

**University Relationships:
A Social Capital Perspective**

By:

Khalid Al Suleimani

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Supervisor

Dr. Miren Larrea Aranguren

Ph.D. Candidate

Khalid Al Suleimani

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ABSTRACT

Governments are at different stages of development in trying to adopt policies that can promote the collaboration and interaction between the different actors within the innovation systems. These governments are increasingly focusing on the knowledge produced by the universities and their roles in the national innovative activities as a vehicle to address a range of problems and challenges. Studies have stressed the important role of social factors and social relations in better managing, enhancing, and maintaining collaborative networks and relationships, for example, within the innovation systems. Therefore, based on the work of Nahapiet and Ghoshal (1998) and Tsai and Ghoshal (1998), this study argued that social capital, through its three dimensions (structural, relational, and cognitive), can enhance to a great extent the collaboration between university and government and industry, as well as enhance the collaboration between employees, departments, and faculties within the university. An analytical framework and guideline table were constructed based on the theoretical discussion in this thesis, which were used for the empirical work in two case studies: Sultan Qaboos University (SQU) from Oman, and The National Technological University of Rafaela, Argentina (UTN), and data were collected through conducting interviews with targeted participants from Oman and Argentina. The results show that structural dimension manifested in social interaction, relational dimension manifested in trust, and cognitive dimension manifested in shared vision, values and goals were highly perceived to be important to the extent of university relationship internally and externally with government and industry. They show that social capital is perceived to play crucial role in enhancing and ensuring the collaboration outcomes at both levels of performance (strategic and operational) directly and indirectly, through facilitating interactions and the process of exchanging knowledge and other resources between the collaborated actors. The findings of this study contribute to a more nuanced understanding of the role of the three dimensions of social capital in enhancing university relationships. In addition, they provide practitioners with many managerial insights about the importance of social capital and the exchange of resources in improving university relationships, internally and externally.

Chapter 1: Introduction

In the last two decades, policy makers of different countries have given great importance to encouraging and facilitating collaborative networks through the innovation process in general and university-industry collaboration in particular. The ability to innovate and create a supportive environment for innovation is a very important determinant of a nation's global competitiveness over the coming years and decades. An important feature of such a supportive environment is effective and efficient interaction between the different actors (e.g. universities, public and private research centres, and industries/firms).

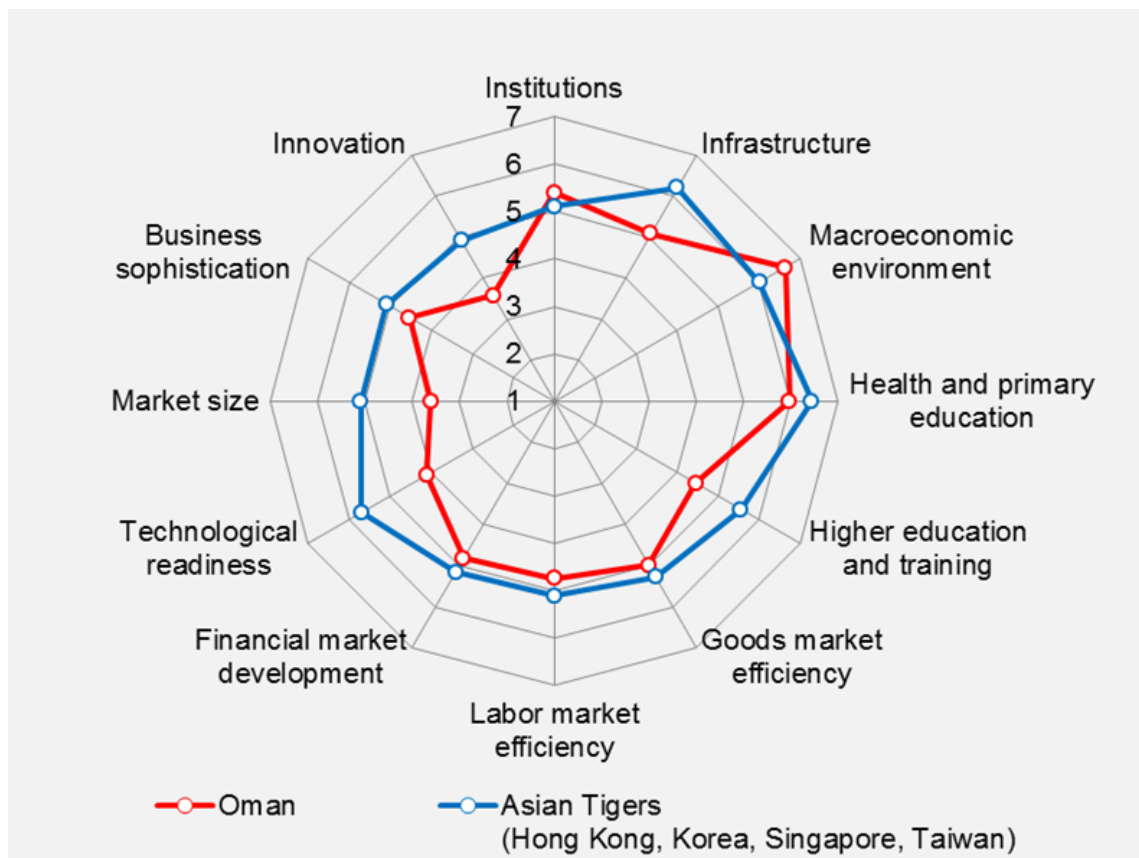
Governments are increasingly focusing on the knowledge produced by the universities and the innovative activities as a vehicle to address a range of problems and challenges. Such problems and challenges include the need for new products and services, new technology, improving sector productivity and quality, improving efficiency and effectiveness of organizations, maintaining competitiveness, generating employment, and the economic renewal and advancement of society. Governments are at different stages of development in trying to adopt policies that can promote the collaboration and interaction between the different actors within the innovation systems. Therefore, a country aspiring to be competitive in this global world has to evaluate its own strategies and policies in order to create the right environment to ensure the successful and fruitful collaboration between university, government, and industry, which will improve development, innovation, and national competitiveness.

1.1. Statement of the problem

According to the World Economic Forum (2015), the Gulf countries of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE are among the 40 highest-ranked economies worldwide, but Oman is ranked 62 out of 140. Even though Oman is doing well according to the basic requirements of competitiveness (institutions, infrastructure, health and primary education), it is performing worse on efficiency enhancers, among them higher education and training, and technological readiness.

Oman is also ranked comparatively lower on innovation and sophistication factors. Drzeniek-Hanouz (2013) points out that three of the main areas of competitiveness that the Omani government should improve are innovation, higher education and training, and technological readiness. Figure 1.1. shows Oman's competitiveness comparison with Asian Tigers (Hong Kong, Korea, Singapore, & Taiwan).

Figure 1-1: Oman's Competitiveness Comparison with Asian Tigers



Source: Drzeniek-Hanouz (2013)

