by-product of a firm's R&D investment, while other work suggests that it is a by-product of a firm's manufacturing operations. The absorptive capacity of an organization will depend on the absorptive capacities of its employees, but is not limited to the sum of the absorptive capacity of the employees. Interactions with the environment and the transfers across and within subunits in a firm are also important to the absorptive capacity of a firm. To optimize the absorptive capacity of a firm, a trade off between diversification and overlap between knowledge across individuals is necessary. Common knowledge improves communication between individuals, but must not be there to such an extent that there is hardly any diversified knowledge left. Important to understand absorptive capacity is the notion that prior knowledge underlies absorptive capacity. Accumulating absorptive capacity, and thus knowledge, will permit more efficient accumulation of absorptive capacity in the next period. This cumulativeness suggests path dependency, meaning that if a firm chooses a certain path (for example, producing and developing car exhausts) it will be difficult to leave that path (for example, produce windscreens). If a firm ceases investing in its absorptive capacity, it may never assimilate or exploit knowledge again in that field because the gap will be too big. This phenomenon is called "lockout". Another effect is that a firm may be or may become blind to new developments in the field in which it ceased investing in or is not investing in. There are two factors that affect the firm's incentives to learn and therefore its incentives to invest in absorptive capacity. The first factor is the quantity of knowledge to be assimilated and exploited. The second factor is the difficulty (or ease) of learning.

The absorptive capacity can be considered as a resource. A high level of absorptive capacity in a country is likely to result in a good innovative performance of the firms in that country. Another resource important to a country is human capital, which consists of the level of education and working experience of the inhabitants. Both these factors also contribute to the absorptive capacity. Other resources important to a country are natural resources, like oil, gold, diamond and iron. The last resource that is important to a country is the knowledge base, which consists of all knowledge available in firms, universities, government institutions and even unemployed inhabitants. South Africa may have a lack of resources, which provides incentives for South African firms to search for innovative partnerships abroad. Therefore, the last research question is:

Does a lack of internal resources inhibit the formation of domestic innovative partnerships in South Africa?

A resource that is important in this context is human capital, including the education and working experience of employees. If a South African firm that is looking for an innovative partnership cannot find another South African firm with sufficient skills and expertise, then this firm will search for a foreign innovative partner. Furthermore, the knowledge base of South Africa may be an important resource. Especially the ownership of technologies by South African firms could be an important factor. If a South African firm needs a certain technology and this technology is not domestically available, then the firm has to acquire this technology from a foreign firm. In that case, the technology could be licensed to the South

African firm or the South African firms can cooperate in developing a certain innovation with that foreign firm. This provides a second possible explanation why South African firms relatively many innovative partnerships with foreign firms and relatively few partnerships with other South African firms. Thirdly, efficiency and effectiveness of firms can be considered resources. If South African innovating firms consider other South African firms to be inefficient and ineffective then these firms will look for innovative partnerships with foreign firms. Finally, the absorptive capacity, which has been described in this section, may provide another explanation. If a South African firm, looking for an innovative partnership, detects the low absorptive capacity of South African firms and thus their poor capability to process new information and applying it to commercial ends, then the firm will search for an innovative partnership with a foreign firm.

2.7 Comparison between Dutch and South African firms

In order to make a comparative study possible between Dutch and South African firms, it is important to examine the characteristics of Dutch and South African firms. Differences found in these characteristics may also provide answers to the main research question. Figure 4 shows the distribution of firm sizes in the Netherlands and South Africa in the manufacturing sector. As can be seen in this figure, South Africa has less small firms (10-49 employees) and more firms in the bigger size classes (50-250, 250-500 and >500 employees) compared to the Netherlands. However, because of the large share small firms have in the total amount of firms, these firms will have the biggest influence on the percentage of firms cooperating with domestic or foreign firms. Large firms will have a relatively small influence.
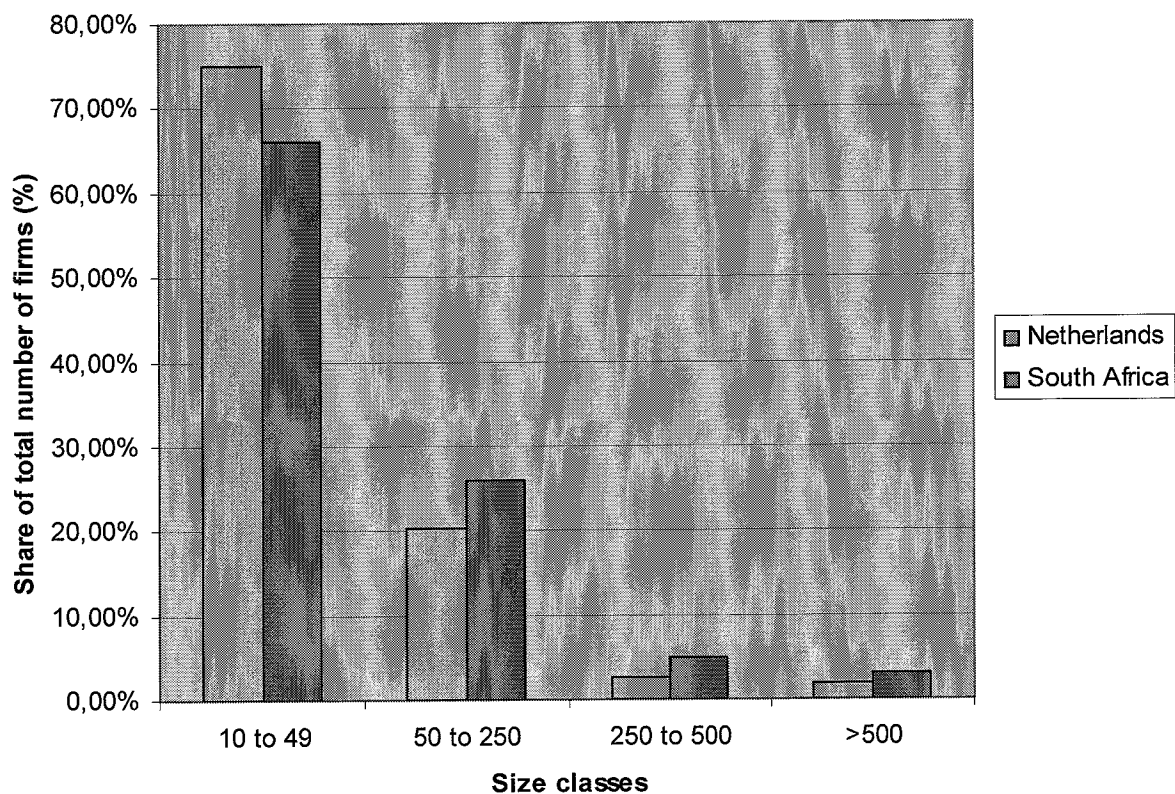
Figure 4: Distribution of the size of firms in the manufacturing sector in the Netherlands[4] and South Africa (Oerlemans et al, 2003: p. 22)

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[4] The Dutch data is found on www.cbs.nl using the Statline tool.

Figure 5 shows an international comparison of the share of innovators with innovation cooperation that has at least one innovative partnership with a firm in their own country. As can be seen in this figure, South Africa is approximately on the same level as Germany and Austria, but is among the countries that have the lowest percentages. Very large South African firms >250 have the smallest amount of innovative partnerships of all nations. Firms between 50 and 249 employees also have relatively few domestic innovative partnerships and small firms with 10 to 49 employees seem to do a little bit better. Distribution of the size of firms in the manufacturing sector in the Netherlands and South Africa (Oerlemans et al, 2003: p. 22).
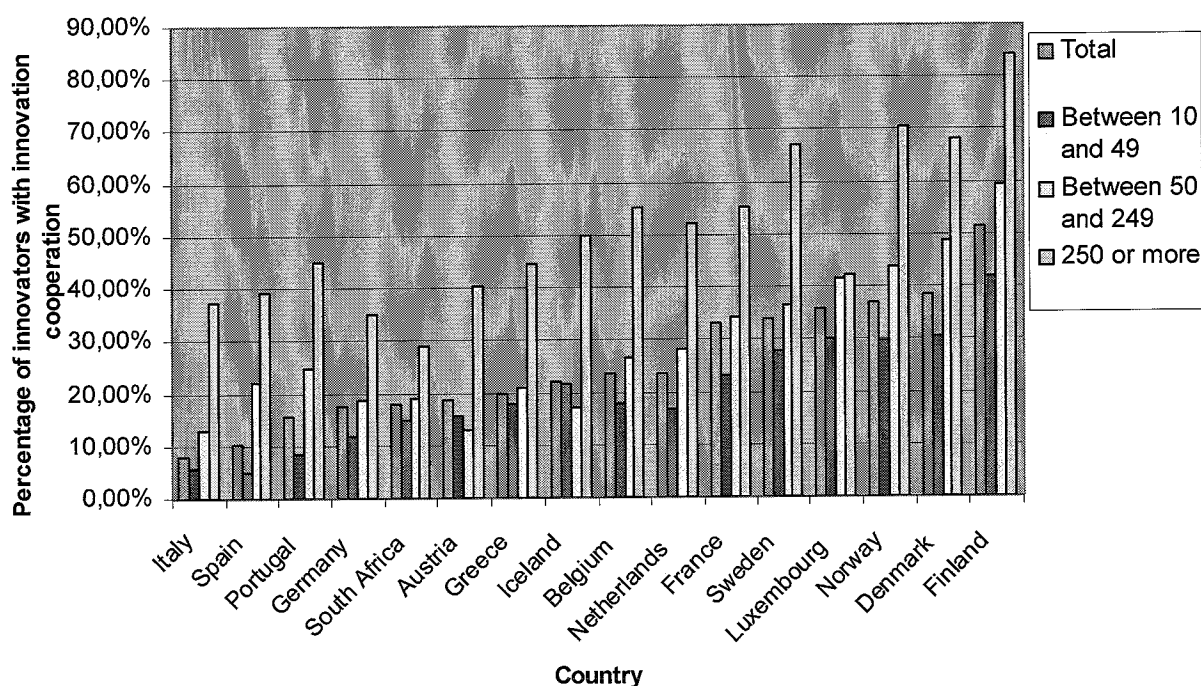
Figure 5: International comparison of domestic cooperation as a percentage of innovators with innovation cooperation classified by firm size[5]

The focus will be turned again to the comparison between South Africa and the Netherlands. Table 1 shows that large South African innovators have almost twice as few domestic innovative cooperations as Dutch firms. Furthermore, small Dutch firms with 10-50 employees have slightly more innovative partnerships than South African firms. Knowing that South Africa has relatively fewer small firms and more large firms (see figure 4) compared to the Netherlands, this explains the smaller percentage of South African innovators that have innovative partnerships with other South African firms to some extent. However, it is important to keep in mind that the South African data in table 1 and figure 5 involves firms in the manufacturing and services sector, whereas the data of the other countries only involves

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[5] The source of the South African data is the SAIS 2001 report (Oerlemans et al, 2003) and applies to the manufacturing and services sectors from 1998-2000, whereas the rest of the data is based on Eurostat data (from the CIS -3 survey) and applies only to the manufacturing sector from 1998-2000. Furthermore, it is noteworthy to mention that the South African figure where firm size >250 is not available in the SAIS report. In that report two figures are available: cooperation of an innovator with 250 to 500 employees with another South African firm (21%) and cooperation of an innovator with more than 500 employees with another South African firm (36%). The figure where firm size>250 employees is calculated by averaging the figure where firms size 250-500 and where firm size>500. The resulting figure is: 36+21/2 = 28.5%. This figure is likely to approach the actual figure.

the manufacturing sector. Therefore, the comparison is likely to be somewhat distorted and it is difficult to estimate the accuracy of the explanation mentioned before.

Firm size	South Africa	Netherlands
Total	17%	23.73%
Between 10 and 49	15%	16.65%
Between 50 and 249	19%	28.39%
250 or more	28.5%	52.15%

Table 1: Comparison between South Africa[6] and the Netherlands of national cooperation as a percentage of innovators with innovation cooperation classified by firm size

This section has suggested that South Africa has a relatively large share of big firms compared to the Netherlands. These firms cooperate almost twice as little with other domestic firms that Dutch firms. The difference in the percentages of domestic cooperation between the South African firms and Dutch firms seems to lie mainly with the big firms.

This chapter has introduced the problem which will be researched by means of this study and has explored reasons that can contribute to the explanation of the problem. South African innovators have few domestic innovative partnerships and many foreign partnerships compared to Dutch firms. The present chapter indicated that several elements of the South African culture, business atmosphere, government and resources are likely to provide an explanation for the relatively small amount of innovative partnerships between South African innovators compared to Dutch innovators. Regarding culture, the combination of the "do-it-yourself" attitude and the small group of friends, both remnants of the Apartheid history of South Africa, are likely to have an impact on the amount of innovative partnerships between South African innovators. Concerning business atmosphere, a lack of trust between South African firms could be an important contributor to the small amount of domestic innovative partnerships. Furthermore, the affirmative action policy of the South African government seems to have an indirect influence on the amount of innovative partnerships between South African innovators. In addition, a possible lack of education and expertise may contribute to the small amount of domestic innovative partnerships of South African innovators. The next chapter will focus on the method of research that has been used in order to research the problem and possible explanations that have been discussed in this literature study.

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[6] The data used in this table is the same data used in figure 5

3 Method of research

The method of research used in this study contains three parts. First of all, a preliminary literature study has been conducted in the Netherlands. This literature study resulted in the first research questions, which changed on several occasions during the course of this study, but eventually turned about to be approximately the same research questions as can be found in the introductory chapter of this report. Paragraph 3.3 elaborates on the preparations that were necessary in order to start the field work. Furthermore, paragraph 3.4 summarizes the explanations, mainly based on literature, and why certain indicators were used in the surveys. Secondly, field work was necessary in South Africa and in the Netherlands in order to collect the necessary data. Initially, one survey was planned which involved about 300 firms. The method used for this survey is described in paragraph 3.5. Because of a response rate that was lower than expected it was necessary to conduct a second survey using a different research method involving 75 firms. This method has been described in paragraph 3.6. Once again, the response rate turned out to be lower than expected. Therefore the choice has been made to interview 6 employees of firms active in the telecommunications, electronics and IT sector. Some information about these interviewees can be found in paragraph 3.7. The interviews have resulted in some very interesting information. Furthermore, in order to use the low number of South African responses in the South African surveys optimally, an additional survey has been conducted in the Netherlands involving 42 Dutch firms involved in similar sectors as the firms involved in the South African survey. This survey has been carried out in a different way than the South African surveys. The most important differences were that the Dutch questionnaire was much smaller and completely conducted by phone instead of using other mediums like mail and a website. The Dutch survey was more successful and had a much higher response rate. More information about this survey can be found in paragraph 3.8 and an overview of the differences in method and response between the Dutch and South African surveys can be found in paragraph 3.9. Thirdly, this report had to be written. In order to do this the data had to be analyzed using the statistical software SPSS 11. Finally, the results, of both the surveys and the interviews, and the discussion has been included in this report.

In order to gain a clear understanding of the dynamics in South Africa it is crucial to highlight South Africa's history and its economic and welfare indicators. Paragraph 3.1 presents information about the history of South Africa and the social consequences of this history. Section 3.2 provides economic and welfare indicators regarding South Africa. These indicators are put in a global context by comparing them with other countries.

3.1 South Africa – historical overview

This section does not provide a complete overview of the history of South Africa, due to its irrelevance to this study. However, some historical information is necessary in order to understand the social situation in South Africa, which in turn influences business. South Africa has a long history of colonization by the English and migration of white Europeans, mainly Dutch, German and French, which is an explanation for the presence of Western influences. Moreover, the Apartheid era, which officially stretched from 1948 to 1994, left its mark on South Africa. During this era, privileges were based on race and colour. The English and Afrikaner population of South Africa constituted the privileged and superior group, while the other groups were less privileged. The "others" were decomposed into coloured, Asian and blacks. The first two groups were relatively more advantageous than the black race. The latter was formed out of the native African population of South Africa. The black groups include the Xhosa, Zulu and Soto people. The repercussions of Apartheid have hit the country

hard. International pressure, as well as internal factors, including increasing social tensions, has led to the abolition of the policy in 1994. In the first truly democratic elections after the Apartheid era, Nelson Mandela was elected president of a country that was racially divided. The termination of Apartheid meant that all of the privileges that some groups benefited from, due to their race, were abolished. The end of Apartheid also meant a change in the way in which different races in the country interact with each other. It also led, in some cases, to changes in the national distribution of wealth. Under the Apartheid regime, white people constituted the wealthiest group of the society, both financially and in terms of power. On the other side of the spectrum, the majority of the black population lived in impoverished townships like Soweto and the Cape Flats near big cities such as Johannesburg, Cape Town and Pretoria. The social circumstances of the different races have fostered a differing perception of the history of the country. Black people who have lived under Apartheid will generally not think very fondly of that era, while white people, who were usually much wealthier, have less negative thoughts about that period. The social stratification has also limited the interaction between the different groups in the society. The end of Apartheid did not necessarily translate into a change in perceptions and in the pattern of interaction among races. Currently, most black people continue to live in townships that may not be as impoverished as they once were, but they are certainly not rich. What should not be overshadowed, though, is a slight change in the pattern of wealth distribution, in favour of a selected black elite. The black middle and upper class are increasing and currently 28% of the top-earning 20% of households are black (SouthAfrica.info, 2004). However, 95% of the poorest 20% of all households in the country are black, which indicates that there are still major inequalities present. The aforementioned patterns of the South African society, including historical changes as well as the current social setting continue, indeed, to influence the culture of the South African society. And by influencing the South African society, South African business will also be affected. The next section will provide more insight in the economic and welfare situation in South Africa.

3.2 South Africa – economic and welfare indicators

This paragraph does not only provide an overview of South Africa, but, more specifically, emphasises the South African economic indicators. The ultimate aim is to acquire a general idea on South Africa and of its position in the world.

From an economic viewpoint, South Africa is indisputably Africa's most important country. South Africa had a Gross Domestic Product (GDP) of $456.7 billion in 2003, whereas all African countries have a total GDP of about $1.81 trillion (2002 estimate; www.nationmaster.com). This implies that South Africa is responsible for about 25% of the total GDP of Africa. South Africa is the number one country regarding GDP in Africa. Table 2 shows the information that is discussed in this section. Number two is Egypt with $295.2 billion (CIA[7], 2004; 2003 estimate) followed by Algeria with $196 billion (CIA, 2004; 2003 estimate). Compared to the rest of the world South Africa is number 23 regarding GDP. Number 21 is the Netherlands ($461 billion), nr. 22 is Turkey ($458.2 billion) and number 24, is Argentina ($435.5 billion). Another important indicator, the GDP per capita, is $10,700/capita, which is the second highest GDP per capita in Africa after Mauritius ($11,400/capita) and followed by Botswana ($9,000/capita). South Africa has a very high

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[7] CIA is indeed the Central Intelligence Agency. The CIA updates a so-called world fact book annually and it includes a vast amount of information concerning the economy, political situation, health and other information per country. Most of the information that is presented in paragraph 3.2 is found in this book. Some information is found on www.nationmaster.com, which has a huge amount of data available. Unfortunately not all of this data is up-to-date.

GDP/capita for African standards. However, in a global perspective the GDP/capita of South Africa only ranks number 75, right after Antigua and Barbuda ($11,000/capita) and before Croatia ($10,600/capita). With the aim of putting this figure into perspective it is interesting to note that the global number one country regarding GDP/capita, Luxembourg has a GDP/capita of $55,100 whereas number 20, France has a GDP/capita of $27,600. According to the source of all this information, the CIA World Fact Book 2004 (CIA, 2004), the countries with the lowest GDP/capita are East-Timor and Somalia, which have a GDP/capita of only $500. In a global context South Africa's GDP/capita can be labelled average.

Economic and welfare indicators	Amount	African ranking	Worldwide ranking
GDP	$456.7 billion (2003 estimate)	1	23
GDP per capita	$10,700 (2003 estimate)	2	75
% below poverty line	50% (2000 estimate)	21	36
Income distribution (richest 10%)	45.9% (1994 estimate)	4	8
Unemployment rate	31% (2003 estimate)	11	24
Inflation rate (consumer prices)	5.9% (2003 estimate)	26	157
HIV/AIDS – adult prevalence rate	21.5% (2003 estimate)	5	5

Table 2: Economic and welfare indicators South Africa[8] (sources: CIA, 2004 and www.nationmaster.com)

In 2003 the inflation rate in South Africa was 5.9% and with that rate it ranks in-between Mali (4.5%) and Chad (6.0%) in Africa. In a global context, South Africa is ranked 157 out of the 221 countries. Number 221 on that list is a neighbour of South Africa, Zimbabwe, which has an inflation rate of 384.4%. Luckily, South Africa is doing much better than that particular neighbour. However, the number one country worldwide regarding inflation rate in 2003, Hong Kong, has an inflation rate of -2.6%. In the number one country concerning inflation rate in Africa, Togo, this rate is -1.0%. The number 100 of the world, Pakistan, has an inflation rate of 2.9%, which is twice as little as South Africa. Therefore it is fair to say that the inflation rate in South Africa is not very good. However, noteworthy is the fact that the inflation rate in 2002 was 9.9% (www.nationmaster.com), which implies that the inflation rate dropped with 4 percent in only 1 year!

Economically, South Africa is doing very well compared to most other African countries. Nevertheless, the country faces many other challenges. One problem is that 50% of the population of South Africa is living below the poverty line (CIA, 2004). Furthermore, major inequalities regarding income are present in South Africa. In 1994, the richest 10% of the population of South Africa earned 45.9% of the GDP and South Africa ranks fourth in Africa concerning inequality. Unfortunately this data is 10 years old and it is likely that it has changed. However, since 50% of the population has an income below the poverty line, it is very likely that South Africa's richest 10% of the population still earn a very large share of the GDP.

In table 2 the HIV/AIDS adult prevalence rates are shown. HIV/AIDS is clearly a problem that is typical for Africa, because the top five in the world are all African countries. South Africa is the African and worldwide number five regarding HIV/AIDS adult prevalence. In

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[8] A ranking is higher if a percentage/amount is higher. A higher ranking does not necessarily mean better. South Africa's 5th place regarding HIV/AIDS prevalence worldwide is obviously extremely bad, whereas the 23rd place regarding GDP is relatively good. It should be noted that not all information from every country worldwide is available in the CIA World Fact Book or on www.nationmaster.com.

2003, about 21.5% of the population of South Africa was infected by the HIV virus (CIA, 2004). The consequences of the AIDS virus can be enormous, but this is very dependent on the medicines that may be or become available for South Africa and other African countries that are suffering from this virus. Estimates are that South Africa's GDP in 2010 will be 2.8% to 17% lower than it would have been without AIDS (IRINnews.org, 2004). However, this percentage varies with the source. Another frightening figure is that the life expectancy of South Africans will be 43 years in 2010, which would have been around 60 years without AIDS. The impact on business will be negative and some firms claim that they already suffer from the consequences of AIDS. It is clear that AIDS is a huge problem and it is unsure whether this problem can be solved in the near future.

3.3 Preparation for the surveys

Several steps were carried out before the actual field work, which consisted of surveys and a series of interviews, could be started. These steps are explained in this section. First of all, the population of the surveys had to be chosen. The population of the South African surveys were all South African firms that were active in the telecommunications, electronics and/or IT sectors. According to SAIS 2001 (Oerlemans et al, 2003) these sectors are highly innovative. Secondly, a sample had to be chosen representative of the population and large enough to do useful statistical analyses. More about the size and population distribution of the samples can be found in paragraph 3.5 and 3.6. The last step before the fieldwork could be started, is compiling a list of firms in the sectors mentioned above. All the data of these firms were found in the Brabys database, which was purchased in the form of a CD. This database was the cheapest option available for compiling a proper list of firms in South Africa. Unfortunately, there is a lot of faulty data present in the Brabys database. More information about the quality of the Brabys database is presented in paragraph 3.5.

The next paragraph describes the measurement methods of the business atmosphere, culture and resources used in this research.

3.4 Methods of measurement

3.4.1 Measurement of business atmosphere

In literature no measurements methods are available that measure the business atmosphere a firm is active in. Therefore a new measurement method had to be developed. The indicators used in order to measure the business atmosphere in South Africa as well as explanations why they are used are listed in table 3.

Indicator	Statement [9] in questionnaire	Why is this indicator used?
trustful	33. Firms in South Africa are trustful	If South African firms do not trust South African firms easily then it would be difficult to form partnerships. This would also negatively influence the business atmosphere in South Africa because mutual trust is an important determinant of the business atmosphere.
reliable	34. Firms in South Africa are trustworthy	If South African firms do not consider other South African firms to be trustworthy, then this provides a reason why South African firms have relatively little domestic innovative partnerships and a lot of foreign innovative partnerships. This would also decrease the business atmosphere in South Africa because mutual trust is an important determinant of the business atmosphere.

Table 3: Indicators used in order to measure the business atmosphere

The indicators "trustful" and "reliable" are related to a very important aspect in the business atmosphere: trust between firms. More information on the business atmosphere is gathered by conducting the interviews. Very little is said in literature about business atmosphere and therefore it seemed appropriate to explore the concept of business atmosphere by using interviews.

3.4.2 Measurement of resources

The measurement of resources is done in a subjective manner. This entails that the respondent's opinion is asked regarding several topics. The focus of the survey is on one of the most important resources of a firm in the context of innovation: the absorptive capacity (for more information, see section 2.6). There is a lot of literature available that describes the measurement of absorptive capacity. According to contemporary literature the measurement of absorptive capacity is problematic (Knudsen, 2001; Vinding, 2003). Knudsen (2001) argues that absorptive capacity is basically a process that consists of two components; the access to external knowledge and the utilisation of this knowledge. Important preconditions to the access to external knowledge are: openness and the role of trained employees as well as characteristics of the knowledge to be absorbed. Knudsen measures the openness towards knowledge sharing by 3 levels. First of all he asks whether a firm has ever been involved in a strategic alliance. Secondly, he asks whether the firm has ever collaborated in the innovation process. Thirdly he asks if the firm has collaborated on its most important innovation. The second precondition, the role of trained employees, is important because highly trained employees are supposed to have a larger knowledge base than poorly trained employees, which means that they have to learn less to reach a certain knowledge level necessary to understand a new technology. Knudsen found that a high share of R&D personnel and a high share of academics contribute positively and significantly to the absorptive capacity of a firm. Furthermore, Knudsen argues that in previous empirical studies, the indicators used did not measure absorptive capacity but only the access to external knowledge. Knudsen provides several indicators to measure the access to external knowledge. First of all, the number of

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[9] In the South African questionnaire (appendix C) respondents were asked to indicate to what extent they agreed with the statement. Respondents could choose between "Not at all", "Sometimes"/"Some", "Most of the time"/"Most of them" and "Always"

publications is supposed to be a good indicator because more publications deepen the absorptive capacity of the individual and thus the firm. Secondly, co-citations, defined by citations used in these publications, can be used as an indicator to measure the ability to understand technologies and can thus be regarded as an indicator of absorptive capacity. According to SAIS 2001 (Oerlemans et al, 2003) patents are bad indicators in South Africa. Furthermore, an indicator for absorptive capacity is the experience a firm has, which can be measured by the number of alliances that the firm has been involved in. This indicator is very difficult to measure in this research.

Vinding (2003) measures absorptive capacity in a rather arbitrary way; he measures it as having at least one academic person employed and the development of a closer relationship with another institution. This does not seem to be a very accurate way to measure absorptive capacity, although the results of the study are mostly consistent with the expectations. None of the methods used in previous studies have proved to be very good and therefore the choice has been made to use a different approach. This study uses four indicators to measure the absorptive capacity in South African firms and five indicators to measure the level of resources in South Africa (see table 4). Two of the four indicators used for measuring the absorptive capacity are important separate domestic resources that contribute to the absorptive capacity. The other two cannot be considered important domestic resources. First of all, the level of education is measured which is also considered very important to the absorptive capacity by Knudsen (2001). It is clear that the level of education is an important national resource. Secondly, the level of practical skills is asked. These practical skills relate to the experience of personnel. It is viable that experience contributes positively to the absorptive capacity of a person and thus of a firm and it is an important domestic resource. Furthermore, the level of performance of the purchasing department and the level of performance of the marketing are measured by means of the survey. These levels are also regarded important by Cohen and Levinthal (1990), who suggest that not only the R&D department is important to the absorptive capacity, but other departments contribute as well. The level of performance of the marketing and purchasing department is not likely to be very important domestic resources, but is of importance to the absorptive capacity of firms.

Additionally, five other indicators are used to measure the level of resources in South Africa. These are listed in table 4 including an explanation why this indicator is used in the survey.

Indicator	Statement/question in questionnaire	Why is this indicator used?
leveducation	28. What is the level of education of your firm's personnel in comparison to other firms in your firm's main sector?	Level of education is an important resource of a nation.[10]
levpractical	29. How do you consider the practical skills of your firm's personnel to be in comparison to other firms in your firm's main sector?	Level of practical skills (experience) is an important resource of a nation.
levpurchasing	31. How would you rate your firm's purchasing department, compared to other firms in your firm's main sector?	Rating of purchasing department is of influence to the absorptive capacity and it can be regarded as a resource.
levmarketing	32. How would you rate your firm's marketing department, compared to other firms in your firm's main sector?	Rating of marketing department is of influence to the absorptive capacity and it can be regarded as a resource.
resources	36. Firms in South Africa offer my firm the resources we need	This indicator provides a general overview of what South Africans think of the resources in their country.
flexible	37. Firms in South Africa are flexible	Flexibility of firms can be considered as a resource. It is viable that a high degree of flexibility can stimulate innovation and a high degree of flexibility can stimulate innovation.
bureaucratic	38. Firms in South Africa are bureaucratic	Bureaucracy can be considered as a resource. It is viable that a high degree of bureaucracy can inhibit innovation and a low degree of bureaucracy can stimulate innovation.
partdomestic	40. Partnerships with South African firms are usually efficient and effective.	Efficiency and effectiveness of partnerships in South Africa can be consider a resource
partforeign	41. Partnerships with foreign firms are usually efficient and effective.	This indicator is used to compare to the previous indicator and check whether there is a significant difference between both.

Table 4: Indicators used in order to measure the level of resources in South Africa

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[10] If there is a lack of a resource important to firms in a nation, like educational skills or practical skills, then domestic firms could search for these resources abroad. In effect, this is likely to influence the number of innovative partnerships South African firms have with other South African firms

3.4.3 Measurement of culture

In the South African survey, two indicators have been used to measure the culture in South Africa. Obviously, this is not a complete measurement of the South African culture, but the indicators used are directed towards explaining why there is a relatively small number of innovative partnerships between South African innovating firms. Table 5 lists the two indicators used to measure culture in both surveys.

Indicator	Statement in questionaire	Why is this indicator used?
world	35. Firms in South Africa can compete with the best in the world	This indicator is used to check the "We are South Africa, we don't need anybody else" feeling, which entails that South Africans consider themselves to be the best.
worktogether	39. Firms in South Africa should work together with Southern African firms from e.g. South Africa, Botswana, Namibia, Mozambique, etc. instead of European and American firms	This indicator is used to check whether South African firms prefer working together with Southern African firms instead of firms form other nations. This indicator is related to the South African culture and to check the idea that Southern African countries consider themselves to be a whole to some extent.

Table 5: Indicators used in order to measure the culture in South Africa

3.5 Method for first sample in South Africa

The information concerning South African firms has been provided by the Brabys database. Brabys is a recognized online business directory that covers most Southern African countries. It can be found online on www.brabys.com and it can also be ordered on CD-ROM. Unfortunately there are a number of problems attached to this database which will be shown in this paragraph.