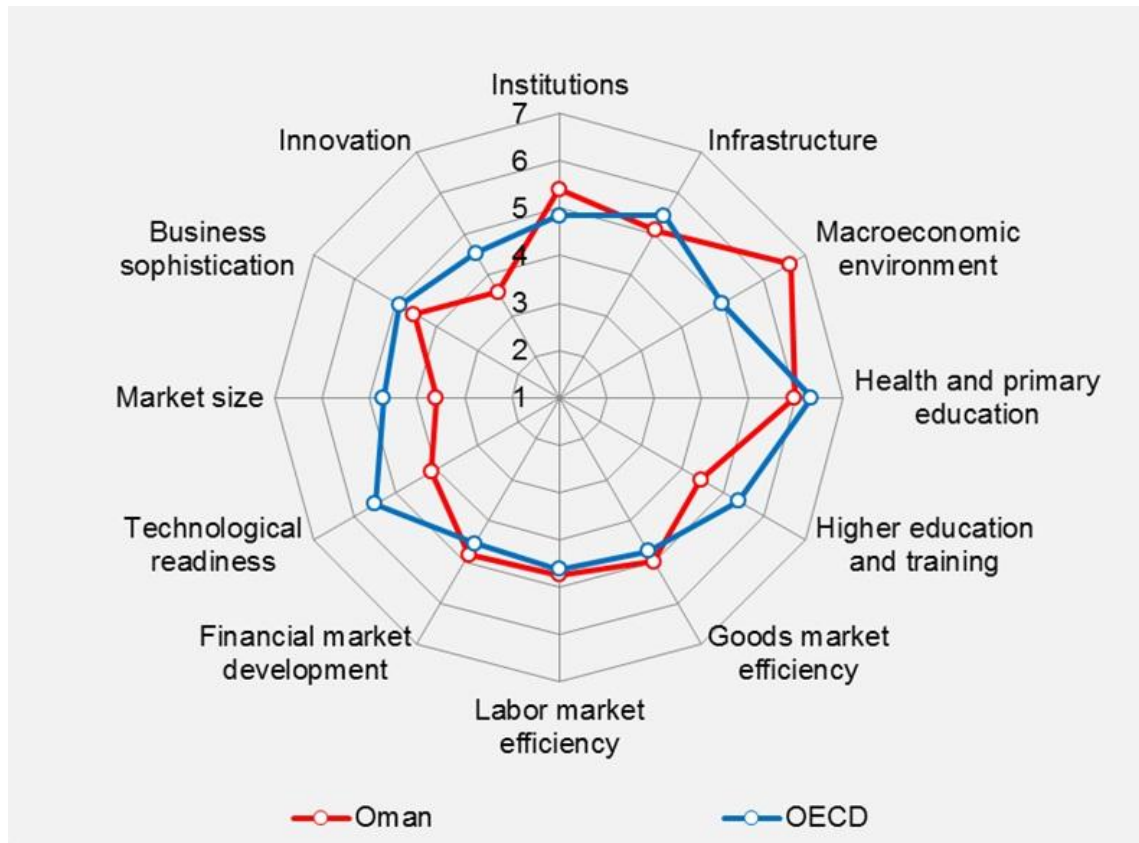
Therefore, there is a pressing need to conduct more research to find out why Oman is lagging behind even though it has the financial resources. This research can help policy makers to improve the relationship between universities, government and industry, which is very important and critical for knowledge and technology transfer, and for improving competitiveness and the transformation process towards a knowledge-economy.

1.2. Context

There are different factors that affect the selection of the research location such as the relevance of the research questions to that location, and to the accessibility of information (Yin, 2014). Even though such factors were considered in selecting Oman, there are other factors involved, such as the economic situation in Oman. Oman's economy is highly dependent on oil and gas, the production of which contributes to the largest percentage of GDP. In regards to that issue, Al-Shanfari (2012) states that “Although oil has been the source of much of the economic and social prosperity in the past, it has become, to some degree, a curse in relation to developing a strong, diversified, innovative economy” (p.3). Therefore, taking into account that oil and gas reserves may be close to exhaustion in the future, as well as the current decline in oil prices, it is very important for Oman to minimize its dependence on oil and diversify its economy (Samuel & Sarprasatha, 2016; The Research Council, 2013). In addition, “Oman is a country which has been very little studied in terms of strategic management” (Rajasekar & Al Raei, 2013, p.235).

Furthermore, according to Drzeniek-Hanouz (2013), and based on World Economic Forum (2013), Oman was scoring low results in three important areas of competitiveness; innovation, higher education and training, and technological readiness (Figure 1-2). Therefore, the Omani context is in great need of more research in how to improve competitiveness, and in how higher education institutions like Sultan Qaboos University can contribute in improving those three areas of competitiveness. Still, the consequences of oil and gas exhaustion are not exclusive to Oman, and the lessons learnt can help other countries better understand their situations.

Figure 1-2 : Oman's Competitiveness Comparison with OECD



Source: Drzeniek-Hanouz (2013)

1.3. Justification and Motivation

It is because of the importance of improving competitiveness in economic development, and the essential role of universities in such a process, we aimed in this research to focus on the role of a university's relations and collaboration with other actors like government and industry within the areas of innovation, higher education and training, and technology readiness, and on how such collaboration can improve competitiveness. This research took into account the expertise and professionalism of many related actors involved in a university's relations.

While working on research administration and other related issues at Sultan Qaboos University, the researcher was able to identify the lack of interactions that exists between the university and other actors such as the industry. Even though some

interactions exist, they are not enough, and the literature poses different reasons why these problems might arise: lack of interaction and trust, complexity of some administrative procedures, shortage of time available for academic and research staff to interact with industry, lack of awareness among firms about the importance of interacting with the university, or because of the poor incentive system on either side (See Chapter 3 for more discussion on these issues).

Furthermore, according to the UNCTAD (2014), and as pointed out by Al Mahroqi (2013), one of the main problems facing the Omani government is the low innovative activity in the Omani industrial sector, which is not in line with the national vision to diversify the economy and reduce the dependence on oil and gas. Therefore, one of the main objectives of this study is to explore the role of universities (particularly in Oman and Argentina) in solving such national problems through their relationships.

In addition to the above issues, one of the main objectives of Oman Vision 2020 is the upgrading of skills in the Omani workforce and developing human resources. Therefore, in line with this national objective, and with the support of Sultan Qaboos University, the researcher applied for a grant from the Erasmus Mundus program which selected him for a Ph.D. program in Business Competitiveness and Economic Development at the University of Deusto Business School, Argentina, in the summer of 2012. With an academic background in Management and Business Administration, and professional experience in Sultan Qaboos University (Department of Research Administration), the researcher had a good foundation for this research.

1.4. The purpose and research questions

The purpose of this study is to examine the importance of social capital in enhancing collaboration within the university as well as between the university and other actors like government and industry. Specifically, it focuses on three dimensions of social capital, which are structural (manifested in social interaction ties), relational (manifested in trustworthiness) and cognitive (manifested in shared vision) dimensions of social capital, and tests how these three dimensions affect the level of collaboration between the university and other actors. The study also tests how social

capital affects competitiveness indirectly through facilitating and improving innovation, higher education and training, and technological readiness.

The common theme throughout this study is that social capital, in its structural, relational and cognitive dimensions, plays a vital role in enhancing interactions and collaboration between university, government, and industry.

Therefore, the main focus of this study is comprised of the following questions:

The theoretical question:

What are the main university's relationships studied by the literature on innovation?

This theoretical question helps construct the relational framework for the next empirical questions.

The empirical questions:

How can the previously detected relationships be analyzed in terms of social capital?

What is the perception of participants concerning social capital in Sultan Qaboos University's relationships, and how can the relationships be improved?

What is the perception of participants concerning social capital in the relationships of The National Technological University in Rafaela, Argentina, and how can the relationships be improved?

1.5. Theoretical background

Globalization and intensified competition have forced universities to devote more resources to studying and managing their relationships with different actors such as

their governments and industries. Many scholars point out that the traditional role of universities is now changed to include a significant and direct role in economic development, and many countries in the world are focusing on developing their education sectors in order to stimulate innovation, increase competitiveness, and achieve high economic development (Charles, Kitagawa, & Uyarra, 2014; Deiac, Hughes, & McKelvey, 2012; Giuliani & Rabelotti, 2012; Karlsen, Larrea, Wilson, & Aranguren, 2012; Kitagawa, 2015; Mujika, Ayerbe, Ayerbe, Elola, & Navarro, 2010; Roos & Pike, 2011).

In regards to the neoliberalism and knowledge society, Karlsson (2016) states that “if asked about the role of universities today, most politicians would probably answer that it is to contribute to economic growth and provide a competitive edge in the globalized economy” (p. 17). The influence of neoliberalism as well as the marketization of knowledge on academic identities, and the possibilities of knowledge conflicts within the academy, and between the academy and the market economy, have been highlighted by relatively recent literature (Adam, 2012; Bleiklie, Høstaker, & Vabø, 2000; Henkel, 2005). Olssen and Peters (2005) point out that higher education is considered as the “new star ship in the policy fleet for governments around the world” (p. 313). Therefore, universities are integrated into politics and society through, for example, university-government-industry partnerships (Thune, 2010), which is one of the main focuses of this thesis.

According to Sataøen (2016), new concepts were introduced to describe the changes that are happening in universities’ relationships (between academics, the state, and the market), for example, the concept of “penetrated hierarchies”, which is proposed by Bleiklie, Enders, and Lepori (2015) to describe the new horizontal relationships of public universities with government, and with academics who are able to make decisions that may impact the university, such as the ones related to the funding bodies and evaluation panels. In linking the environmental influences with social capital and showing how they can affect the relationships of an organization (e.g. university), and after examining three European public universities, Bleiklie et al. (2015) state that

The structure of the environment influences the value of social capital vested in relationships between members of the organization and key external audiences ... The social relationships of organizational leaders and other organization members thus do not just influence their individual power and career , but have broader structural effects on how organizations are managed (p.38-39).