In order to be able to use statistical analysis with a high degree of confidence, the initial objective was to get approximately 80 responses. The idea behind this was that even when the results were disappointing, there was still a reasonable margin of safety. For a large sample T-test the response had to be at least thirty (Agresti & Finlay, 1999). Therefore, the first sample group was chosen relatively large and a target response of about 25% was expected. Furthermore, only firms with production or research facilities were included in these lists. The first sample contained 300 firms and these firms were randomly chosen out of the total population of the 2,968 firms that the Brabys CD produced. It was not easy to compile both the population list as well as the sample list due to restrictions in the Brabys CD. Eventually, both lists were compiled. The sample list included the firm names, the phone number of these firms, the e-mail address, the physical address and the postal address. The population lists were less detailed and consisted only out of firm names, phone numbers, a unique ID and the reference number of each firm. These reference numbers were 10-digit numbers, randomly generated and each firm had a unique reference number. Respondents had to fill in this number on the website, which identified the firm in the database.

The firms in the first sample were contacted in the following way. First of all, all 300 firms were screened on appropriateness for this research. The first sample list initially also included electronics wholesalers, small electronics and computer shops and several other firms that were not interesting for this research. Due to screening, 71 firms were removed from the list. This means that the sample was reduced to 229. Secondly, all firms were called and typically a secretary picked up the phone. He/she was asked to put me through to an employee involved

in R&D. Thirdly, if that employee, involved in R&D, answered the phone, he/she was asked for his/her e-mail address and whether he/she had time to fill in the questionnaire on the website (more about the website can be found in appendix B) that would take approximately 20 minutes of his/her time. If he/she answered "yes" or "maybe", this e-mail was sent. This initial e-mail resembled the introduction page of the questionnaire (see appendix C). The approach with the website was chosen because of the ease of use for both the respondents and the researchers. Furthermore, this approach seemed to be promising to accomplish a high response rate. More about this website can be found in appendix B. Finally, if the respondents, who answered "yes", did not fill in the questionnaire in 2 weeks, a reminder e-mail was sent. If they still had not filled in the questionnaire a week later, they were called for the second time. Unfortunately not all the contact names had been noted down during the first phone call, but only approximately 60%. This made it much harder to contact the correct person again. Table 6 gives an overview of the responses of the firms in the first sample.

		Number of firms or respondents	Firms or respondents/total number of firms in %	Respondents/total number of existing firms that were screened in %
Initial situation	Initial sample	300	100.0	Not relevant
	Sample after first screening	229	76.3	Not relevant
	Deleted after second screening (if the firm slipped through the first screening)	206	68.7	Not relevant
Answers of respondents after first phone call	Not reachable, firm/phone number doesn't exist	58	19.3	Not relevant
	Total number of existing firms that were screened	148	49.3	100
	Not reachable by phone, sent e-mail/fax	8	2.7	54.1
	Reachable, but don't want to cooperate	7	2.3	4.7
	Reachable and maybe want to cooperate	21	7.0	14.2
	Reachable and want to cooperate	44	14.7	29.7
	Reachable, but too small/no R&D	15	5.0	10.1
	Not in target group	22	7.3	14.9
	Other[11]	31	10.3	20.1
Results	Filled in after first phone call	7	2.3	4.7
	Filled in after reminder e-mail	5	1.7	3.4
	Filled in after second phone call	4	1.3	2.7
	Total responses	**16**	**5.3%**	**10.8%**

Table 6: Results of surveying the first sample

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[11] "Other" consists out of answers by people who argued that I can speak to their colleague who was not available at the time due to the fact that he/she was out of the country, sick or something alike.

It is noteworthy to mention that respondents were not obliged to fill in the questionnaire entirely and only 10 filled in the questionnaire completely. A response rate of 16/300 * 100 % = 5.3% was not expected. Arguably this percentage is not correct, because in the total of 300 there are many firms that were screened out or did not exist anymore. Therefore a much better representation of the response rate is 16/(229-58-23) x 100 =10.8%, which is a much higher response rate. Still, this result was much lower than the targeted 25%, which is why a change of strategy of strategy was deemed to be necessary.

3.6 Change of strategy for second sample in South Africa

The second sample was again randomly chosen from the total firm population of 2,968. This time the sample was chosen larger, because it was expected that the response rate would not be above 15%. The total sample size of this second sample was 600. After the first screening, equal to the one described in the previous paragraph, 435 firms were left. The strategy changed in comparison to the strategy used for the first sample on the following points:

- The respondents were given the choice whether they wanted to reply via e-mail, via fax or via the website. If they wanted to reply via mail or fax, the questionnaire was sent to them through the corresponding medium.
- No reference number was used in the second sample. The idea behind this was that the reference number could be an obstacle that prevented respondents from filling in the questionnaire.
- The contact name was written down every time. Because of this, these persons could always be contacted after the first call.
- All replies were noted down more carefully than in the first sample by using a form in Microsoft Access. This facilitated processing information significantly.

Furthermore, the choice was made to try 75 firms first and see what the response would become. Table 7 presents the results of surveying these 75 firms.

		Number of firms/ respondents	Firms or respondents/total number of firms in %	Respondents/total number of existing firms that were screened in %
Initial situation	Initial sample	75	100.0	Not relevant
	Sample after screening	72	96.0	Not relevant
Answers of respondents after first phone call	Not reachable, firm/phone number doesn't exist	24	32.0	Not relevant
	Total number of existing firms that were screened	48		100
	Not reachable by phone, sent e-mail/fax	0	0.0	0
	Reachable, but don't want to cooperate	1	1.3	2.1
	Reachable and maybe want to cooperate	6	8.0	12.5
	Reachable and want to cooperate	9	12.0	18.8
	Reachable, but too small/no R&D	10	13.3	20.1
	Not in target group	16	28.0	33.3
	Other	5	0.0	10.4
Results	Filled in after first phone call	0	0.0	0
	Filled in after reminder e-mail	0	0.0	0
	Filled in after second phone call	2	2.7	4.2
	Total responses	**2**	**2.7**	**4.2**

Table 7: Results of surveying the test sample of 75 in the second sample

Similar to the first sample, the real response can better be calculated by excluding the firms that are not reachable or have a faulty phone number in the Brabys database. The response rate is then 2/(75-24-3) x 100% = 4.2%. The total response rate of the South African survey is 18/(148+48) x 100% = 9.2%. It hardly matters how the response rate is calculated, because the results are lower than expected anyway. Therefore the choice was made to stop the survey and try an alternative to gain interesting information especially concerning business atmosphere and culture in South Africa. This is why interviewing a limited number of firms (due to time constraints) was a good alternative to gather some additional information.

Appendix D gives recommendations for future South African research. This appendix can be summarized by stating that the South African questionnaire contained too many questions and covered a range of topics that was too wide, which resulted in the fact that it took quite long to answer the questionnaire (20 minutes). Maybe even more important is that most respondents had trouble with filling in the questionnaire by themselves. They needed help from colleagues, sometimes even from other departments. All the interviewees were asked to fill in the questionnaire and during the talks most of them indicated these problems. Furthermore, no contact persons were available of the firms that were contacted. This implies that the contact had to be built up starting from scratch. Moreover, the survey should have

been carried out entirely through phone, so without using e-mail or a website. The Dutch survey (see paragraph 3.6) shows that this strategy works better in the Netherlands. The last point that is important in this context is that the Brabys database, used for compiling the population, is highly incorrect. This makes it very difficult to compile a proper population and representative samples.

3.7 Interviews in South Africa

The South African survey provided some interesting results, but due to a response rate, that was lower than expected, these results needed verification. Interviews are a method for verifying some of the results and exploring them in a more detailed manner. Therefore, a number of interviews have been carried out in South Africa. These interviews were semi-structured, meaning that there was a predefined set of questions and that it left the interviewee with plenty of opportunities to give their own opinion regarding several topics. The topics highlighted in the interviews were the South African culture, government, business atmosphere and resources in South Africa. All interviewees worked in firms active in the telecommunications sector or were involved in the developing and manufacturing of electrical equipment. Six interviews have been carried out in four firms, which implies that three of the interviewees were working in the same firm. Table 8 provides some general information about the interviews. Personal information of the interviewees can not be disclosed due to privacy restrictions.

Interview number	Length of interview	Firm size (number of employees) [12]	Number of years interviewee works for firm [13]	Racial group of interviewee [14]	Position of interviewee
1	50 minutes	>1000	3-6	Black	Senior engineer
2	30 minutes	>1000	>6	White	Technology Architect
3	90 minutes	150-1000	>6	White	Manager
4	50 minutes	>1000	3-6	White	Product developer
5	50 minutes	>1000	>6	Coloured	Manager
6	40 minutes	>1000	>6	White	Unknown

Table 8: General information about the interviews in South Africa

The most interesting results and quotes from the interviews will be used in the results and the discussion. The interview numbers in table 8 will be referred to when a quote or opinion is used.

3.8 Survey in the Netherlands

To make comparisons between South Africa and the Netherlands possible, a survey, similar to the one in South Africa, was conducted in the Netherlands. Based on data of the Kompass database (URL: www.kompass.com) and the database of the Kamer van Koophandel (Dutch Chambre of Commerce, URL: www.kvk.nl), 42 firms were selected. Similar to the South African survey, these were all firms that are active in the ICT or the electronics sector. However, dissimilar to the South African survey is that these firms were not selected

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[12] 3 classifications are used: "<150", "150-1000", ">1000"
[13] 3 classifications are used: "<3 years", "3-6 years", ">6 years""
[14] This column contains the "racial group" classification that is used in South Africa. The categories are "black", "white", "coloured" and "Asian". "Black" are all people that are descendents of native South African tribes, "white" are those people that only have native European ancestors, "coloured" are those people that are descendents from two or more racial groups and "Asian" are people that only have native Asian ancestors. Racial groups are of importance in this research, especially because of the different opinions that members of these groups have regarding black empowerment.

completely randomly, but in order of appearance on the websites of Kompass and the Kamer van Koophandel. Furthermore, the most important differences with the South African survey are that no website/e-mail/fax is used anymore, the number of questions is much smaller (20 compared to 57) and the much smaller amount of time required to fill in the survey (6 minutes compared to 20). The questionnaire had to be shortened thoroughly. After looking at the results of the South African surveys, it was clear that the results regarding business atmosphere, culture, government and resources were the most interesting. It made sense to try and compare these results with the Netherlands. Therefore most of these questions were included in the Dutch questionnaire, whereas most questions concerning the business network of the firm were discarded, because there were hardly any proper South African responses. All firms were approached via phone and the 20 questions (see appendix E) were asked immediately. The results of this questionnaire were good, as is shown in table 9.

		Number of firms/ respondents
Initial situation	Initial sample	42
Answers of respondents	Not reachable, firm/phone number doesn't exist	2
	Yes, wants to cooperate	28
	No, correct person not here	5
	No, doesn't have time for this	6
	Other	1
	Total responses	**28**

Table 9: Results of the Dutch survey

The response rate is very good, 28/42 x 100% = 67 %. Obviously, this is much better than the response rate in South Africa. But the methods for conducting these two surveys differ a lot and are hardly comparable at all. In the next section, the differences in method and in response between the Dutch and South African survey will be presented and clarified.

3.9 Differences between the South African and Dutch surveys

It is important to have a look at the differences between the South African and the Dutch survey because comparisons of the results of both surveys will be made in chapter 4. First of all, the firm size is important. Ideally, the percentages in the last two columns of table 10 would be exactly the same, which would imply that the size distribution in the South African survey is equal to the size distribution of the Dutch survey. Table 10 shows clearly that this is not the case. The last two columns represent the percentages of respondent firms that are present in a certain size class. It is easy to see that there are much more very small firms, with 0-49 employees, that responded in South Africa whereas the share of firms with 50-249 employees is much bigger in the Netherlands. Furthermore, no firms with 250-499 employees responded in South Africa. Therefore it is not possible to state that the size distribution of both surveys are the same. The comparisons made between South Africa and the Netherlands are therefore very preliminary and will have to be supported by additional research to give them a high validity.

Firm size (number of employees)	Number of respondents South African survey	Number of respondents Dutch survey	Respondents/total number of respondents (in %) in the South African survey	Respondents/total number of respondents (in %) in the Dutch survey
0-49	11	10	11/22 x 100 = 50	10/28 x 100 = 36
50-249	4	14	4/22 x 100 = 18	14/28 x 100 = 50
250-499	0	2	0	2/28 x 100 = 7
>499	3	2	3/22 x 100 = 14	2/28 x 100 = 7
Information missing	4	0	4/22 x 100 = 18	0
Total	22[15]	28	100	100

Table 10: Firm size of respondents in the South African and the Dutch surveys

In addition, there are some differences in the method of conducting the survey in South Africa and in the Netherlands, which are listed in table 11. The South African questionnaire can be found in appendix C and the Dutch questionnaire in appendix E. These differences imply that no conclusions can be drawn based on the huge difference in response rate between the Netherlands (67%) and South Africa (9%).

	South Africa	Netherlands
Medium	First approach on phone, then fill in on the Internet/e-mail	Whole questionnaire via phone
Number of questions in questionnaire	57	20
Time required to fill in/answer	About 20 minutes	About 6 minutes
Topics	Detailed general information, detailed R&D efforts, innovative performance, detailed network of firm, innovative capacity of firm, business atmosphere in South Africa	Basic general information, basic innovative performance, basic innovative capacity and business atmosphere in the Netherlands
Question types	Most questions are multiple choice. In the "business atmosphere" section, respondents are asked to indicate to what extent they agree to a certain statement (like "South African firms can compete with the best in the world").	Most questions are multiple choice. In the "business atmosphere" section, real questions are asked in contrast to the South African version. This is done because it is easier to ask questions via phone. However, the content of the questions is exactly the same.

Table 11: Differences between the surveys in South Africa and the Netherlands

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[15] The total is 22 because 4 of the interviews also produced some data that could be used in the quantitative analysis. 18 of the total of 22 responses were generated by the South African survey

4   Results of the quantitative research

This chapter will present the results of the empirical part of this study. The chapter is aimed at comparing the results of the Dutch and the South African survey and highlight the indicators that produce significant differences between the Netherlands and South Africa. Besides the surveys, this research also contained a qualitative part, namely the interviews. The results of these interviews will be discussed in the next chapter. The next paragraph provides the reader with an analysis of the descriptive statistics and the results of the Mann-Whitney U tests of the relevant indicators from the Dutch and South African surveys. In chapter 1 and 2 four possible explanations have been pointed out and this chapter will examine the results of the surveys that are related to these explanations. Paragraph 4.2 elaborates on the first explanation, which is the business atmosphere in South Africa. Subsequently, the cultural elements in South Africa that provide an explanation are dealt with in paragraph 4.3. Subsequently, paragraph 4.4 addresses the differences in opinion about the government in the Netherlands and South Africa. The last paragraph of this chapter, paragraph 4.5, copes with the fourth possible explanation, which is the (lack of) resources in South Africa.

4.1 Results of the South African and Dutch surveys

Surveys were carried out in both South Africa and the Netherlands. The survey in South Africa covered various topics, but the most interesting results were related to the culture, resources, government and business atmosphere in South Africa. Comparisons between the Netherlands and South Africa have been made and these are shown in this chapter. Details about the response, the measurements and the differences between the surveys can be found in chapter 3. All the questions related to culture and business atmosphere and culture had to be answered with never, sometimes, most of the time or always (as shown in table 12). In the statistical software analysis program SPSS, these values were replaces by 1, 2, 3 and 4. Some questions in the South African questionnaire concerning resources also had to be answered on a scale of 1-4 (question number 36, 37, 38, 40 and 41), others had to be answered on a scale of 1-7 (question number 28,29,31,32).

Answer category	Value used in SPSS for statistical purposes
Never	1
Sometimes	2
Most of the time	3
Always	4

Table 12: Answer categories and corresponding SPSS values

The South African questionnaire can be found in appendix C and the Dutch questionnaire in appendix E. Table 13 presents the statistical results of the comparisons between the Dutch and the South African survey, including the mean difference, the minimum/maximum value a respondent answered, the mean rank, the z-value of the Mann-Whitney U test, the 2-tailed significance and the number of responses (N). The Mann-Whitney U test was the best method to compare the data of the Dutch and South African surveys, because the data was ordinal. If the data would have been quantitative, t-tests would have been the preferred method.

Indicator (scale)	0=SA, 1=NL	N	Min. value	Max. value	Mean rank	Mean rank diff.	z-value	Sig. (2-tailed)
reliable (1-4)	0	10	2	3	14.30	-7.06	-2.428	*0.015*
	1	28	3	4	21.36			
world (1-4)	0	10	1	4	25.90	8.69	-2.275	*0.023*
	1	28	2	4	17.21			
resources (1-4)	0	9	2	3	16.67	-3.08	-0.840	0.401
	1	28	1	4	19.75			
worktogether (1-4)	0	10	2	4	14.55	-0.69	-0.221	0.825
	1	19	1	4	15.24			
partdomestic (1-4)	0	10	2	4	18.95	-0.75	-0.213	0.831
	1	28	1	4	19.70			
partforeign (1-4)	0	10	2	3	20.45	1.29	-0.369	0.712
	1	28	2	4	19.16			
bureaucratic (1-4)	0	10	2	3	21.10	2.17	-0.633	0.527
	1	28	2	4	18.93			
government (1-4)	0	10	1	3	13.30	-2.59	-0.838	0.402
	1	19	1	3	15.89			
leveducation (1-7)	0	10	3	5	11.65	-10.65	-2.742	*0.006*
	1	28	4	7	22.30			
levpractical (1-7)	0	10	3	7	15.10	-5.97	-1.517	0.129
	1	28	3	7	21.07			
levpurchasing (1-7)	0	9	4	6	19.17	1.57	-0.415	0.678
	1	26	2	6	17.60			
levmarketing (1-7)	0	10	2	6	12.75	-7.35	-1.961	*0.050*
	1	25	3	7	20.10			

Table 13: Statistics for indicators in the South African and Dutch surveys

Some conclusions can be drawn out of the results presented in the table above. There are four indicators that result in significant differences with a confidence level of 95 percent. These are 'reliable', 'world', 'leveducation' and 'levmarketing'. These indicators will be discussed in the paragraphs 4.2-4.5.

4.2 Explanation one: business atmosphere

The business atmosphere has been measured by means of a couple of questions in the questionnaire and some questions in the interviews. One items in the questionnaire were answered in the Netherlands and in South Africa with a significant difference between both nations. This item was the perceived trustworthiness of firms in South African and the Netherlands. The question asked to the respondents in the Netherlands was:

Do you consider Dutch firms to be trustworthy?

This is question 37 in the South African questionnaire and question 1 in the Dutch questionnaire. The indicator associated with the question is 'reliable' and an overview of the responses can be found in table 13 and 14. The resulting significance level of the Mann-Whitney U test which compares both the Dutch and South African data is 0.015 (see table 13), which makes this a significant result even at a significance level of 0.025. A fact worth

mentioning is that in the 28 Dutch responses on this question, none of them answered below 3 ("most of the time"), whereas in South Africa there were two 2 ("sometimes") answers out of 10. Hence, the conclusion that *Dutch respondents consider their own firms to be more reliable than South African respondents*, is justified.

Reliable	*Netherlands*	*South Africa*
Mean rank	21.36	14.30
Sample size	28	10
Mean rank diff. = -7.06	*z = -2.428*	*Sign. = 0.015*

Table 14: Descriptive statistics and results of Mann-Whitney U test for the "reliable" indicator

4.3 Explanation two: culture

The purpose of this paragraph is to point out those cultural issues that inhibit South African innovative firms to form innovative partnerships with other South African firms. Some interesting points concerning culture, brought up by interviewees, will not be discussed here, but in chapter 5. One indicator used in both surveys, the indicator 'world' was the cause of a surprising result. The question related to the 'world' indicator in both the Dutch and the South African survey is:

Do you think Dutch/South African firms can compete with the best of the world?

This question is question number 35 in the South African questionnaire and question number 2 in the Dutch questionnaire. The results are highly interesting because it was expected that the Dutch would consider their firms to be better performers than the South Africans. However, this is not true at all. Table 13 and 15 show the responses of the South African and Dutch respondents. It is clear that South African respondents are much more positive about their firms competing with the best of the world than the Dutch. This is confirmed by the results of the Mann-Whitney U test, which are shown in table 15.

world	*Netherlands*	*South Africa*
Mean rank	17.21	25.90
Sample size	28	10
Mean rank diff. = 0.66	*z = -2.275*	*Sign. = 0.023*

Table 15: Descriptive statistics and results of Mann-Whitney U test for the "world" indicator

It is remarkable to see that the opinion of South Africans about whether South African firms can compete with the best in the world is much more positive than the Dutch opinion. Based on table 15 the following conclusion can be drawn: *South African employees perceive South African firms to be more competitive than Dutch employees perceive Dutch firms*
This is a very interesting conclusion because if South Africans think that South African firms are among the best in the world, then why do they have relatively few innovative partnerships with each other? South African firms should form innovative partnerships with South African firms in that case. On the other hand, South African firms may consider themselves to be very skilled and competitive and therefore want to cooperate with foreign firms that they consider to be highly skilled.

4.4 Explanation three: opinion about the government

Most South African people have an opinion about the government, whereas in the Netherlands some people do not really know what the government is actually doing to stimulate or restrain the sectors in which their firm is active. In South Africa, especially the

affirmative action programme of the government is a popular subject. It is also likely that there are differences in opinion about this subject between white people and black people. However, that subject is not the topic of this analysis. The question asked to respondents in both South Africa and the Netherlands about the government was:

Do you think the government is doing well in supporting your firm's industries?

The question above is question number 42 in the South African questionnaire (which can be found in appendix C) and question number 8 in the Dutch questionnaire (appendix E). Table 13 and table 16 present an overview of the results regarding the indicator 'government'. In the Dutch survey the question was aimed at both the Dutch and the EU government and this was also told to the respondent. In South Africa "government" only related to the South African government. In the Netherlands, the respondents also had the choice to answer "no opinion", "the behaviour of the government does not or hardly influence my firm" or "I don't know anything about this subject", because it was obvious that a number of people (9 out of 28) really did not have an opinion about this subject or did not know anything about the topic. Of course they could also answer in the conventional way (see table 12). In South Africa, respondents could not answer "no opinion", so they had to answer the question the conventional way as is shown in table 12. However, it shows in the South African responses that if they did not have an opinion about a certain topic, they simply would not fill in that question. Therefore it is remarkable that all 10 of the South African respondents that filled in the "business atmosphere" section, answered this question. They all seem to have an opinion about this topic. If the answers "no opinion" and "no knowledge" in the Dutch survey are replaced in the table by a missing value, the conclusion is simple because in that case there is no significant difference between the opinions about the government in South Africa and the opinion about the government in the Netherlands (see table 16).

government	Netherlands	South Africa
Mean rank	15.89	13.30
Sample size	19	10
Mean rank diff. = -2.59	*z = -0.838*	*Sign. = 0.402*

Table 16: Descriptive statistics and results of Mann-Whitney U test for the "government" indicator with "no opinion" as missing value

However, treating "no opinion" and "no knowledge" as a missing value is not the best method, because "no opinion" or "no knowledge" in the Netherlands means that neither the Dutch nor the European government is bothering that specific firm in any way known to the respondent. I think that "no opinion" or "no knowledge" should be considered on an equal level as "most of the time", or a value of 3 in the statistical analysis. If the answers "no opinion" and "no knowledge" are replaced in the table by the value 3, the results are different than the initial results. Table 17 shows the results.

Government	Netherlands	South Africa
Mean rank	21.23	14.65
Sample size	28	10
Mean rank diff. = -6.58	*z = -1.746 with df = 36*	*Sign. = 0.081*

Table 17: Descriptive statistics and results of Mann-Whitney U test for the "reliable" indicator with "no opinion" as 3

The significance level is 0.081, which is not enough to consider the result to be significant at a significance level of 0.05, but it does support the impression generated by the interviews in South Africa. This impression is that firms are relatively negative towards the policies and the general attitude of the government, whereas in the Netherlands firms are quite neutral towards the governments, because they are usually not restricted nor specifically stimulated by these governments. Therefore, the preliminary conclusion can be drawn that *the opinion of the South African respondents about the South African government is more negative than the opinion of the Dutch respondents about the Dutch and EU governments.*

4.5 Explanation four: resources

A lack of resources in South Africa may provide an explanation why South African innovative firms have relatively few innovative partnerships with other South African firms. In the Dutch and South African surveys several questions were asked that related to resources in South Africa. An important part of these resources is the absorptive capacity of South African firms (more information about absorptive capacity can be found in paragraph 2.6). Two indicators stood out of the others: the level of education (paragraph 4.5.1) and the marketing department (paragraph 4.5.2).

4.5.1 Level of education

It was expected that the level of education in Dutch firms was higher than the level of education in South African firms. Question number 28 of the South African questionnaire and question number 10 of the Dutch questionnaire was:

On a scale of 1 to 7, how good do you assess the level of education of your firm in comparison to the competition?

The indicator related to this question is 'leveducation'. Tables 13 and 18 show an overview of both the Dutch and the South African responses. The result of the analysis of this indicator was clear. The Dutch respondents' opinion about the level of education of their firms' employees is much higher than the South African respondents' opinion about their firms' level of education. The descriptive statistics are shown in table 18.

leveducation	*Netherlands*	*South Africa*
Mean rank	22.30	11.65
Sample size	28	10
Mean rank diff. = -10.65	*z = -2.742*	*Sign. = 0.006*

Table 18: Descriptive statistics and results of Mann-Whitney U test for the "leveducation" indicator

Without any doubt, it can be claimed that there is a significant difference with a significance level of 0.006 between the Netherlands and South Africa regarding this topic. Based on table 18, the conclusion is that *respondents from Dutch firms consider the level of education of their firms to be much higher than respondents from South African firms.*

4.5.2 Marketing department

A result that also stood out of the rest is that South African respondents consider their firms' marketing departments to be less good than Dutch respondents. The following question was asked to the respondents:

On a scale of 1 to 7, how good do you assess the marketing department of your firm in comparison to the competition?

This is question number 32 in the South African questionnaire and number 13 in the Dutch questionnaire. The indicator related to this question is 'levmarketing'. In table 13 and 19 both the Dutch and the South African responses are presented.

levmarketing	*Netherlands*	*South Africa*
Mean rank	20.10	12.75
Sample size	25	10
Mean rank diff. = -7.35	*z = -1.961*	*Sign. = 0.050*

Table 19: Descriptive statistics and results of Mann-Whitney U test for the "marketing department" indicator

According to the Mann-Whitney U test with a significance level of 0.050 (see table 19), the conclusion that *the Dutch consider their firm's marketing department to function better than the South Africans* is acceptable. The underlying causes for this difference, however, are unknown.

5 Results of the South African interviews

Six interviews have been conducted in South Africa. Table 8 shows some characteristics of the interviewees and the interview numbers listed in table 8 will be used to refer to a specific interview in this chapter. The structure of this chapter is similar to the previous chapter, which implies that those issues and quotes related to culture will first be dealt with, followed by the business atmosphere. Subsequently, the quotes and topics related to the South African government will be presented. Finally, quotes and issues associated with South African resources will be dealt with. The interviews produced several very interesting and potentially controversial quotes. A fine example of an interesting remark of an interviewee, an experienced manager from a well know South African firm, is this one:

"We [South Africa] will never win a war, because South Africans can't work together!" (interview nr. 3 in table 8)

Although the SAIS 2001 survey (Oerlemans et al, 2003) has shown that South African firms can and do work together, it is a very interesting remark. It suggests that a part of the South Africans feel that they cannot work together properly.

In the interviews with employees (see paragraph 3.7) from several South African firms, some interesting issues related to culture were pointed out. One interviewee (interview nr. 3 in table 8) said that Africa is different from the rest of the world. You need ties to African firms because *"African firms are the only firms that understand Africa"*. He illustrated this statement by an example in which a foreign firm has to deal with African tribes. In some tribes decision-making can take a long time. African firms ought to know this and can anticipate on this problem, whereas foreign firms are often surprised by such behaviour. Another very interesting example that illustrates a part of the South African culture was mentioned by another interviewee (interview nr. 5 in table 8). He claimed that Pepsi tried to get a big market share in South Africa a couple of years ago, by investing a lot of money and opening factories and office buildings. They tried to succeed on a large scale, but it didn't work out. They made a huge loss after some time and decided to retreat from South Africa. According to the interviewee, *"Pepsi moved out of the country because of the human character in South Africa"*. In addition, a topic one interviewee (interview nr. 3 in table 8) brought up was that South African firms traditionally had the tendency to do everything themselves, including innovative activities. After the change in the government system in 1994 this has changed significantly, but recently there have been firms that are trying to get back to the old system of 'do-it-yourself', which entails that firms prefer innovating themselves instead of cooperating with other firms. This 'do-it-yourself' attitude does not only apply to innovation, but also to vertical integration, for example a windscreen producer that is taken over by a car producer.

The business atmosphere is another factor important to business networks. One interviewee made a very interesting point by saying that the attitude of employees is quite negative in South Africa (interview nr. 5 in table 8). For example, in supermarkets the cashiers are usually totally uninterested in their customers and sometimes they have an openly negative attitude. In the Netherlands, these cashiers are usually quite friendly, sometimes uninterested, but hardly ever openly negative. Another interviewee (interview nr. 3 in table 8) made was the following comment: *"to be somebody [in South Africa] you have to be a teacher, lawyer or doctor"* and in his opinion technical specialists are not very highly regarded in South Africa. Furthermore, he stated that there are not a lot of black or coloured engineers as most engineers

are white. According to him, most black students preferred a study that *"has something to do with management"*.

Having presented a the results linked to culture and business atmosphere, the next section focuses on quotes and topics related to the South African government. A rumour that was heard on more than one occasion during the interviews was that the affirmative action policies are called *"reversed Apartheid"*[16]. One interviewee's (interview nr. 3 in table 8) opinion was *"it hurts a lot of firms the way [black] empowerment is enforced"* and *"by empowering black people they [the government] want to enrich them"* and *"a lot of pressure has been put on the industry to fast-track those people [black empowerment benefactors], while they are not ready yet!"*. However, my study was not aimed at exploring the social consequences of the affirmative action policies in South Africa and therefore the social consequences of affirmative action have not been examined. An interesting point made by another interviewee (interview nr. 4 in table 8) is that affirmative action encourages innovative partnerships with foreign firms and that affirmative action has a large impact on the South African business atmosphere, mostly in a negative way. It must be noted that not all the interviewees had a purely negative opinion; one interviewee (interview nr. 5 in table 8) said about black empowerment that: *"black empowerment is basically a good idea"*, but *"they [the government] should make some adjustments"*. However, this interviewee also claimed that there were big problems with the way black empowerment is implemented currently. According to him, one problem of affirmative action is *"window dressing"*. For example, when a white director of a firm makes his black gardener part of the board of directors in order to comply to an affirmative action target. In effect, this means that this black person has no, or hardly any, saying in this board. But the board does have the required share of black people. According to this interviewee, *"it is too easy to fool the government"*. He suggests that the government improve their monitoring capabilities and assure that this *"window dressing"* will become impossible. During the interviews some interesting remarks were made by some interviewees. One interviewee had a very clear opinion and seemed to be knowledgeable about the policies of the South African government regarding innovation. He claimed that *"the importance of innovation and technology is highly underestimated at the highest [governmental] level"* (interview nr. 3 in table 8). The government is not following a specific innovation strategy, which is not beneficial to innovation in South Africa. For example, according to that particular interviewee the department of Science & Technology offers research grants from 1 to 5 million Rands. Anyone can file a research proposal and, of course, too much proposals are filed. This means that only a selected number of researchers will receive a grant. The interviewee claimed that it has been quite obvious recently that there is not really a strategy in this selection process. For instance, recently a researcher received a grant to build up a database with information on chickens and especially the spread, amongst these chickens, of a specific disease, the Newcastle disease. Other researchers that were offered grants were allowed to research completely different subjects. According to one of the interviewees, there are very big problems in South Africa that need research, but the government chooses to give grants to researchers who are researching much less important problems, like a chicken disease. His opinion is that the government should create an innovation strategy and give researchers grants according to that strategy and not in an apparently random way.