Studies have stressed the important role of social factors and social relations in better managing, enhancing and maintaining collaborative networks (Nahapiet & Ghoshal, 1998; Zheng, 2010). Even though there is no common definition for the concept of “Social Capital”, all definitions tend to share one main idea that is “social networks have value” and relationships are important for social action (Nahapiet & Ghoshal, 1998). In emphasizing the role of social capital in the innovation process, Barrutia and Echebarria (2010) highlight that social capital is an essential ingredient for understanding innovation. Yokakul, Zawdie, and Booth (2011) find that social capital is enhancing the effectiveness of the Triple Helix network, and they consider social capital as the active ingredient of that network where it includes university, government, and industry. Empirical evidence shows that an organization's social structure can affect and influence its decisions to form alliance or collaborative relationships (Chung, Singh, Lee, & others, 2000; Gulati, 1995).

Social capital refers to valuable intangible resources (such as trust, commitment, resilience, etc.). They can be accessed free of charge if the relationships are strong (such as those that exemplify high mutual trust, commitment to a shared vision, and strong stakeholder identification with each other), and they become unattainable when relationships are dysfunctional. From the resource-based view, an important intangible resource (e.g. trust and commitment) that is difficult to be imitated by others is thought to be the firm-specific social capital (Buller & McEvoy, 2012; Chisholm & Nielsen, 2009).

For example, trust is recognized as a powerful intangible resource for both the individual and an organization because of its ability to enable the access to valuable knowledge and other resources (e.g. political and economic) (Savolainen, 2011; Savolainen & Lopez-Fresno, 2013). Trust, in the long run, can lead to construct and form other capitals like human, social and cultural intangible capital, which are considered to be competitive advantages (Martín-de-Castro, Delgado-Verde, López-Sáez, & Navas-López, 2011; Nahapiet & Ghoshal, 1998; Robison, Schmid, & Siles, 2002; Savolainen & Lopez-Fresno, 2013).

In addition to the direct effects, social factors can also affect relationship and collaboration indirectly through enhancing the exchange of resources. Resources include information, personnel and technology. Nahapiet and Ghoshal (1998) conclude that social capital dimensions have a positive impact on resource exchange at an intra-organizational level, and propose the potential of their model at an inter-organizational level. In a similar study, Tsai and Ghoshal (1998) suggest extending their study to examine other outputs of resource exchange, and applying the research design to inter-organizational settings. Levin & Cross (2004) propose simultaneously studying the effect of relational and structural dimensions of social capital on knowledge transfer. In a nutshell, scholars suggest looking into a comprehensive model that investigates the effect of social factors on collaboration.

To address these research needs, this study presents two theoretical chapters: one focuses on the concept of social capital, and the second on the main relationships of universities in innovation processes. The argument within this study is that social capital with its three dimensions (structural, relational, and cognitive) is essential in a university's relations to facilitate, enhance, and ensure their success. The theory of social capital has been used in this study (more specifically the three dimensions of social capital), to examine the concept of collaboration in university relations (internally and with government and industry). Social capital plays an important role in explaining and understanding the importance of university relationships. This way of thought argues that building social capital by enhancing social relationships

between a university and other actors can strengthen the collaboration and improve innovation.

1.6. Research method

Case study was used as a research method in this study. As Yin (1994) has pointed out, case studies are a preferred approach when “how” or “why” questions are to be answered, when the researcher has little control over events, and when the focus is a current phenomenon in a real-life context. According to Yin (2009), "a case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p. 18). More specifically, a phenomenological case study approach was used in this dissertation because this approach is considered to be suitable to identify and find out how individuals perceive the particular phenomena or situation they are dealing with (S. Lester, 1999; Moustakas, 1994; Osborn & Smith, 2015; J. A. Smith, 2015). As stated by Henry, Casserly, Coady, & Marshall (2008, p.10), “The purpose of a phenomenological approach is to understand the issue or topic from the everyday knowledge and perceptions of specific respondent subgroups”.

Even though there is no formula that the researcher can follow to know whether he/she should use the case study method or not, the objectives and the research questions of this study fit within the previous research method (phenomenological case study approach). This study investigated the phenomenon of the role of social capital in a university’s relationships in depth within its real context in Oman and in Rafaela in Argentina.

Furthermore, as mentioned above, two case studies were selected from Oman and Argentina for comparison. This comparison was made following the approach called “Learning from Differences” proposed by Gustavsen, Nyhan, and Ennals (2007). There will be more discussion and details about this approach in the Methodology chapter (Chapter 5).

1.7. Contributions

This research makes several important contributions toward the objective of better understanding the role of social factors in affecting the collaboration between a university and other actors including government and industry, and how social factors can improve the impacts of such collaboration on competitiveness.

This study advances university-government-industry partnership and social capital literature by describing how social capital can affect collaboration between university, government and industry. At a more detailed level, this study contributes to theory and knowledge development in different ways.

For example, this study adapts Ghoshal and his colleagues' view on the concept of "social capital" (Nahapiet & Ghoshal, 1998; W. Tsai & Ghoshal, 1998). It does this by applying the concept to an intra- and inter-organizational context and by examining the effect of social capital and resources exchange on competitiveness. Also, it provides further empirical support for Nahapiet and Ghoshal's (1997, 1998) framework, which states that social capital and resource exchange can create value for participating organizations.

In addition, by studying university collaboration with government and industry through a social capital lens, this study provides a comprehensive understanding of the role of social factors in enhancing the level of collaboration between the three actors.

There is a scarcity of studies analysing the university-government-industry collaboration to empirically investigate the way in which the three different dimensions of social capital affect collaboration between the three important actors; therefore, this thesis contributes insights into the role of social capital through its three dimensions in enhancing collaboration among those actors.

Policy makers in some countries like Oman are faced with the questions of what must be done and how it can be done so that innovation and knowledge transfer activities are raised to a high level of importance. Further questions concern how the

collaboration between university, government, and industry can be promoted, and how such collaboration can be used to improve the competitiveness in forms of innovation, higher education and training, and technological readiness. This research provides contributions to answer such questions.

In conclusion, this research offers an attempt to empirically investigate the role of the different dimensions of social capital in improving collaboration in the context of a university's relations. By integrating the literature on social capital and a university's roles and involvement, as well as university-government-industry collaboration, this research provides a comprehensive study to explain how social capital can affect collaboration and improve the impacts of such collaboration on competitiveness, especially in the forms of innovation, higher education and training, and technological readiness.

1.8. Structure of the thesis

The thesis is structured as follows:

- Chapter 2 provides a literature review relating to social capital. The purpose of this chapter is to provide a detailed theoretical background relating to social capital and to identify the main issues of social capital that are related to this study. Among such issues are the connections of social capital to university's relationships with government, industry and intra-university social capital. In this chapter, special focus is given to the three dimensions of social capital; structural, relational, and cognitive dimensions, which were considered useful in later integrating the analytical framework.
- Chapter 3 provides literature reviews about university roles and relationships such as relationships with government and industry based on what has been said about the roles and involvement of universities on the three main innovation system approaches: National Innovation Systems (NIS), Regional Innovation System (RIS), and Sectoral Innovation System (SIS). Also, this chapter covers the impacts of a university's relationships on competitiveness.

- Chapter 4 presents the analytical framework and the guideline table which were formulated from the literature reviews on chapters 2 and 3. This chapter discusses the analytical framework, which shows how social capital through its three dimensions can improve the university's relationships and their impact on competitiveness in forms of innovation, higher education and training, and technological readiness. In this chapter, more details about the main elements and components of this framework are discussed. Furthermore, it presents the guideline table which shows the relationships of a university with government and industry as well as its internal relationships. The analytical framework and guideline table discussed in this chapter were used for the empirical part of this study.
- Chapter 5 presents the research method and the research design used in the study. It provides an overview of the qualitative method used as well as a discussion about the data collection process and data analysis steps.
- Chapters 6 and 7 present the findings of the empirical work applied in both case studies: Sultan Qaboos University in Oman (Ch.6) and The National Technological University of Rafaela in Argentina (Ch.7).
- Chapter 8 discusses the findings in chapters 6 and 7, and answers the research questions.
- Chapter 9 provides a conclusion to the findings of the research. It also summarises implications and recommendations of this study. Furthermore, it acknowledges the potential areas for future study.