In addition, the interviews produced some interesting information regarding the availability of resources in South Africa. One interviewee highlighted the phenomenon of brain drain, which

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[16] Amongst others, the interviewee in interview number 6 said this

often occurs because of the need for better earning (interview nr. 3 in table 8). According to this same person, *"South Africa has a lack of qualified, experienced personnel"*. This opinion has been confirmed by another interviewee (interview nr. 4 in see table 8) who preferred South African firms working together with South African firms. However, his firm has to do business with a lot of new firms (especially black empowerment firms), who hardly have any experience and simply *"can't do the job"*. In addition, one interviewee (interview nr. 3 in table 8) claimed that *"You need links with European firms because of technology"*. The opinion of the interviewee was that technology is mainly developed in Europe, the USA and Japan and African firms need ties to these firms to be able to buy and use technology. It is useless for African firms to try to develop technologies parallel to foreign firms. An issue that another interviewee (interview nr. 5 in table 8) brought up was that people who are living *"outside the areas with the big cities have difficulties with accessing resources"*. For example, poor people in rural areas currently have hardly any options in applying for funds or other important resources. It is worth noting that the interviewee grew up in such an area. The problem he addressed here is not the availability of some resources in South Africa, but the geographical distribution of those resources.

6 Conclusions, discussion and recommendations

6.1 Conclusions

This study focussed on the remarkable fact that only 17% of South African innovating firms have innovative partnerships with other South African innovating firms, which is relatively little compared to most developed countries. For example, 64% of Finnish firms, 49% of Swedish firms, 30% of French firms and 24% of Dutch firms have domestic innovative partnerships. This research has explored explanations for the relatively small amount of innovative partnerships between South African innovating firms[17]. An empirical study has been conducted to find differences between the Netherlands and South Africa. Moreover, a qualitative study has explored elements in the South African culture, business atmosphere, government and resources that could provide explanations for the relatively small amount of innovative partnerships between South African innovators. The conclusions presented in this section are split according to their connection to business atmosphere, culture, government and resources.

First of all, the business atmosphere in South Africa may hamper the formation of innovative partnerships between South African innovators. The conclusions based on both the Dutch as well as the South African survey are fourfold. The first conclusion is that the perceived reliability of Dutch firms by employees of these Dutch firms is higher than the perceived reliability of South African firms by South African employees. Secondly, some features of the South African culture provide some interesting insights. The only significant difference regarding culture between both surveys was that South African respondents think that their firms can compete better with the best firms in the world than the Dutch respondents think their firms can. This is a highly interesting result, because the expectations were that Dutch firms would perceive their firms to be more competitive than South Africans would. Thirdly, the opinion of the South African respondents about the South African government is less positive than the opinion of the Dutch respondents about the Dutch and EU governments. The somewhat negative attitude of South African employees towards some policies of their government has also been confirmed by the interviews, where most interviewees disapproved affirmative action as it is implemented in South Africa currently. However, this is not a direct contributor to the relatively small amount of innovative partnerships between South African innovators. The interviews with South African employees confirm that the affirmative action policy of the South African government is very unpopular and even the benefactors of these policies, the black and coloured population, agree that some changes are necessary to make the policy work properly. According to one interviewee the affirmative action policies are also responsible for the relatively large amount of innovative partnerships with foreign firms and the small amount of innovative partnerships with South African firms. According to him, firms need to do business with firms that have a certain black empowerment level. Some of these so-called black empowerment firms are not competent enough and therefore, some South African firms prefer cooperating with foreign firms. Finally, the lack of some resources in South Africa provides a fine explanation why South African innovators tend to form innovative partnerships with foreign firms. According to the survey, South African respondents consider the level of education in their firms to be lower than Dutch respondents.

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[17] It is important to keep in mind that the reliability of the statistical analyses, of which the conclusions are presented in this paragraph, is not very high. Therefore all these conclusions need additional research in order to increase that validity.

Since properly educated personnel is an important resource of a country and is important to all forms of business transactions including innovative partnerships, this provides an explanation for the relatively small amount of innovative partnerships between South African innovating firms. Another resource that is on a lower level in South Africa than in the Netherlands is the marketing department of South African firms. A marketing department that is not functioning adequately could be a reason why another firm decides not to engage in an innovative partnership with the focal firm.

The main conclusion of the empirical research is that some elements in the South African business atmosphere, especially the relatively low perceived reliability of South African firms, and a lack of an important resource in South Africa, educated personnel, provide explanations for relatively small amount of innovative partnerships between South African innovating firms. In addition, the interviews indicate that the governmental affirmative action policy and the South African culture are also likely to be part of that explanation. The next section will discuss the conclusions raised in this section and some additional topics. Furthermore, the next section will present some critical remarks regarding the methodology of the surveys.

6.2 *Discussion*

The present study explored elements of the South African culture, business atmosphere and resources that contribute to the fact that South African innovators have relatively few innovative partnerships with domestic firms. This discussion will discuss the conclusions presented in the previous paragraph, some interesting points - mentioned by interviewees - and the methodology of the research.

Regarding the culture of South Africa, several interesting issues were pointed out by means of this study. One interviewee mentioned that firms are returning to the 'do-it-yourself' mentality, which was also present before the end of the Apartheid era in 1994. If it is true that South African firms are falling back to a "do-it-yourself" mentality then it should result in a decrease in innovative partnerships in the long term. By means of the South African survey, this study intended to examine the number and the strength of relationships South African firms have with other firms. Due to the low response on the survey, it is impossible to present reliable results on that topic. Therefore, it is not possible to confirm the theory that South African firms only have a small group of friendly firms in South Africa and that the relationships between these firms are strong. However, some pieces of information from the interviews do indicate that this could be true. Consequently, it may be correct that South African firms prefer to do as much as possible by themselves and only have a small group of South African "friends". Another important aspect of the South African culture influencing business networks is the hesitance of a number of South Africans to cooperate with anybody of a different skin colour. Some of the interviewees suggested that this is a real problem in South Africa and it is a stubborn remnant of the Apartheid era, which will take time to fade away. However, some positive signs are detectable in this context. Compared to 1994, there are much more black and coloured managers active in higher positions in firms. When people that have different skin colours mix more with each other, it is likely that these people will start appreciating each other more. That would improve the business atmosphere of South African firms and would - in time - also eliminate an important element of the South African culture that hampers business networks between South African firms. On the other hand, mixing managers or other employees from different cultures may also lead to a clash of these cultures, resulting in a business atmosphere that deteriorates.

The business atmosphere in South Africa is another factor that is likely to contribute to the relatively small amount of innovative partnerships between South African innovating firms. An example that is based on my own experience is that in South African supermarkets the cashiers are usually totally uninterested in their customers and sometimes they have an openly negative attitude. In the Netherlands, these cashiers are usually quite friendly, sometimes uninterested, but hardly ever openly negative. This is an interesting observation, but it can not be generalized to the whole South African business life. During the interviews I had, the interviewees and other employees of those firms, were very friendly and were willing to cooperate without any problems. Furthermore, there seems to be a business atmosphere of distrust in South Africa. It would be exaggerated to state that all South African firms distrust each other, because that is certainly not true. However, during the interviews the impression arose that South African firms were not very fond of cooperating with each other. This impression is supported by one of the results from the survey, namely that South African firms find each other less reliable that Dutch firms. I think that this is directly linked to a problem that is addressed in the previous section. White people tend to trust other white people and distrust other people, whereas black people seem to trust other black people and are less inclined to trust non-black people. Furthermore, although South African people are usually very friendly, it was noticed that the collective mood (business atmosphere) is on a rather low level. The example of the cashiers is illustrative for this moderately negative collective mood. Just like is the case with the South African culture, this is likely to be linked to Apartheid and its consequences, like affirmative action. The relatively low level of trust is also related to the low level of some resources, which will be discussed later in this paragraph. As some interviewees and literature point out, there is a lack of qualified, educated personnel in South Africa. Therefore, many firms do not have skilled personnel, are thus incompetent and it is likely that this incompetence decreases the level of trust that South African firms have in each other.

One particular policy of the South African government continues to heat a number of discussions in the country. This is the affirmative action policy. It is quite clear that the costs of affirmative action are high and that the benefits are doubtful (more about affirmative action can be found in appendix A). However, there is no evidence in contemporary literature that affirmative action cannot become a success in South Africa. The final conclusion of Jafta (1998) about affirmative action is *"Building capacity through hard work and patience will take longer, but it will be a better use of resources than the attempted short-cut of affirmative action"*. I fully agree with this conclusion and would like to add that it is not only an economical issue. There are also big social consequences involved in implementing an affirmative action policy. In the case of South Africa, a lot of white employees consider themselves to be discriminated against. The term *"reversed apartheid"* was heard on several occasions, but in my opinion this is highly exaggerated. However, it does reflect the opinion of a part of the South African population. According to one interviewee, business networks are affected by black empowerment targets set by firms in cooperation with the government. One objective of these targets is that firms do business and cooperate with so-called black empowerment firms, which are firms that have a certain percentage of black employees. That interviewee also claimed that these firms are sometimes not capable enough to do the job they are meant to do properly. Therefore, some South African firms prefer doing business with foreign firms above other South African firms. Based on the data that has been produced by this study, it is very difficult to assess the impact affirmative action has on South African business networks, but it is likely that affirmative action has at least a small influence.

Having discussed the influence of the South African culture, business atmosphere and government on business networks, the focus now turns to a resource-based view on South African business networks. Both the surveys and the interviews indicated that South Africa has a lack of educated, qualified personnel. Because of this problem some firms prefer doing business with overseas firms that do have the capabilities to do the job properly. Hipkin & Bennet (2003) support the lack of capable and educated personnel by stating that *"...the dearth of managerial and technological skill available from a poor educational system, and low commitment by the workforce"* are among the main factors hampering innovation in South Africa. Furthermore, emigration of skilled personnel poses a severe problem. According to Denneman (2003), 13.085 highly skilled professional have left South Africa at the peak of their economically active ages between 1996 and 2001. The actual number is even assumed to be about three times higher (Denneman, 2003). Some sort of an exodus has taken place in South Africa in the last decennium, which contributes to the relatively low level of education of the South African work force. Therefore, the lack of educated, experienced personnel is an important reason for South African firms to look for foreign partners and it partly explains the relatively small amount of innovative partnerships South African innovators have with other South African firms. Furthermore, an interviewee claimed that South African firms need ties to foreign firms, especially European, North American and Japanese, because of technology. This technology is not available in Africa and it is not profitable to develop it parallel to foreign firms. In my opinion, a lack of certain resources, especially educated, qualified personnel and technology, is very likely to be one of the main reasons why many South African firms establish innovative partnerships with foreign firms and only few partnerships with South African firms.

Thus far this discussion has focussed on those factors hampering the formation of innovative partnerships between South African innovators. However, some remarks regarding the methodology are in place as well. The first problems encountered in this study were related to the literature study. There is a lack of relevant literature concerning business atmosphere. Therefore, it has been difficult to describe the effects that business atmosphere can have on the number of innovative partnerships between South African innovators. Initially, the plan was to obtain all the necessary information by means of a survey in South Africa. However, this has proved to be much more difficult than expected and resulted in a response rate that was much lower than expected. By conducting six interviews and carrying out a similar, although less comprehensive, survey in the Netherlands, additional information has been gathered and comparisons between South Africa and the Netherlands could be made. Instead of the initial idea, which was a quantitative study, this study became an exploratory study that is mainly based on some quantitative and some qualitative data. It is clear to me that some critical remarks are in place regarding the methodology of the South African and Dutch survey. Due to the low response rate of only 10 for most questions in the South African survey, the reliability of the South African survey is quite low. The Dutch survey, however, has a much higher reliability because of the higher number of responses. One critical remark has to be mentioned in this context because the Dutch firms have not been selected entirely randomly. Therefore the reliability of the Dutch survey can not be considered extremely high. A final remark to end this discussion is that this study has been an exploratory study, which needs more research in order to validate the conclusions.

6.3 Recommendations

Several recommendations can be made based on this study. The first section of this paragraph focuses on those recommendations that are directly related to the content of this study, whereas the second part of this paragraph focuses on recommendations that can be made

related to carrying out a survey in general and carrying out a survey in South Africa in particular (see appendix D for more information).

Several recommendations need to be made regarding this study. Firstly, the business atmosphere in South Africa requires additional research. This study indicates that the business atmosphere in South Africa has an impact on business networks and it explores the South African business atmosphere. However, the South African business atmosphere needs to be mapped more comprehensively in order to find additional and more detailed explanations for the relatively small amount of innovative partnerships between South African innovating firms. Secondly, the lack of resources that is suggested by this research requires additional research. Is there a difference in the skills of South African employees and employees of other countries? A comparison between South African and Dutch employees in terms of education has been made. A comparison of the skills of South African employees with skills of the employees of other nations or regions could provide interesting insights. Comparisons that may be interesting include comparisons between South Africa and other South African countries, e.g. Botswana, Mozambique and Namibia. Such a study would put the situation in South Africa in perspective. Furthermore, a comparison with rapidly growing economies like China and India could be interesting because such a comparison could identify certain factors within South Africa that inhibit innovative performance or influence business networks. Thirdly, an in depth study of the effect of affirmative action, especially black empowerment, on South African business networks is likely to find some interesting results. Finally, a study that researches whether foreign firms initiate innovative partnerships with South African firms or whether South African innovating firms initiate innovative partnerships with foreign firms is recommended. It would provide the answer to the question whether South African innovating firms have a large number of innovative partnerships with foreign firms because South African firms prefer having innovative partnerships with foreign firms or whether foreign firms prefer having innovative partnerships with South African firms.

Furthermore, carrying out a survey in South Africa was found to be quite difficult. However, if some precautions are taken into account it should be possible to attain a good response rate. The first recommendation is that the database, used for creating the sample, should be a good database. This means that as many firms as possible should be in it with as much information as possible. A good affordable database is definitely a problem in South Africa. The database used for this study, the Brabys database, contains a lot of faulty information and it is difficult to use the database, due to restrictions implemented on the Brabys CD. Secondly, it is imperative to restrict the number of questions and the range of topics to an absolute minimum. This does not only apply to surveys in South Africa, but it is essential to the success of any survey. Furthermore, the survey will be facilitated immensely if contact persons of the firms in the sample are available. Of course, these contact persons have to be the persons that can fill in the questionnaire without problems. The last recommendation regarding surveys in South Africa is that the survey should be carried out using a phone. This was efficient in the Netherlands and would probably have been efficient in South Africa. This strategy is also important in assuring that respondents who were willing, at the time of the call, to respond will do so immediately. Either people want to cooperate and answer the questions or they simply refuse to cooperate. Conducting a survey through the phone will require less time and it lead to a higher response rate than the method used by this study in South Africa.

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Appendices

Appendix A: Affirmative action in South Africa

The intention of this appendix is to provide an overview of the content of the affirmative action programme and the costs and benefits involved. The South African affirmative action programme is enforced by the "Employment Equity Act" of 1998 (Department of Labour, 1998). It is not only black empowerment that is part of this act, but also women empowerment and empowerment for disabled people. The basic idea is to give the previously disadvantaged people a better chance to get a certain occupation, for which they have to be qualified in terms of education and experience, than the previously advantaged people (typically white males). For example, if a black woman and a white man apply for a certain job and they have the same qualifications; affirmative action requires the employer to give the black woman the position. Employers with more than 50 employees or an annual turnover of more than R4.000.000 (currently about 550.000 Euro) (Msimang, 2001) had to develop an affirmative action plan within six months after the act came to effect in 1999 (Department of Labour South Africa, 1998; Msimang, 2001). This plan had to be reasonable for the firm to implement. Although the South African population contains 77% black people, this does not mean that all firms had to have 77% black employees in half a year. This depends on how many black, female or disabled workers are qualified to have a certain job and how many positions are available in a certain firm. Firms are not required to fire white male workers only to be replaced by black, female and/or disabled workers. Every year (or two years, depending on the firm size) a new "reasonable" affirmative action plan has to be developed by every designated firm. If a firm does not comply to the targets it set itself, the firm can be warned or fined by the government. South Africa has an affirmative action program that is active now for about five years. Other nations, like the United States and Malaysia have more experience with affirmative action and it is interesting to have a look at the amount of success of these nations with their affirmative action programs.