Chapter 2: Review of Literature on Social Capital

2.1. Chapter introduction

In recent years, social capital has been receiving more interest from scholars belonging to different fields because it can provide answers to many questions related to different fields like social, political, and economic by describing the different patterns for personal relationships between individuals and organizations, as well as by identifying factors that could affect such relationships or networks. For example, social capital has provided valuable answer to the question of why there are differences between some people and some organizations in the ability to build strong relations. As highlighted by Coleman (1988) when he defined social capital, those people in embedded networks can have higher levels of achievement because they can obtain more interactions, they have mutual trust, and can enhance and develop their connection skills. In this chapter, literature review covers the main issues of social capital (SC) that are related to this study.

There are four main sections in this chapter. Section 1 begins with a background about SC which includes its importance, its conceptualization, networks and SC, alternative definitions of SC, and benefits of SC. Section 2 covers the three dimensions of SC (structural, relational, and cognitive) which were considered most useful in integrating the analytical framework. The third section in this chapter includes the main related connections for this study's analytical framework. Such connections cover, for example, SC in the innovation process, SC in university-government relations, SC in university-industry relations, and intra-organizational SC. Section 4 takes about measuring SC in different levels, and section 5 provides a summary of the chapter.

2.2. Background about social capital

2.2.1. Importance of social capital

Social capital has been used to study different fields through its influence, facilitation, and effects. For example it has been used to study public life in contemporary societies (Doh, 2014), innovation (Pérez-Luño, Medina, Lavado, & Rodríguez, 2011), the intra-organizational resource exchange (Tsai, 2000; Tsai & Ghoshal, 1998), human resources (Coleman, 1988), performance of strategic alliances (Chaharbaghi, Adcroft, Willis, Todeva, & Knoke, 2005; Gulati, 1995; Kale, Singh, & Perlmutter, 2000), and organizational learning (Expósito-Langa, Molina-Morales, & Tomás-Miquel, 2015). As highlighted by Lin, Cook, and Burt (2001), social capital is important when using relations out of the social interaction in achieving goals in different levels, from individual level to community level. USAID (2011) state that

Social capital is invoked as contributing to a very diverse set of structural outcomes including governmental performance, economic performance and regime outcome (democratization), as well as individual-level outcomes such as the quality of health, happiness and well-being (p. 2).

Social capital, because of its direct effects on exchange processes (e.g. knowledge) and on the accessibility to network resources, has a positive relationship with learning (Barrutia & Echebarria, 2010), and innovation (Zheng, 2010), and has a significant impact on organization growth and innovation performance (Al-Tabbaa & Ankrah, 2016a; Maurer, Bartsch, & Ebers, 2011; Y.H. Tsai, Joe, Ding, & Lin, 2013).

If we take, for example, the case of the innovation processes in Gulf Cooperation Countries, we find that one of the main problems is the unavailability of articulate linkage between innovation systems and stakeholders. Such a situation results in preventing the formation of a streamlined innovation system that can convert great ideas into commercial venture (Moujaes, 2012). The same author highlights that the harmonization of activities among different stakeholders can advance considerably the operational and institutional levels through facilitating stakeholders' interactions,

which remain insufficiently connected in GCC's innovation landscape. Social capital can overcome the problems of weak coherent linking and low interactions between the different stakeholders.

According to Burt (2001), people who do better are well connected and the general idea is that relationships do matter (Andriani, 2013). It is believed that social capital can simplify and facilitate the exchange of knowledge, value creation, and the improvement of organizational performance (Abili, 2011), and reduce opportunistic behavior (Andriani, 2013).

2.2.2. The three main approaches for the conceptualization of social capital

There are three main seminal contributions behind the spreading of the social capital concept, and it is widely accepted that these contributions have been the ones of James Coleman, Pierre Bourdieu, and Robert Putnam. It was after these three contributions that many scholars studied the social capital concept from different perspectives, but based on the ideas of these contributions. Each approach or contribution will be explained briefly in the following sections.

Pierre Bourdieu

According to Portes (1998), Pierre Bourdieu was the first to present social capital theory in 1986. Pierre Bourdieu (1986), the French social theorist, defined social capital as the actual and the potential collective resources which are associated with having a solid durable network. Based on Bourdieu's definition, social capital owned by an agent depends on two main things: the network size and the quantity of accumulated capital the agent has. Such capital can be economic, cultural or symbolic. Barandiaran and Korta (2011) highlight that Bourdieu's definition of social capital is closely related to other concepts, such as economic and cultural ones. They also state that "its definition is associated with the capacity of resources to which an agent can gain access due to the fact that he/she belongs to certain groups of a certain status" (Barandiaran & Korta, 2011, p. 49).

Bourdieu explained how some social relationships can give access to individuals to assert the ownership of resources possessed by their associates (Martinez, 2013). Gauntlett (2011) and Tzanakis (2013) claim that Bourdieu uses social capital to clarify the stony realities of social disparity and the structure and dynamics of differentiated societies.

James Coleman

The concept of social capital that is provided by Coleman (1988) is linked to economic concepts, like that of Bourdieu's, but from a completely different perspective (Gauntlett, 2011; Tzanakis, 2013). According to Coleman (1988), social capital is not a single object, but rather constituted from two different elements: some features of social structure and certain actions of performers – whether individuals or other actors – within the structure. Stolle and Hooghe (2005) and Martinez (2013) highlight that when Coleman used the concept of social capital, he wanted to reject the individualistic premises and introduce the social structure into the rational choice paradigm, where social capital is inhering in family relations and social organizations.

Coleman (1988) lists some forms of social capital such as obligations, expectations, trustworthiness of structure, and norms. In his theory, Coleman argues that lack of connection makes some forms of social capital very difficult to attain; therefore, closed social structure is essential to maintain benefits of social capital where obligations can be forced and norms can be constructed. Stolle and Hooghe (2005) indicate that social capital exists at varying levels, depending on the types of social capital relations which may take various forms.

Barandiaran and Korta (2011) point out that the most important feature of Coleman's conceptualization is related to immediacy, trust and regulations that are generated within a certain social structure. Tzanakis (2013) adds other features like the productivity of social capital which means that an actor can achieve particular ends which without social capital cannot be achieved; and the possibility of using social capital conceptually at both levels (micro and macro) without requiring a separate theory of social structure for each level. One of the differences between Bourdieu and

Coleman is that social capital in Coleman's contribution contains the nature of a public good which means direct contributions by actors will help the whole, while for Bourdieu, social capital breeds social unfairness, but it may increase integration within specific groups (Tzanakis, 2013).

Robert Putnam

Some scholars like Stolle and Hooghe (2005) claim that after 1993, when Robert Putnam published his book '*Making Democracy Work*', the real boom in social capital studies started. Putnam in his book (1993) indicates that social capital is made of different characteristics of social organization such as norms, networks, and trust, which can help in improving the efficiency of any society by coordinating different actions.

Coleman's principles and work have provided the main foundation for Putnam's view of social capital, but his view is narrower because it focuses on specific aspects of social interactions (Stolle & Hooghe, 2005; Tzanakis, 2013). In differentiating social capital from other forms of capitals, Putnam (2001) states that "Whereas physical capital refers to physical objects and human capital refers to the properties of individuals, social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them" (p. 19).

According to Vilhelmsdóttir (2012), the core of Putnam's theory is that activities in formal and informal social interaction platforms can help in creating habits and norms of helping and cooperation and hence more trust that subsequently can lead to more positive results for the whole society. The same author points out that Putnam's theory can be used to explain different outcomes such as political, social, and economic ones as well as government effectiveness. Barandiaran and Korta (2011) point out that Putnam draws special attention to the political and economic benefits which a community or organization can get because of the high level of social capital.

Vilhelmsdóttir (2012) claims that Putnam's theoretical contributions have focused more on the collective feature of social capital and its effects on the meso and macro

levels of society, and this led him to use aggregated data rather than individual-level data in his research. Based on Putnam's theoretical contributions, social capital can operate as bridging (expanding networks) or as bonding (increasing network cohesion) (Tzanakis, 2013).

2.2.3. Networks and Social Capital

Nahapiet and Ghoshal (1998) highlighted that the central tenant of social capital theory is that social network connections constitute valuable resources that assist in conducting various social affairs. These network connections provide to their members credentials that enable them to increase their credit. Lin (1999) gave a simple and straightforward premise behind this theory that is '*investment in social relations with expected return*'. There are three main conceptualizations of networks and social capital: the strength of weak ties (Granovetter, 1973), structural holes (Burt, 1992), and social resources (Lin, 1999).

The Strength of Weak Ties

The focus of this “social capital” theory is on the strength of the relations or ties that are used to obtain economic benefits. Among those first scholars is Granovetter (1973) who worked on conceptualizing the social capital theory. The proportion of the relations or ties used in looking for a job was the main focus of his study. Granovetter (1973, 1983) found out in his studies that weak bonds appear more likely to be sources of information and resources rather than strong ties. According to Granovetter (1983), relations among social groups are likely to be strong and the information communicated through any member is shared quickly

Structural Holes

The pattern of the relations or bonds in the social network of a member who is regarded as the supplier of information and resources was the focus of Burt (1992). His argument is that it is beneficial for the person to obtain information from other members who are already disjoined. Hence, there comes a structural hole due to the lack of links among groups and “new ideas emerge from selection and synthesis across structural holes between groups” (Burt, 2004, p. 350). Kleinberg, Suri, Tardos,

and Wexler (2008) point out that Burt's theory of structural holes views organizations in two terms: the tight connections within their social structure and in terms of the holes where connections have failed to form.

Social Resources

According to Lin et al. (1981b, p. 1165) social resources are defined as “the wealth, status, power, as well as social ties, of those persons who are directly or indirectly linked to the individual”. There are two main components that are included in this definition that are social associations and the resources rooted out of these relations (Lin, Ensel, & Vaughn, 1981a). This conceptualization of social capital, unlike the other two views, argues that social capital is not the structure or the pattern of relations or ties, but rather the nature of resources entrenched in these relations or ties in social networks (Lin, 1999; Lin, Ensel, et al., 1981a; Lin, Vaughn, et al., 1981b).

2.2.4. Lack of a unique definition for Social Capital

The concept of Social Capital comes from the sociological field and it was first used in the 1980s by a number of researchers who are regarded in academic literature as being responsible for the spread and popularization of this concept. They are Bourdieu (1980, 1986), Coleman (1988) and Putnam (1993). Macke, Genari, and Faccin (2012) indicate that social capital is made of both formal and informal structures of norms, the various organizations and institutions that enforce trust and helping within communities as well as a whole society.

Despite the great amount of research that has been studied on the concept of “Social Capital”, no common definition has been found. For example, Bourdieu (1986) defines social capital as “made up of social obligations (connections), which is convertible, in certain conditions, into economic capital and may be institutionalized in the form of a title of nobility” (p. 243). Coleman (1990) provides another definition for social capital by stating that “Social Capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: they all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure” (p.302). According to Lin et al. (2001),

social capital can be defined as resources rooted within a social network which is accessed by the members of that network.

Nevertheless, definitions of social capital tend to share one main idea that is “social networks have value” (USAID, 2011). Also, there is a consensus between the above authors regarding the importance of relationships as a resource for social action, but they lack agreement on a similar and clear definition of social capital (Nahapiet & Ghoshal, 1998). Different authors focus on different branches of social capital, including the formal structure of the ties that form a social network, the content of those ties (which refers to the resources that individuals are able to exchange), the quality of groups, and individuals' social relations (Dervojeda, Kraaijenbrink, & Groen, 2010). Such focuses give us different views of social capital and enrich the knowledge of the subject. One important issue regarding social capital is that it is made up of three basic dimensions: norms, trust and a net of relationships (Barandiaran & Korta, 2011). The concept is that people within or among groups share the same values, standards and understandings.

2.2.5. Benefits of Social Capital

Social capital is considered valuable for its expected benefits. It was found that social capital has the capacity to achieve the desired results in various areas of social life, such as economic development, community development, and health and knowledge exchange (Zheng, 2010). Social capital can reduce transaction cost, increase efficiency and effectiveness, improve the communication between the different levels as well as within an organization, improve economic performance, promote creativity and innovation, and increase the efficiency of information diffusion (Maskell, 2000; Maurer et al., 2011; Nahapiet & Ghoshal, 1998; Tsai et al., 2013; Zheng, 2010).

Facilitates mutual understanding and shared goals between participants, enhances group communication and knowledge sharing, Lessens the possibility of conflicts and disagreements, and supports cooperative behavior are among the benefits of social capital (Steinmo, 2015; Tsai, Ma, Lin, Chiu, & Chen, 2014; Villena, Revilla, & Choi, 2011).

Lin et al. (2001) divided the outcomes of social capital into two categories: the first one is called instrumental, containing the like of wealth and power; and the second is called expressive, containing the like of health and life satisfaction. It has also been shown in some studies that social capital is related to peace in the community and healthier and happier people. The following table (**Table 2.1**) shows different types of social capitals' benefits for various levels, such as individual, community, and social.

Table 2-1 : Benefits of Social Capital

Assets or benefits Type	Individual	Community	Social
Welfare Economic benefits and materials	<ul style="list-style-type: none"> - Access useful to find or improve labor condition information. - Access to economic assets such as property, equipment, and scope. - Access to loan money or informal credit systems. - Access to collective productive initiatives (micro-enterprises, cooperatives). - Exchange of goods and chattels. 	<ul style="list-style-type: none"> - Increased economic and social development of the consequence community of new collective enterprises. - Development of community projects in various areas. - Increased sustainability of projects within a community. - The community attracts more economic resources and materials. 	<ul style="list-style-type: none"> - Exchanges and ventures are increased. - Contributes to economic development. - Contributes to the generation of productive clusters.
Social integration Social and cultural benefits	<ul style="list-style-type: none"> - Recognition and social acceptance. - Personal Development. - Expansion of world references. - Knowledge and information. - Feelings of utility and staff rating. - Acquisition and construction of skills and aptitudes. 	<ul style="list-style-type: none"> - Community social life is strengthened. - Allow access to community services. - Contributes to group cohesion. - Strengthen community identity. 	<ul style="list-style-type: none"> - Improves quality of social ties. - Stimulates creativity and social enterprises. - Protects risk of social fracture. - Contributes to install feelings of respect and solidarity.
Power and Social Influence Political and civic benefits	<ul style="list-style-type: none"> - Opportunities for review and influence. - Exercise of the right to petition and complaint. - Exercise of public voice. - Disposition to participate in public interest initiatives. 	<ul style="list-style-type: none"> - Improves coordination of different agents. - Improves dialogue, negotiation and generating agreements. - Improved interaction with the public system and with other agents. - Power capacity 	<ul style="list-style-type: none"> - Contributes to citizenship. - Inspire civic virtues within the social networks. - Strengthen the role of active citizenship. - Contributes to a major relationship

		proposal and intervention.	between citizenship and the public apparatus. - Strengthens citizen action state control. - Facilitates public-private coordination.
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Source: Mujika et al., (2010).

Another group of studies regarded as critical studies of social capital have recognized that social relations and their economic impacts are not always positive; for example, according to Payne, Moore, Griffis, and Autry (2011), social capital is not a universally beneficial resource. Van Staveren and Knorringa (2007) state that

Social structure inevitably incorporates power irregularities that lead to processes of inclusion and exclusion, on the basis of certain discriminating criteria, to relationships of authority and control, ... social capital can have a perverse character, involving social costs, such as undemocratic tendencies, and economic costs, such as rent seeking and discrimination (p. 111).

Social capital does not always have a positive impact in either social or economic issues, which indicates that an individual or organization or a system should be careful in dealing or using such capital. This thesis considers that social capital can ensure the successful interactions and collaboration between the different actors.

Villena et al. (2011) argue that blindly calling for higher levels of social capital can end in wasting resources, and it may also lower rather than enhance performance. In their study, they consider the "dark side" of social capital in collaborative buyer-supplier relationships. They evaluate how social capital through its three dimensions (structural, relational, and cognitive) contributes to or impedes value creation within such relationships. According to the findings of their study, social capital has both the bright and the dark sides, and too little or too much of it can lower performance. According to Kwon & Adler (2014), the dark side of social capital is because of "its capacity to fragment broader collectivities in the name of local, particularistic identities" (Kwon & Adler, 2014, p.418).

Even though there is general agreement on the importance and the benefits of social capital, there are still multiple disagreements in social capital literature. Zheng (2010) points out that some of these disputes arise from the following (some of them have been discussed in the previous sections):

- Is social capital a private or public good?
- Is social capital completely desirable or does it entail a dark side?
- The area of social capital's definition.