Affirmative action in the US and Malaysia

The United States passed their first affirmative action law in 1964 (Jafta, 1998) and it is still active in the US. Although the female share in the labour force grew from 27% in 1960 to 36% in 1990 and average female earnings compared to men increased from 61% to 72%, the black social conditions had deteriorated heavily. In 1950, 9% of black families were headed by a single parent; in 1990 this was 28%. Furthermore, in 1959 15% of black births were illegitimate and in 1992 62%. The affirmative action programme of the US is therefore not even close to a big success. However, it is difficult to compare the US situation to the South Africa situation because most of the disadvantaged people in the US are part of minority groups, whereas in South Africa most of the disadvantaged people are part of majority groups (black people, women).

Malaysia also has experience with affirmative action and this country has been moderately successful (Jafta, 1998). Affirmative action was aimed at reducing the inequalities between the poor Malay majority and the relatively rich Chinese minority. Affirmative action has been in force in Malaysia since 1969. Poverty decreased from 49% of the population in 1969 to 19% in 1987. However, in 1998 Malays were still not proportionally represented in management positions and the professions. Moreover, they still find themselves overrepresented in the less productive parts of the economy. Still, the affirmative action policies in Malaysia can be considered moderately successful.

Reflecting the results of these countries upon South Africa is partly useless, because the settings in these countries are different. On the other hand, it has proven to be difficult in both countries to achieve what their objectives were. Hardly any of the targets were met

completely and both countries used affirmative action for more than 30 years already. Therefore, South Africa will encounter difficulties which have to be addressed before affirmative action can become a big success. Based on the experiences of the USA and Malaysia, this will prove to be very difficult.

Costs of affirmative action

Implementing and developing affirmative action policies results in costs, some financial and some non-financial. These costs can be divided into (Jafta, 1998):

- Direct costs: according to Tito Mboweni (Governor of the South African Reserve Bank), administering the "Employment Equity Act" would cost about 28 million Rands (approximately 3,7 million Euro).

- Indirect costs: these costs involve no direct cash flows, but are costs built up out of delays in hiring and recruiting that are caused by affirmative action regulations in those firms that have a affirmative action target to meet. According to Jafta (1998) these are real problems in, for example, the South African construction sector. In the US, these costs in 1991 were estimated at 96 billion US dollars. In South Africa, these costs are not yet estimated. Furthermore, affirmative action interferes with the market mechanism and this also results in indirect costs.

- Opportunity costs: according to Jafta (1998) the opportunity costs constitute the biggest proportion in the total costs of affirmative action. In the US in 1991 the estimate was about 236 billion US dollar. According to Jafta, *"the opportunity cost of a particular choice is the value of the best alternative foregone"*. In reality the opportunity costs of affirmative action arise from "bad hiring decisions under government coercion, negative effects on morale and the misallocation of financial resources" (Jafta, 1998). Jafta brings up a very interesting point by asking: *"What results might have been achieved if these resources had been invested in efficient education, essential infrastructure or other efforts to empower the truly disadvantaged – those outside the economic mainstream?"*

Appendix B: Website of the questionnaire

In chapter 3, the method of research, it is stated that the survey in South Africa was mainly done via the internet. Thus, a site had to be created and put on a server. This appendix describes the functioning of that website and shows several screenshot of that website.

When the firms of the first sample were contacted for the first time via phone and the contact person indicated he/she wanted to fill in the questionnaire, he/she received an e-mail with the link to the website.

The website is placed on my own domain, which is http://www.royclerx.com. The chosen URL for the questionnaire was http://www.bnis.royclerx.com. BNIS is the abbreviation of Business Networks and Innovation Survey. The site was built with Macromedia Dreamweaver MX and is mainly written in the HyperText Markup Language (HTML). The data, filled in by the respondent, is saved in a MySQL database on the server of the website and PHP is used to save this data. I already had experience with PHP because of the creation of my own website (http://www.royclerx.com). The creation of the website and the database took about two weeks. Of course, everything had to be tested and debugged and this is also included in those two weeks.

The design of the site is chosen to be as simple and clear as possible with a grey background and black text. In figure 6 the welcome page of the site is displayed.
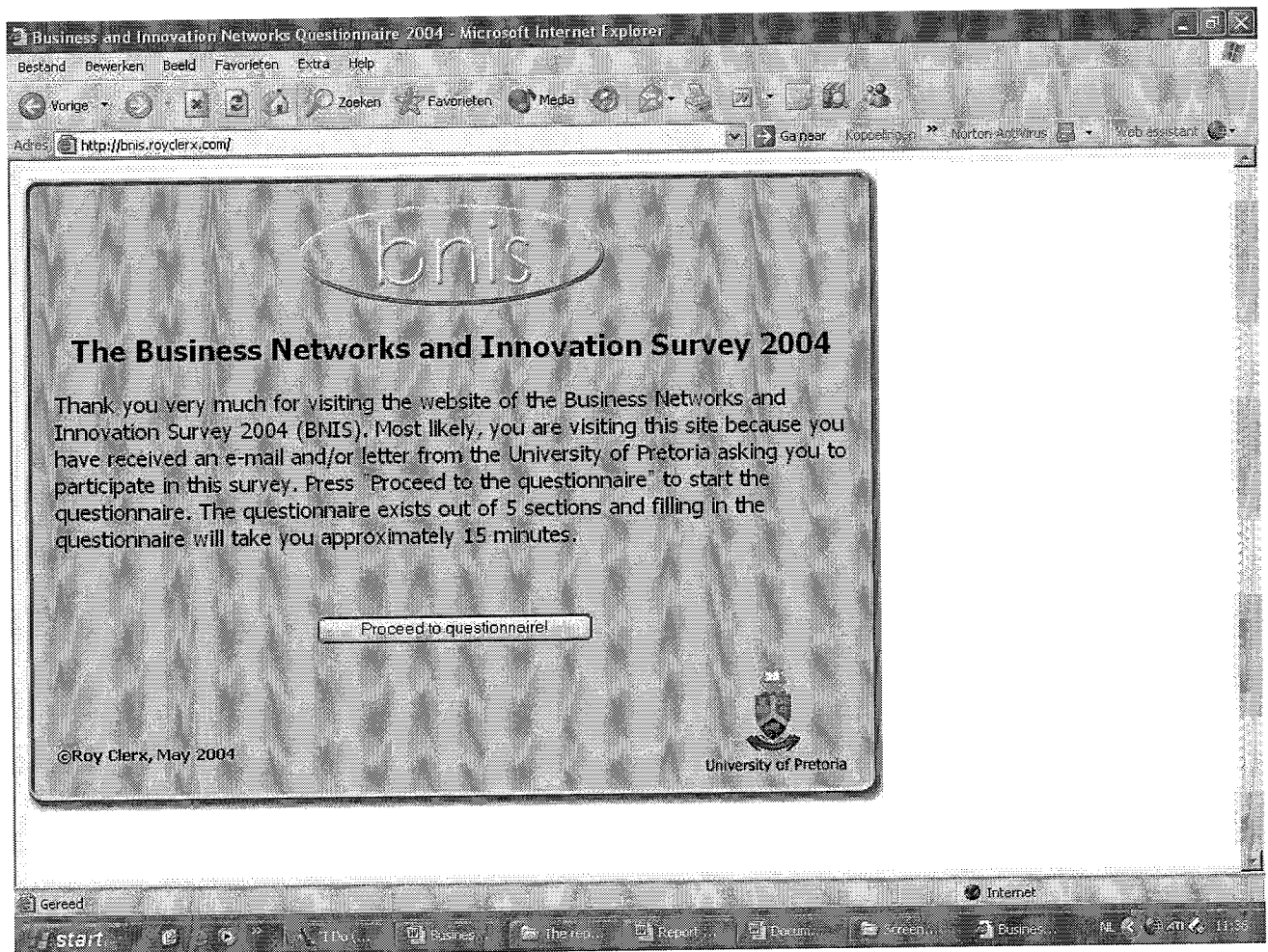

Figure 6: Screenshot of the welcome page of the internet questionnaire

Functioning of the website

After the respondent opens the website, he/she will see the page displayed in figure 6. After pressing the button "Proceed to questionnaire" the section "General information" will be shown (see figure 8). The internet questionnaire is divided into 10 web pages:

1. Welcome page (see figure 6)
2. Page with the "General information" section (see figure 8)
3. Page with section 1: "Information about your firm's R&D efforts" (see figure 9)
4. Page with section 2: "Innovative performance of your firm"
5. Page with section 3a + 3b: "Network of your firm"
6. Page with section 3c: "Close cooperation with firms"
7. Page with section 3d: "Business network of your firm"
8. Page with section 4: "Innovative capacity of your firm"
9. Page with section 5: "Business atmosphere in South Africa"
10. "Thank you" page (see figure 10)

These pages will be opened sequentially. Every time a respondent presses the "Proceed to..." button, the data filled in by the respondent will be saved in the database and the next section will be loaded into the square box in the centre of the screen (see figure 7). If a respondent found out that he/she filled in something incorrectly, he/she could press "back" in their internet browser and fill it in again. This would result in a double entry in the database, but this doesn't matter because every time data is saved a time stamp and date stamp are also saved. The most recent entry in the database is considered the valid entry and the rest is discarded. This information is also available to the respondent by looking in the FAQ (Frequently Asked Questions) (see figure 7).

The questions displayed in the internet questionnaire are exactly the same questions as in the South African questionnaire in appendix C.
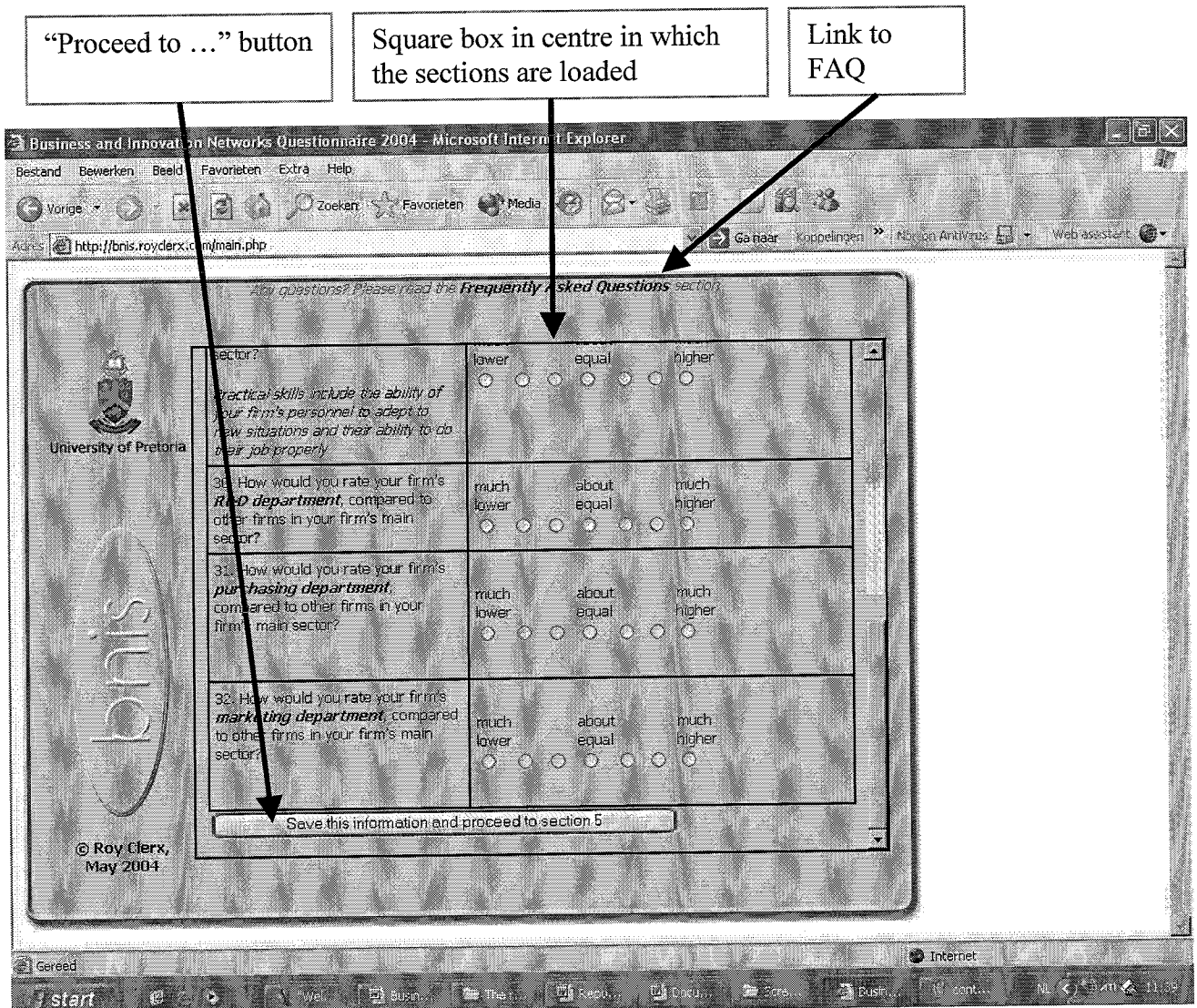
Figure 7: Screenshot of website with proceed button

Screenshots of the website

In this section more screenshots of the website can be found. This gives a good impression of how the internet questionnaire looks like.
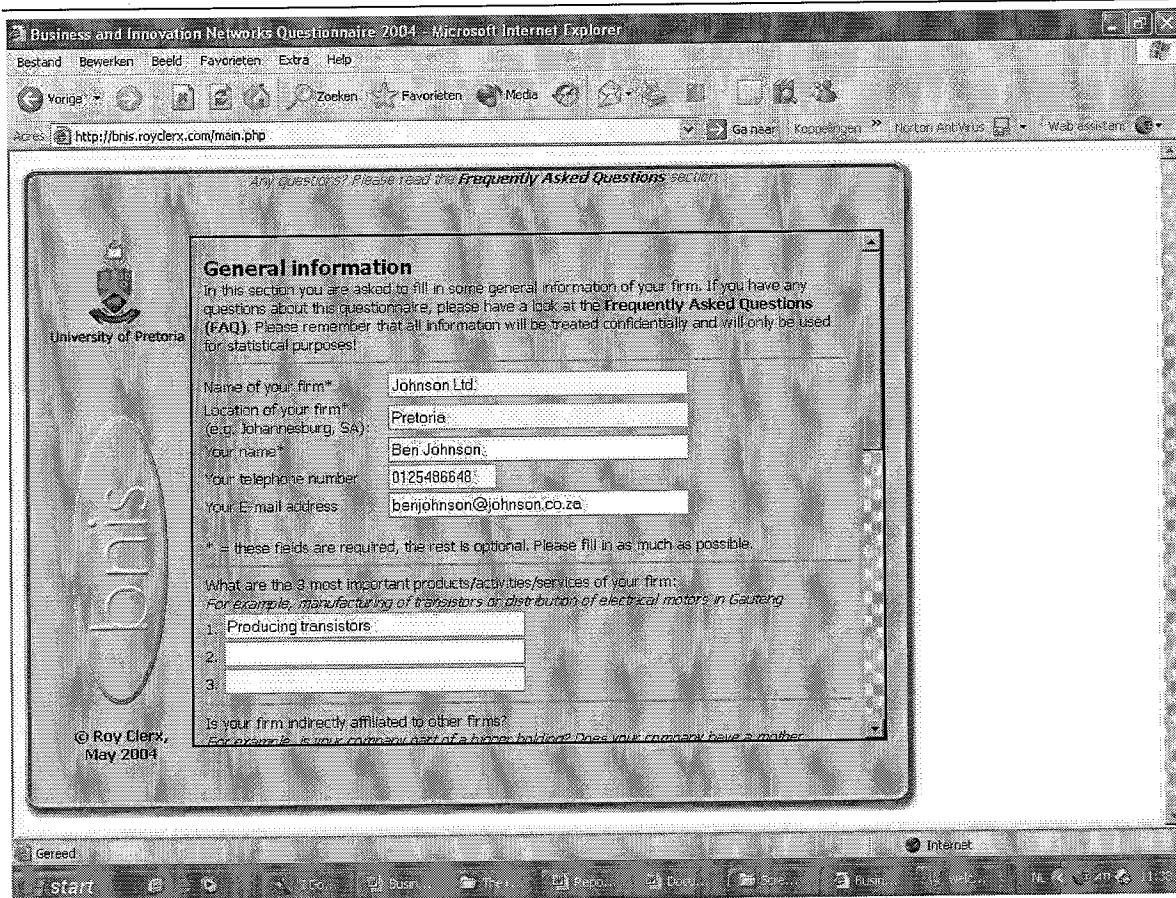
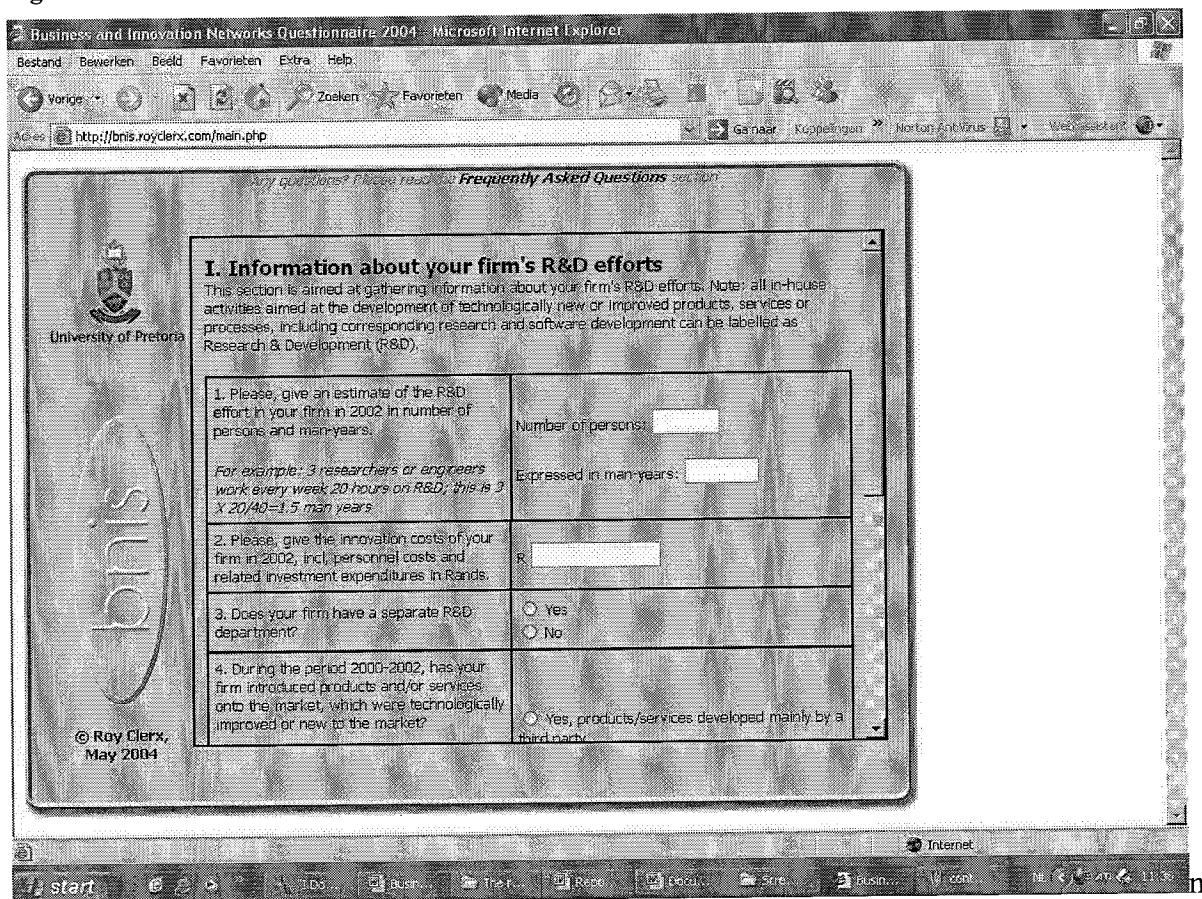**Figure 8: Screenshot of "General Information" section**

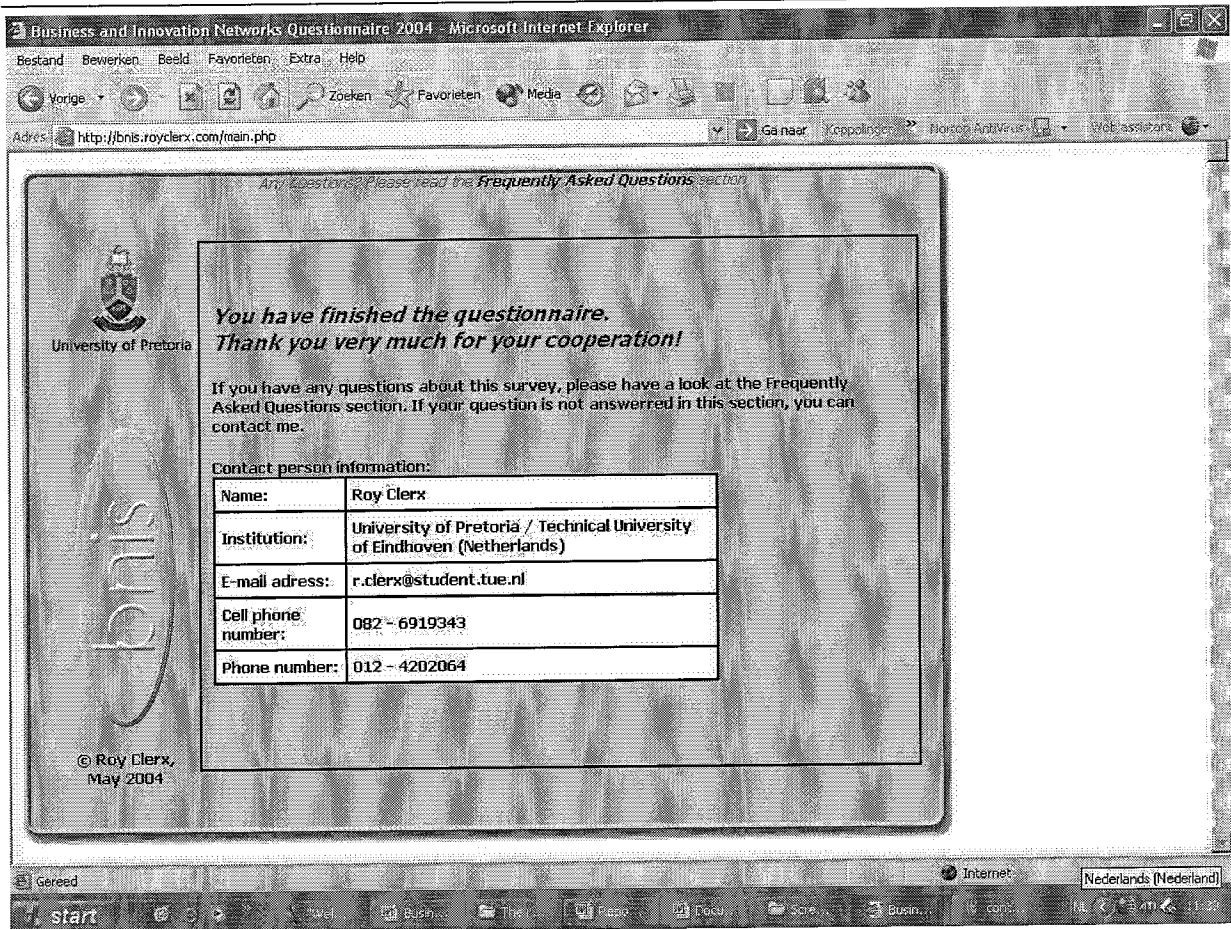**Figure 9: Screenshot of section 1 "Information about your firm's R&D efforts"**

Figure 10: Screenshot of the "Thank you" page

Appendix C: Questionnaire South Africa

In this appendix the questionnaire used in South Africa can be found. These are the same questions that are used on the website and this questionnaire has also been sent by e-mail and fax to several firms. In order to facilitate answering the questions via e-mail, the version sent via e-mail is slightly adjusted. On the next page the introduction letter can be found. The 8 pages after that contain the full questionnaire. In the rows on the right of the tables, the indicators can be found that are used in this report. These indicators are displayed in bold font.

A survey on business networks and innovation in South Africa

My name is Roy Clerx. I am a Dutch student who is doing a Master thesis research in South Africa at the University of Pretoria (department of Engineering and Technology Management).

I would appreciate it very much if you would participate in this research. The 43 questions, divided in 5 sections, are very easy to answer and filling in the questionnaire won't take more than 15 minutes. Of course I will treat your answers with great care, and you and your firm will be treated anonymously. Please be assured that all the obtained information will be handled with the strictest confidentiality.

My study's objective is researching the relation between innovation and the structure of networks of firms. The motive for this study lies in a finding of the first South African Innovation Survey (http://www.sais2001.up.ac.za). It appears that most South African innovation measures are comparable to those in developed European countries, despite of a relatively low financial input in R&D. Not all of the causes and consequences of this phenomenon are known. In this study I want to get to know more about the relation between innovation and business networks, because it is likely that business networks are a key to explaining this paradox.

Your cooperation in this survey is highly appreciated!

Kind regards,

Roy Clerx (University of Eindhoven)

Supervisors of the project:

Dr. G. Rooks (University of Eindhoven)
Prof. Dr. L.A.G. Oerlemans (University of Tilburg)
Prof. Dr. M.W. Pretorius (University of Pretoria)

Contact person:
Roy Clerx
R.Clerx@student.tue.nl
Phone number: 012 - 4202064
Cell phone number: 082 - 6919343

A. Contact information _Please answer where appropriate_

Name of your firm:

firmname

Location of your firm (e.g. Johannesburg, SA)

firmlocation

Your name:

yourname

Your telephone number:

telnr

Your E-mail address:

email

B. Most important products/activities/services of your firm _Please answer where appropriate_

1. **act1**

2. **act2**

3. **act3**

C. General information _Please, tick where appropriate_

Is your firm indirectly affiliated to other firms?

○ Yes
○ No   **affiliated**

For example, is your company part of a bigger holding? Does your company have a mother company?

Is your firm's head office located in South Africa

○ Yes
○ No   **headoffice**

Number of employees currently in your firm

employees

Percentage of highly educated personnel in your firm:

educated ......%

A highly educated employee is an employee with at least 3 years post high school education

Total sales of your firm in 2002

R **sales**

Total net profit after taxes of your firm in 2002

R **profit**

Exports as a % of total sales of your firm in 2002

export ......%

D. Type of firm _Please, tick only one answer_

Your firm is:

When answering this question, use the activity in which the highest percentage of sales is realised as the criterion

○ A manufacturing firm

typefirm

○ A service firm

I. Information about your firm's R&D efforts	*Please, tick or answer where appropriate*

Note: all in-house activities aimed at the development of technologically new or improved products, services or processes, including corresponding research and software development can be labelled as Research & Development (R&D)

1. Please, give an estimate of the R&D effort in your firm in 2002 in number of persons and man-years.

Number of persons:　**persons**

....

For example: 3 researchers or engineers work every week 20 hours on R&D: this is 3 X 20/40=1.5 man years

Expressed in man-years:　**manyears**

....

2. Please, give the innovation costs of your firm in 2002, incl. personel costs and related investment expenditures

inncosts

R..

....

3. Does your firm have a separate R&D department?

O Yes　**sepRandD**

O No

4. During the period 2000-2002, has your firm introduced products and/or services onto the market, which were technologically improved or new to the market?

O Yes, products/services developed mainly by a third party

O Yes, products/services developed together with third party

O Yes, products/services developed mainly by my own firm

Improved: an existing product/service which has clearly improved technical specifications or an increased usability, compared to previous versions

O No　**newproducts**

New: a product/service incomparable with previous products or services of your firm and in which new technology is embodied

5. During the period 2000-2002, did your firm bring new production processes into use, which were technologically improved or new to your firm?

O Yes, processes developed mainly by a third party

O Yes, processes developed together with third party

O Yes, processes developed mainly by my own firm

O No

Improved: existing production processes, but with clearly higher performance, less costs or improved production reliability

newprocesses

New: a process incomparable with previous processes of your firm and in which new technology is embodied

II. Innovative performance of your firm	*Please, tick or answer where appropriate*

In this section, several questions will be asked about the innovative performance of your firm. This will mainly be researched by determining the number of innovative projects your firm has been involved in, is involved in and will be involved in.

6. Please indicate the number of innovative projects * that were started in the period 2001-2002?

Number of projects:　**projects**

......

....

* = Projects aimed at realising technologically new or strongly improved products, services and/or processes

7. Please, indicate the number of innovation projects that were succesfully completed in the period 2000-2002?

Number of projects:　**succesfulproj**

......

....

8.	If any innovative projects have failed during the period 2000-2002, what were the reasons for these failures?	*Multiple answers are possible!*
		costbenefit8 ○ Cost-benefit analyses presented too many doubts
		qualpersonnel8 ○ Lack of qualified personnel
		information8 ○ Lack of information/familiarity with technologies
		costs8 ○ Estimated costs too high/exceeding initial budget
		lacksources8 ○ Lack of appropriate external financial sources
		introduction8 ○ Could not meet required market introduction time
		cooperation8 ◉ Cooperation with partners not proceeding smoothly
		uncertainties8 ○ Too many uncertainties on (future) product markets
		regulations8 ○ Restrictive public or other government regulations
		rigidities8 ◉ Internal organisational rigidities hampered innovation
		○ other reason(s), namely:
		other8 ....
9.	Please, indicate the number of innovative projects that your firm is working on at this moment.	**projectsnow** Number of projects: ....
10.	Please, indicate the number of innovative projects that your firm planning to start?	**projectsplanning** Number of projects: ....
11.	Please, indicate the number of new products that your firm introduced into the market in the period 2000-2002?	**productsintroduced** Number of products: ....
12.	Please, indicate the number of products is your firm planning to introduce to the market?	**productsplanning** Number of products: ....
13.	How does your firm's innovative performance compare with other similar firms in your industry/sector?	**innperformance** much lower about equal much higher 1 2 3 4 5 6 7 ○ ○ ○ ○ ○ ○ ○

III Network of your firm

Relations between firms and networks of relations between firms can be important factors in business life. In this section questions will be asked about:
- *the number of firms you know (section **IIIa**)*
- *the number of firms your firm has done business with (section **IIIb**) and*
- *the number of firms your firm has cooperated with (for example, in an innovative partnership or strategic alliance) (section **IIIc**)*
- *the business network of your firm (section **IIId**)*

In all three of these sections, your answers will be split up in the following categories:
- *Inside/outside your firm's main sector*
- *Number of competitors/buyers/suppliers*

IMPORTANT: please do not put a firm in multiple categories. If you have a close cooperation with a firm and this firm is also a buyer/supplier/competitor, then put this firm in the category "close cooperation" (section IIIc), not in the category "doing business with" (section IIIb).

IIIa Firms you know

*Please give an **estimate** of the numbers asked in the following questions.*

14. Please indicate the number of firms that you *know*.

"Knows" means firms that are known to you but with which your firm has no business transactions, for example potential buyers, potential suppliers and competitors. Please do not include firms with which your firm has some sort of a close cooperations.

firmsknow

Number of firms:

<5	10	20	40	75	100	>100
O	O	O	O	O	O	O

15. Please, for the above mentioned firms, indicate the percentage of firms that are active in one of your firm's sectors.

percknowinsec ....%

16. Please indicate what number of firms, mentioned in question 14 are competitors.

compknow

Number of competitors:

<5	10	20	40	75	100	>100
O	O	O	O	O	O	O

IIIb Doing business with firms

*Please give an **estimate** of the numbers asked in the following questions.*

17. Please, indicate the number of firms your firm does business with.

To do "business with" a firm encompasses buying/selling including licensing and subcontracting. Please do not include firms with which your firm has some sort of a close cooperation. Information about these firms will be asked to you in section IIIc and IIId

firmsbuss

Number of firms:

0	4	10	25	50	75	>75
O	O	O	O	O	O	O

18. Please, for the above mentioned firms, indicate the percentage of firms that belong to your firms sector.

percbussinsec .....% of the number of firms, mentioned above, can be classified as being an actor in my own firm's sectors.