2.2.6. Dimensions of Social Capital

As highlighted in the above discussion, there are dissimilar approaches used to study social capital, and various models have been developed such as those by Nahapiet and Ghoshal (1998), and Leana and Van Buren (1999). However, for the purpose of this study, the model proposed by Nahapiet and Ghoshal (1998) was used as a foundation for the analytical framework. In their model they identified three dimensions to constitute social capital construct, “whereby the value of social capital can be significantly moderated by the interactions of these dimensions” (Al-Tabbaa & Ankrah, 2016, p.1). Their arguments for that model include that social capital through the three dimensions expedites the creation of new intellectual capital, and organizations are conducive to the development of high levels of social capital.

Also, the model proposed by Nahapiet and Ghoshal (1998) was chosen because its connection with intellectual capital provides social capital’s link with the role of universities in innovation. Social capital in this model refers to networks, mutual trust, and shared values and goals which enable individuals and organizations to act and behave collectively. This model introduces a framework which integrates different issues of social capital into the following three dimensions of social capital:

2.2.6.1. The Structural Dimension

The main argument to introduce the structural dimension within the framework proposed by Nahapiet and Ghoshal (1998) is that, structural dimension impacts the development of intellectual capital through its various facets which affect access to parties for exchanging knowledge and practicing other activities related to knowing (Nahapiet & Ghoshal, 1998). Structural dimension of social capital refers to the overall pattern and non-personal links (Abili, 2011) of connections between actors – that is, whom you reach and how you reach them (Li, Ye, & Sheu, 2014; Nahapiet & Ghoshal, 1998; Villena et al., 2011). Such personal links or contacts can enable the actor to obtain specific information or access to resources that are not available for others (W. Tsai & Ghoshal, 1998) and they can facilitate or curb the flow of information (Siegel, Waldman, Atwater, & Link, 2003).

From the existing literature, four major sub-categories were identified for this dimension: structural holes, network size, tie strength and centrality (Zheng, 2010). Macke et al., (2012, p. 24) state that "structural dimension includes connections and network settings in terms of density, connectivity, hierarchy, and organizational adequacy" and it also includes social interactions (Nahapiet & Ghoshal, 1998). Social interaction as explained by Li et al. (2014) refers to communication frequency, how strong the relationship is, and how many times members are gathered. Villena et al. (2011) highlight that structural dimension has received much attention in social capital literature.

2.2.6.2. The Relational Dimension

The relational dimension of social capital labels the different kind of personal relationships people have established through a history of interactions with each other (Li et al., 2014) and it refers to "assets created and leveraged through these relationships" (Nahapiet & Ghoshal, 1998, p. 244) such as trust and trustworthiness (Tsai & Ghoshal, 1998). This dimension focuses on the relationship between people and on the aspects that affect such relationships. Such aspects include attributes like identification, trust, norms, sanctions, obligations, expectations (Bao, 2009; Macke et

al., 2012; Nahapiet & Ghoshal, 1998), and respect and friendship that actors have developed over time (Villena et al., 2011). Relationships built on such attributes influence network members' behavior and enable them to share valuable assets between them (Li et al., 2014).

This dimension focuses on qualities of relations and does not emphasize quantities of relations, unlike the case of structural dimension (Abili, 2011). According to Soetanto and van Geenhuizen (2015), the relational dimension produces not only psychological benefits like trust and prestige, but also binding commitments like expectations and obligations.

2.2.6.3. The Cognitive Dimension

Nahapiet and Ghoshal (1998) introduce the cognitive dimension in their framework because they argue that the sharing of context between parties requires a shared language and vocabulary, and shared collective narratives. According to them, “these two elements constitute facets of shared cognition that facilitate the creation of intellectual capital especially through their impact on combination capability” (Nahapiet & Ghoshal, 1998, p. 254). The cognitive aspect of social capital discusses those resources providing shared depictions, clarifications and understanding among individuals or actors, such as shared codes, language, and narratives (Bao, 2009; Nahapiet & Ghoshal, 1998) that facilitate a common understanding of collective goals and the right means of acting in a social system (Tsai & Ghoshal, 1998).

Other scholars like Inkpen and Tsang (2005), and Steinmo (2015) consider shared culture and congruent goals as the main parts of cognitive capital. Villena et al. (2011) point out that parties who have the same culture can facilitate the individual actions and constrain undesirable behavior. The absence or lack of shared culture can be a major barrier to knowledge sharing (Curry & Moore, 2003). Li et al. (2014, p. 1446) state that “Overall, cognitive social capital is expected to facilitate the exchange of information due to members’ ability to share a common understanding”.

2.2.6.4. *The interactions between the three dimensions*

Tsai and Ghoshal (1998) examined the relationship between the three dimensions of social capital. They found that the relational dimension represented by trustworthiness was significantly associated with both other dimensions. Villena et al. (2011) found that the above three dimensions of social capital have a positive impact on the strategic and operational performance improvement. Li et al. (2014) found that the three dimensions of social capital are inter-related in important and complex ways. For example, they conclude that the structural dimension represented by social interactions in their study has significant positive impacts on the other two dimensions represented by trust and shared vision. However, according to Carey, Lawson, and Krause (2011), and Roden and Lawson (2014), the scale and intensity of the relational dimension are a result of a combined effect of structural and cognitive dimensions.

Li et al. (2014, p. 1453) state that “stronger relational capital (trust) enables network members to develop similar perceptions and vision toward inter-firm collaboration”. Steinmo (2015) indicates that the development cognitive and relational social capital at the individual, organizational and alliance levels appears crucial for effective collaboration. According to Al-Tabbaa and Ankrah (2016), the impacts and interactions of the three dimensions are not static but rather varying over time and thus, through their study, they provide an evidence that social capital does not develop linearly but through a continuous complex interaction among the three dimensions. Gonzalez-Brambila, Veloso, and Krackhardt (2013), after studying the impact of network in knowledge output, confirmed the need for taking into account the different dimensions of social capital.

We will see later in this chapter how these dimensions are important for some related issues to this study, like innovation and relations with government, universities, and industry.

2.2.7. Social Capital Accumulation

According to Lollo (2012), social capital is accumulated through social relationships. One feature of this accumulation is the frequency of contacts between individuals and organizations because frequency of interactions is important for reciprocity among people, and thus social capital is increased (Bowles & Gintis, 2002; Cassar, Crowley, & Wydick, 2007; Coleman, 1988; Narayan & Pritchett, 1999; Sethi & Somanathan, 2003).

Another feature for social capital accumulation is homogeneity, which means that individuals share some common value or interest. Homogeneity of individuals strongly influences participation and interactions between people because they understand each other, and information asymmetries can automatically be reduced (Cassar et al., 2007; Grootaert, 1999; Lollo, 2012; Narayan & Pritchett, 1999). Hierarchy, defined as the degree of concentration of contacts around a single individual within a group (Lollo, 2012), is also among the features of social capital accumulation because it makes the allocation of expectations and obligations clearer (Burt, 2000; Coleman, 1988; Collier, 2002).

2.3. Connections for this study's analytical framework

2.3.1. Social capital and innovation

Since the innovation process does not work independently in its environment but rather in an interactive manner with the different actors involved in this process, such as universities and industry, special attention is given to encourage the interconnections between actors and institutions by adapting systemic models to emphasize the continuity interaction between them throughout the innovation process, as well as social (institutional, organizational, cultural) factors which can affect such a process (Garatea, 2008). Dovey (2009) concludes in his study that collaborative learning processes can be largely impacted by trust, because "Trust, as a key social capital resource, is indispensable to the creating of a social environment in which

ideas are freely generated, honestly assessed and selected and collectively transformed into profitable new products and services" (Dovey, 2009, p. 322).

According to Xu (2016), previous studies found that social capital has significant impacts on the performance of new ventures, organizational learning and innovation. Barrutia and Echebarria (2010) point out that understanding innovation depends greatly on social capital, and they argue that social capital is also an essential ingredient for understanding university-industry interactions. Zheng (2010, p. 152) states that "innovation entails the convergence of different kinds of knowledge from different types of actors and social capital enables this convergence". Coleman (1988) argues that if research partners spend extended periods of time working together, the relationship between them may "converge", in that the two partners will have the same understandings, habits, and languages. "Although convergence enhances the efficiency of exchange, the consistent mind-set implied by convergence lessens the diverse opinions and perspectives essential to new knowledge creation" (McFadyen & Cannella, 2004, p. 737).

According to social network theory, social capital acts as a mediator between the disbursement on innovation and innovation outcome. Social capital enhances the productivity and effectiveness of the innovation process. Maskell (2000) points out that social capital contributes toward the innovation by reducing disagreements, creating a supportive atmosphere to share reliable information, and enabling employees to share tacit information. Even though social capital has been used only recently, it is considered to be an important contribution to the factors that affect innovation.

The locus of innovation shifts from individuals and firms to the networks between them (Zheng, 2010). The same author reviewed the firsthand studies of the association between social capital and innovation wherein he found that the organizational breadth of social capital has been the most frequently investigated dimension of the three social capital dimensions. The following table (Table 2.2) summarizes Zheng's findings.

Table 2-2 : Summary of Zheng's Findings

Social capital	Components	Effects on innovation	Potential moderators
Structural Dimension	Network Size	Positive, but potentially a quadratic or diminishing returns relationship.	- Intellectual capital - Costs
	Structural Holes	- Positive to idea generation, but potentially a quadratic relationship. - Negative to co-ordination and idea implementation.	- Intellectual capital. - Nature of innovative tasks. - Costs
	Tie Strength	Positive but potentially a quadratic or diminishing returns relationship.	- Internal vs external ties. - Intellectual capital. - Costs.
	Centrality	Interact with external network.	- Internal vs external ties. - Type of innovation.
Relational Dimension	Trust	Positive	- Type of trust.
	Norms	Positive	- Stages of innovation
Cognitive Dimension	Shared Vision	Positive when other social capital variables are not present.	

Source: Zheng (2010, p. 174)

Zheng (2010) draws attention to the importance of contacting more firsthand findings regarding the connections among social capital and innovation. Therefore, this study contributes to this issue by providing empirical results to study the importance of social capital in government-university-industry collaboration as part of the innovation process. These contributions constitute the framework for the argument in this dissertation that social capital can enhance innovation.

2.3.2. Social Capital and University-Government Relations

There are arguments that governments can reveal different ranks of social capital, which disturbs the level of democracy and economic growth (Putnam, Leonardi, & Nanetti, 1993). According to Beugelsdijk and Smulders (2003), social capital at the government level refers to the social construction that improves the efficiency of local governments with the effects of civic engagement and the organization of civic networks. Knorringa and van Staveren (2006) argue that there are three types of relationships between the government and the social capital: 1) social capital can be

entirely organized by the government; 2) social capital can develop externally to and autonomously from the government; 3) social capital and government complement each other, operating according to their individual capabilities.

Boix and Posner (1998) started their discussion about the relationship between social capital and government functioning by asking "why are some governments more stable, efficient, innovative and well-managed than others?" Then, they mentioned some traditional answers such as the ones that focus on factors like institutional design, political polarization, organizational aptitude and socio-economic innovation. They claim that the reason social capital creates governmental efficiency is underspecified and that social capital theory has not specified the logic of the micro-linkages that provide linkage to the community's cooperative aptitude to the accomplishment of decent government. They conclude their study by emphasizing the need for more research agenda focusing on the connections between social capital and governmental efficiency.

Yokakul, Zawdie, and Booth (2011) study the role of social capital, knowledge interchange and the development of indigenous knowledge-based industry in the Triple Helix system. They found that social capital enhances the effectiveness of the Triple Helix network and they consider social capital as its active ingredient. They argue that government intervention is very important to ensure the creation and effectiveness of social capital. According to them, government intervention can provide a suitable framework and continual support in terms of provision of integrated service and network development based on social capital, and also by the creation of intermediary organization that intermediates between university, industry and government.

In a related issue, R. Putnam et al. (1993), after studying northern and southern Italy, recommended that a sophisticated level of government efficiency can be a result of a higher level of social capital in northern Italy than in the south. According to Beugelsdijk and Smulders (2003, p. 3), "Putnam claims to have proven that more social capital in Italian regions is positively correlated with effective governance and

economic performance". In emphasizing the importance of trust in government institutions, Knorringa and van Staveren (2006) point out that when government institutions are not perceived as trustworthy, the likelihood of finding high levels of generalized trust is poor.

From the above discussion, it can be seen how important social capital is in strengthening the relationship between government institutions and other actors like university and industry. The argument in this dissertation is that social capital through its three dimensions (structural, relational, and cognitive) can affect the successful collaboration by enhancing government effectiveness, and by building a strong relationship between all participants.

2.3.3. Social Capital and University-industry relationships

Social capital is argued to have influence on the collaboration between individuals and organizations through its dimensions. This influence can be within the internal structures of organizations as well as between different organizations. Personal relations influence organizational collaborations (Steinmo, 2015). Bertrand, Bombardini, and Trebbi (2011), after discussing the concept of whom you know or what you know, show that the influence is more from whom people know, and not what they know. In addition, social structure plays a key role in social capital. In other words, the structure of every society, differing from other societies, has its influence on the social formulation. Social structure also plays an essential role in directing inter-organizational relations. Chung et al. (2000) consider social structure to be one of the key drivers for forming collaborative arrangements with key members.

According to Gulati (1995), empirical evidence shows that an organization's social capital can affect and influence the companies' decisions to form alliances. Gulati (1995) also argues that social ties, including direct and indirect ties, have positive impacts on establishing collaborative relationships. Chung et al. (2000) confirm that argument, and they illustrate that an existing social network provides the infrastructure for forming collaborative relationships. Hence, alliances lead to organisational collaboration. This collaboration is originally initiated by personal ties.

Such ties represent a base for many alliances as well as influencing the links between organisations. Collaborations and ties work towards enhancing or diminishing social interaction. For example, Xu (2016) found that there is a significant positive relationship between strong research ties and new venture's research collaboration with universities.

Social interaction is a key structural dimension aspect leading to a debate between researchers on the impact of social interaction. According to Grandori and Soda (1995), social interaction ties improve collaboration between collaborative members. Brass, Galaskiewicz, Greve, and Tsai (2004) argue that interpersonal ties not only represent themselves but also represent the department and organization they belong to. Hence, it becomes apparent that social interaction ties between people extend their impact to create ties between organizational units and organizations. In addition, scholars argue that social interaction ties affect the strength of inter-organizational relationships (Ahuja, 2000; Gulati, 1995; Gulati & others, 1999; Xu, 2016).

“Appropriable” is the terminology applied when, through personal relationships, members develop and make business exchanges on organizational levels (Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998). Social capital is described as “appropriable” (Coleman, 1990). According to Grandori and Soda (1995), social interaction ties are vital, as some of the relationships are solely based on interpersonal networks, which, according to Larson (1992), lead to establishing the bases of developing collaborative relationships. Consequently, intra-university or intra-firm and inter-university or inter-firm relations are often a function of interpersonal ties. These interpersonal ties cannot be strengthened without basing them on trust. From this argument the consideration is made in this dissertation that the structural dimension of social interactions is relevant for university-industry collaboration.

Trust establishes the foundations for collaboration that are positively addressed and envisioned (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). Through trust, collaborative partners can minimize opportunistic behaviour that could result from collaborative behaviour such as information exchange. Trust, together with social

interaction ties, can also improve the effectiveness and mutuality of participating universities and firms within collaborative settings (Larson, 1992). In addition, they can improve efficiency through reducing negotiating time, contracting costs, and speed up decision making by providing the right information at the right time (Uzzi, 1997).

However, “there is a dearth of research that examines the role of trust in U-I collaborations” (Bstieler, Hemmert, & Barczak, 2015, p.113). Trust facilitates the extent of resource exchange and combination (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). These are the justifications for considering trust as one of the major points of social capital in this dissertation. In other words, trust strengthens personal ties, enhances mutual interests, and builds a basis for solid collaboration between units within each organisation and between different organisations. Trust, therefore, results in a shared vision between the different stakeholders of any social formation regardless of its formal or informal creation.

Shared vision is one of the important elements of successful collaborative arrangements between university and industry. Shared vision is one of the aspects of the cognitive dimension (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). To achieve collaboration, collaborative members need to find common ground on which to build relationships. Through shared vision, supply chain members can achieve alignment, which is one of the important prerequisites of successful collaboration. Shared vision positively affects collaboration (Kim, Park, Ryoo, & Park, 2010). Steinmo (2015) states that

Common goals and understandings regarding the collaboration and the creation of personal relationships between the employees of firms and universities helps mitigate collaborative challenges, stimulate cohesion and realize the goal of creating innovations (p.597).