19. Please indicate what number of firms, mentioned in question 17 are competitors, buyers and suppliers.

compbuss

Number of competitors:

0	4	10	25	50	75	>75
O	O	O	O	O	O	O

buybuss

Number of buyers:

0	4	10	25	50	75	>75
O	O	O	O	O	O	O

suppbuss

Number of suppliers:

0	4	10	25	50	75	>75
O	O	O	O	O	O	O

IIIc Close cooperation with firms

*Please give an **estimate** of the numbers asked in the following questions.*

20. Has your firm cooperated closely with other firms during the last 3 years.

closecoop

O Yes, please go to question 21
O No, please go to question 26

21. Please indicate the number of firms that your firm closely cooperates with.

firmscoop

Number of firms:

0	2	4	7	13	20	>20
O	O	O	O	O	O	O

=A close cooperation is for example an innovative partnership or a strategic alliance

22. Please, for the above mentioned firms, indicate the percentage of firms that belong to your firms sector.

perccoop.......% of the number of firms, mentioned above, can be classified as being an actor in my own firm's sectors.

23. *Please indicate what number of firms, mentioned in question 21 are competitors, buyers and suppliers.*

compcoop

Number of competitors:

0	2	4	7	13	20	>20
O	O	O	O	O	O	O

buycoop

Number of buyers:

0	2	4	7	13	20	>20
O	O	O	O	O	O	O

suppcoop

Number of suppliers:

0	2	4	7	13	20	>20
O	O	O	O	O	O	O

24. Please list the 5 most important firms your firm has close cooperations with right now.

If your firm has less close cooperations than 5, please list these.

1. ....**firm1**..

2. ....**firm2**..

3. ....**firm3**..

4. ....**firm4**..

5. ....**firm5**..

IIId Business network of your firm   *Please, answer where appropriate*

Some information about the business network of your firm will be collected in this section.

25. Please indicate how often your firm has contact with the firms mentioned in question 24.

	every day	weekly	monthly	yearly
		firm1cont		
Partner 1:	O	O	O	O
		firm2cont		
Partner 2:	O	O	O	O
		firm3cont		
Partner 3:	O	O	O	O
		firm4cont		
Partner 4:	O	O	O	O
		firm5cont		
Partner 5:	O	O	O	O

26. Please indicate what kind of relationship the 5 firms, mentioned in question 24 have with each other. In each cell, please write down one of these characters:
- **S** = strong relationship between firms (lot of intensive contact)
- **M** = medium relationship between firms (average amount and intensity of contact)
- **W** = weak relationship between firms (some non-intensive contact)
- **N** = no relationship between firms
- **U** = relationship between firms is unknown to you

This question is aimed at researching the network around your firm.

Please fill in a S, M, W, N or U in each available cell.

	P2	P3	P4	P5
P1	firm1firm2	firm1firm3	firm1firm4	firm1firm5
P2		firm2firm3	firm2firm4	firm2firm5
P3			firm3firm4	firm3firm5
P4				firm4firm5
P5				

Example:

	P2	P3	P4	P5
P1	S	W	U	M
P2		N	S	M
P3			N	S
P4				W
P5				

IV Innovative capacity of your firm   *Please, tick or answer where appropriate*

In this section the innovative capacity of your firm will be researched. You will be asked to give your opinion about the skills and performance of several departments of your firm, compared to the performance of other firms in your sector.

27. Is your firm a leader, follower or imitator on your firm's main market?

marketpos

O *leader*: my firm has the highest market share in this market and is usually first with introducing new/improved products to the market

O *follower*: my firm has a substantial market share in this market and is sometimes first with introducing new/improved products to the market

O *imitator*: my firm has a relatively small market share and usually does not introduce new/improved products to the market

O my firm is active in a *niche* market and the concepts of leader/follower/imitator are not applicable

O *other*, namely

other2
....
....

28. What is the level of *education* of your firm's personnel in comparison to other firms in your firm's main sector?

leveducation

much lower		about equal		much higher		
1	2	3	4	5	6	7
O	O	O	O	O	O	O

29. How do you consider the *practical skills* of your firm's personnel to be in comparison to other firms in your firm's main sector?

levpractical

much lower		about equal		much higher		
1	2	3	4	5	6	7
O	O	O	O	O	O	O

Practical skills include the ability of your firm's personnel to adept to new situations and their ability to do their job properly.

30. How would you rate your firm's *R&D* department, compared to other firms in your firm's main sector?

levRandD

much lower		about equal		much higher		
1	2	3	4	5	6	7
O	O	O	O	O	O	O

31. How would you rate your firm's *purchasing* department, compared to other firms in your firm's main sector?

levpurchasing

much lower		about equal		much higher		
1	2	3	4	5	6	7
O	O	O	O	O	O	O

32. How would you rate your firm's *marketing* department, compared to other firms in your firm's main sector?

levmarketing

much lower		about equal		much higher		
1	2	3	4	5	6	7
O	O	O	O	O	O	O

V Business atmosphere in South Africa   *Please, tick or answer where appropriate*

In this section, the business atmosphere in South Africa will be researched. The 'business atmosphere' entails things like the degree in which firms trust each other, the attitude of South African firms towards each other and the degree of cooperation between each other. In the following questions you will be asked to what extent you agree with a certain statement.

33. Firms in South Africa are trustful

trustful

Not at all	sometimes	most of the time	always
O	O	◎	O

34. Firms in South Africa are trustworthy

reliable

Not at all	sometimes	most of the time	always
O	O	O	O

35. Firms in South Africa can compete with the best in the world

world

Not at all	sometimes	most of the time	always
O	O	O	O

36. Firms in South Africa offer my firm the resources we need	**resources**			
	Not at all	sometimes	most of the time	always
	○	○	○	○

37. Firms in South Africa are flexible	**flexible**			
	Not at all	some	most of them	always
	○	○	○	○

38. Firms in South Africa are bureaucratic	**bureaucratic**			
	Not at all	some	most of them	always
	○	○	○	○

39. Firms in South Africa should work together with Southern African firms from e.g. South Africa, Botswana, Namibia, Mocambique, etc. instead of European and American firms	**worktogether**			
	Not at all	sometimes	most of the time	always
	○	○	○	○

40. Partnerships with South African firms are usually efficient and effective.	**partdomestic**			
	Not at all	sometimes	most of the time	always
	○	○	○	○

41. Partnerships with foreign firms are usually efficient and effective.	**partforeign**			
	Not at all	sometimes	most of the time	always
	○	○	○	○

42. The government is doing well in supporting my firm's industries.	**government**			
	Not at all	sometimes	most of the time	always
	○	○	○	○

Additional remarks/your opinion about this survey   *Please, answer where appropriate*

43. Do you have any remarks?   **comment**

If you have any remarks, please write them down here.

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Thank you very much for participating in this survey!

Appendix D: Surveys in South Africa

This appendix discusses the problems encountered while doing the survey in South Africa which can be classified as typically South African, general problems with surveying that were encountered and problems with the questionnaire.

General problems:
- Too much questions, questionnaire is too long (8 pages), takes too much time to fill it in
- No reward for the respondents at all.
- Respondents do not have time.
- It is very difficult to get the right person to fill in the questionnaire. This is directly related to the wide range of topics that has been addressed by the questionnaire. This range can be considered too wide and should have been much more narrow.
- Students are less likely to receive a proper response than a professor or an employee of an institute well-known (inter)nationally.
- Some contact persons who try to answer the questionnaire only work in the firm for a month and can answer hardly any questions.

South Africa specific problems:
- There is no proper database of firms available in South Africa for a decent price. Around 50% of the firms in the Brabys database do not exist anymore, have moved or have an incorrect phone number. Furthermore, by using this database it is very difficult to distinguish sectors, you cannot look at the firm size and you have very little accurate information at all.
- Contacting firms by e-mail seems to be useless, unless the firm has been contacted by phone first.
- It is very difficult to get an appointment with anybody which is likely to be linked to the fact that there is no reward involved for the firm and due to the fact that I'm a student. However, it is difficult to say whether this is South Africa specific.

Problems in my questionnaire
- In bigger firms (100+ employees) it is very hard to get to speak to the correct person. My questionnaire covered too many topics in too many areas. It is very difficult for anybody in a big firm to fill in the whole questionnaire, without asking a lot of other people. This is also a big barrier for them to fill in everything.
- There were too many questions in the South African questionnaire. In total there were 8 pages and 43 real questions + some extra questions called "general information" which were not numbered. This discouraged several people, although it would only take around 15 – 20 minutes to fill it in properly, if all the information available was available to the respondent, which was usually not the case.

General remarks:
- The first method (first calling, filling in on the Internet) appeared to be working better than the second method (first calling and then giving the choice to fill it in via e-mail, internet or fax). Although the first method was not very successful, the second one was even less successful.
- It is not very stimulating for the interviewer to call hundreds of firms and have very little response in the end. It is much more motivating to do that with two persons or more. This makes the important work of calling firms, which is not the most interesting part to do,

much more interesting because calling firms with more persons enables talking about it, comparing results, etc.

- If it is possible, try to approach firms when you have a contact name. Preferably tell this contact that this number has been acquainted through a person that both the caller as well as the respondent know. This will motivate the respondent to answer the questions more carefully and will allow the caller to take more time for the phone call.

Appendix E: Questionnaire Netherlands

In this chapter the Dutch questionnaire can be found. In the first square box, the questionnaire will be displayed in Dutch. In the next square box, the questionnaire will be displayed in English. Of course, this questionnaire is done in Dutch in the Netherlands.

The Dutch version:

U spreekt met Roy Clerx van de Technische Universiteit Eindhoven. Ik ben namens de universiteit bezig met een onderzoek naar de relatie tussen bedrijfsnetwerken en innovatie en zou u daar graag een paar vragen over willen stellen. Ook zou ik graag een paar vragen willen stellen over de bedrijfscultuur in Nederland. Alle informatie die u mij geeft zal vertrouwelijk behandeld worden en alleen gebruikt worden voor statistische doeleinden.
In totaal zal dit gesprek ongeveer 6 minuten duren en ik zal u 20 korte vragen stellen, waarvan de meeste meerkeuzevragen zijn. Heeft u even tijd om mijn vragen te beantwoorden?

De eerste 8 vragen gaan over de bedrijfscultuur in Nederland. U kunt deze vragen simpelweg beantwoorden met nooit, soms, meestal of altijd.
1. Beschouwt u Nederlandse bedrijven als betrouwbaar?
2. Denkt u dat Nederlandse bedrijven kunnen concurreren met de besten in de wereld?
3. Denkt u dat Nederland uw bedrijf alle hulpbronnen bied die u nodig heeft (bv kapitaal, arbeidskrachten, kennis)?
4. Denkt u dat Nederlandse bedrijven zoveel mogelijk zaken moeten doen met bedrijven uit de EU in plaats van met bedrijven daarbuiten?
5. Denkt u dat samenwerkingsverbanden met Nederlandse bedrijven een goed resultaat hebben?
6. Vindt u dat samenwerkingsverbanden met buitenlandse bedrijven normaalgesproken een goed resultaat hebben?
7. Beschouwt u Nederlandse bedrijven als bureaucratisch?
8. Denkt u dat de overheid goed bezig is met het ondersteunen van de sectoren waarin uw bedrijf actief is?

Bij de volgende 5 vragen kunt u antwoorden op een schaal van 1 tot 7, waarbij 1 veel lager betekent, 4 gelijkwaardig en 7 veel hoger.
9. Op een schaal van 1 tot 7, hoe goed schat u de innovatieve prestatie van uw bedrijf in in vergelijking met concurrenten?
10. Op een schaal van 1 tot 7, hoe goed schat u het opleidingsniveau van uw bedrijf in in vergelijking met concurrenten?
11. Op een schaal van 1 tot 7, hoe goed schat u de praktische vaardigheden van uw bedrijf in in vergelijking met concurrenten?
12. Op een schaal van 1 tot 7, hoe goed schat u de inkoopafdeling van uw bedrijf in in vergelijking met concurrenten?
13. Op een schaal van 1 tot 7, hoe goed schat u de marketing afdeling van uw bedrijf in in vergelijking met concurrenten?

Bij de volgende 4 vragen vraag ik alleen maar schattingen van de aantallen en bedragen want het is misschien moeilijk om een exact antwoord te geven. Toch zou ik u willen vragen om een zo nauwkeurig mogelijk antwoord te geven.

14. Welk bedrag heeft uw bedrijf ongeveer aan R&D besteedt in 2002?

15. Hoeveel nieuwe producten of nieuwe diensten heeft uw bedrijf tussen 2000 en 2002 op de markt gezet?
16. Met hoeveel bedrijven of instanties doet uw bedrijf momenteel zaken?
17. Met hoeveel bedrijven of instanties werkt uw bedrijf momenteel nauw samen?

De laatste 3 vragen zijn:
18. Wat is uw naam?
19. Hoeveel werknemers heeft uw bedrijf
20. Is het hoofdkantoor van uw bedrijf in Nederland gevestigd?

Dat was het! Heel erg bedankt voor uw medewerking!

Dag!

The English version including the indicators, also used in the South African questionnaire, in a bold font:

You are speaking to Roy Clerx from the Eindhoven University of Technology. In name of the university I am researching the relation between business networks and innovation and I would like to ask you a couple of questions concerning these topics. Furthermore, I would like to ask a few questions about the business atmosphere in the Netherlands. All information you provide me with will be treated confidentially and will only be used for statistical purposes. In total, this questionnaire will take about 6 minutes to answer and the total number of questions is 20, of which most are multiple choice questions. Do you have time to answer my questions?

The first 8 questions deal with the business atmosphere in the Netherlands. You can answer these questions with never, sometimes, most of the time and always.
1. Do you consider Dutch firms to be trustworthy? **reliable**
2. Do you think Dutch firms can compete with the best of the world? **world**
3. Do you think the Netherlands offers your firms all resources your firm needs (capital, labour, knowledge) **resources**
4. Do you think Dutch firms should do as much business as possible with firms from the European Union instead of with firms outside the EU? **worktogether**
5. Do you think collaborations with Dutch firms are effective and efficient? **partdomestic**
6. Do you think collaborations with foreign firms are effective and efficient? **partforeign**
7. Do you consider Dutch firms to be bureaucratic? **bureaucratic**
8. Do you think the governments (both European and Dutch) are doing a good job in supporting you firms industries? **government**

You can answer the next 5 questions on a scale of 1 to 7, where 1 is much lower, 4 about equal and 7 much higher.
9. On a scale of 1 to 7, how good do you assess the innovative performance of your firm in comparison to the competition? **innperformance**
10. On a scale of 1 to 7, how good do you assess the level of education of your firm in comparison to the competition? **leveducation**
11. On a scale of 1 to 7, how good do you assess the practical skills of your firm in comparison to the competition? **levpractical**
12. On a scale of 1 to 7, how good do you assess the purchasing department of your firm in comparison to the competition? **levpurchasing**

13. On a scale of 1 to 7, how good do you assess the marketing department of your firm in comparison to the competition? **levmarketing**

In the following 4 questions I only ask for estimates of the numbers and amounts asked, because it maybe difficult to give an exact answer. I would like to ask you anyway to give me an answer as exact as possible.

14. What amount of money did your firm spent on R&D in 2002? **inncosts**
15. How many new products or services did your firm launch on the market between 2000 and 2002? **newproducts**
16. How many firms does your firm currently do business with? **firmsbuss**
17. How many firms does your firm currently closely cooperate with? **firmscoop**

The last 3 questions are:
18. What is your name? **yourname**
19. How many employees does your company have? **employees**
20. Is the head office of your firm located in the Netherlands? **headoffice**

That was the whole questionnaire. Thank you very much for your cooperation!

Bye!