Achieving alignment is an important aspect of university-industry collaboration, and it is a social dilemma. Alignment is when collaborative members adapt their

objectives and goals and work toward maximizing their overall interests and not their own interests (Lee, 2004). In U-I context, the dilemma is about the misalignment that can occur where some might look to maximize their own interest while others work towards the benefit of all members in the network. As mentioned earlier, social capital can provide a common vision for the social networks, which in U-I context can provide alignment.

Bao (2009) provides in-depth analysis of the work of Nahapiet and Ghoshal (1998), showing its relevance to the industry-university-research (IUR) cooperation. He analyzed the social capital features that affect the understanding of (IUR) from the relational, cognitive and structural dimensions. He concludes his study by emphasizing the importance of social capital in innovation and the collaboration between industry-university. He proposes some countermeasures to support the recognition of IUR collaboration in the perception of social capital, such as the establishment of supportive innovation networks of IUR and the enrichment of weak bonds of enterprises.

The conclusions of Martínez-Cañas and Ruiz-Palomino (2010) support Bao's findings. They found that social capital has positive and significant facets (structural, relational, and cognitive) reflected in each dimension. They also found that social capital generated through relationships with universities had a significant positive effect on knowledge acquisition and reputation.

An unexpected finding of the study by Martínez-Cañas and Ruiz-Palomino (2010) was that social capital had no significant positive effect on the development of new products and technological distinctiveness. Such a result can be because of the strong network and relationship between the partners and which is continued for a long time. In this case and over time, such a relationship may "converge", which means the partners will become so similar in their understanding, habits, and experience that they will not have much diversity in their opinions and will have less new knowledge creation.

In a related study, Macke et al. (2012) attempted to identify and understand how social capital and commitment are related to the environment of a collaborative food network: the Brazilian Wine Industry Cluster. Their results show that affective and normative organizational commitments enhance social capital development, especially in relational and cognitive dimensions. They also found that the instrumental, relational and cognitive dimensions of social capital have a positive correlation with affective and normative dimensions of organizational commitment through the following characteristics:

- a) The structural dimension of social capital and organizational commitment: elements such as reciprocity and cooperation influence the manifestations of commitment.
- b) Relational dimension of social capital and organizational commitment: elements such as trust, participation and shared norms influence the indicators of commitment.
- c) The cognitive dimension of social capital and organizational commitment: elements such as communication and values influence organizational commitment.

From the above discussion, it can be suggested that social capital through social interaction ties, trust and shared vision can affect university-industry collaboration. Thus, this study contributes to understanding such an environment by examining the impact of social capital's factors on the university-industry collaboration.

2.3.4. Intra-organizational Social Capital

Social capital is important for both the internal and external relationships of any organization. The internal social capital can be defined by the organization and the substance of relationships between actors within a system (Leana & Pil, 2006). Steinfield, DiMicco, Ellison, and Lampe (2009) state that "within an organizational setting, social capital facilitates knowledge management processes in that it enables

individuals to locate useful information, draw on resources and make contributions to the network" (Steinfield et al., 2009, p.245). Along similar lines, it has been found that strong intra-firm networks help to increase intellectual capital (Khoja & Maranville, 2009).

Maurer, Bartsch, and Ebers (2011) argue that even though many studies indicate a positive effect of social capital on organizational performance outcomes, the empirical results do not conclude the link between social capital and organizational performance. So, they suggest that "the organizational performance outcomes of organizational members' social capital hinge on the mediating processes of resources mobilization, assimilation, and use" (Maurer et al., 2011, P. 157). Their findings support their theoretical suggestion in that knowledge transfer facilitates the members' intra-organizational social capital and the organizational performance outcomes of growth and innovation performance.

Nahapiet and Ghoshal (1998) suggested three dimensions of social capital: structural, relational, and cognitive. Tsai and Ghoshal (1998) show, after using the three dimensions of social capital, that social interaction positively affects the extent of resource exchange at an intra-organizational level. In a similar study, Tsai (2000) finds that the interaction between social capital and strategic relatedness significantly affects the formation of intra-organizational linkages.

The first aspect of social capital addresses the relations amongst actors—with whom and with what frequency they share information. Tsai and Ghoshal (1998) also argue that the information provided by this aspect can help to achieve the goal of improving the organization's ability to engage and integrate knowledge. It is also believed that to facilitate individual learning in a context there is a need to share the information where individuals learn knowledge through means other than the formal recognized practices such as reflective dialogue, and collaborative discussions (Jordan, 1989). This type of learning is thought to improve performance, mainly in knowledge-intensive organizations.

The relational aspect of social capital, as explained by Nahapiet and Ghoshal (1998), identifies the type of personal relations people have established with each other through a history of communications. Leana and Van Buren (1999) and Nahapiet and Ghoshal (1998) assert that amongst social capital's central characteristics is the level of trust among actors. To foster and reinforce that behavior, Coleman (1990) argues that believing in relations enhances cooperative behaviors and united action in the absence of obvious mechanism. This trust allows the spread of more information in addition to richer and possibly more esteemed information. The trust between members would result in establishing a healthy environment where they may exchange sensitive information that is not available to others outside the circle of trust (Bradach & Eccles, 1989; Rousseau, Sitkin, Burt, & Camerer, 1998; Sabel, 1993). The same authors add that these members are assumed to not fear opportunistic behavior on the part of their colleagues. This should eventually enable a kind of collaboration and exchange that result in great value for both organizations and the individuals who work within them.

The third aspect of social capital is the cognitive aspect which emphasizes that a better interaction between individuals could have a positive result in developing a mutual set of goals, and a collective vision for the organization; this is, in fact, what Nahapiet and Ghoshal (1998) refer to as the cognitive dimension of social capital. Coleman (1990) notes that shared vision and goals help promote integration and create a sense of shared responsibility and collective action. This aspect of social capital is both supported by, and supporting of, structural and relational components; as Mohammed and Dumville (2001) point out, people who share equivalent mental models about their work also have stronger high-quality relations which enable them to network with one another and share information frequently.

All three aspects are believed to allow information to flow easily and be absorbed between legislative members, thus improving organizational functioning ((Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). This study argues that, based on what has been discussed earlier and on the findings of Tsai and Ghoshal (1998), the three

dimensions of the internal social capital of a university can impact the extent of collaboration between university and industry.

In addition, this dissertation considers that the internal social capital of a university or a firm is equally important and is a prerequisite for interaction with other actors. It is important for each side (university and firm) to identify its social capital by determining, for example, how it is connected internally, and whether the main departments and critical members are connected properly to each other and share the same vision and goals.

2.3.4.1. *Inside the University*

It is argued that the changes occurring around the world result in many challenges facing higher institutions, such as the increasing competition locally and internationally with other universities and institutions, the shortage of government funding and support, and new laws (e.g., intellectual property). According to Perry (2009), in order to face such challenges universities should take actions to rationally manage both internal and external knowledge and capital, and use all its social capital and the collective value of all social networks to do things for each other.

Safarzadeh, Soloukdar, Alipour, and Sharif (2012) investigated the effects of social capital on work activities of academics employed in universities in Iran. Their objective was to measure social capital among academics and how it affected their work activities. They found that there was a positive and significant correlation between the level of social capital and the level of quality and quantity of academics' work; that is, the higher level of social capital among academics resulted in higher levels of quality and quantity in academics' activities.

Dervojeda (2012) conducted a study to explore why some academics exploit their social networks with industry more actively than others. She examines this issue taking individual academics as the unit of analysis. Dervojeda argues that since the interaction with industry is not a compulsory task for academics, new systems of incentives are needed to encourage academics to activate their social capital with

industry. Therefore, understanding why academics activate their social capital with industry is important for designing the right policies and incentive systems.

Based on Dervojeda's findings, the activation of academics' social capital with industry is a complex process which is influenced by a number of factors, such as academics' individual motivation to interact with industry, their perceived ability to do so, and their perceived social influence. This dissertation considers that any organization including the universities should give more attention to the social capital dimensions (structural, relational and cognitive) when formulating their policies, whether for internal or external activities, such as when interacting with government and industry.

Rotolo and Messeni Petruzzelli (2013) focus their study in the debate concerning academic scientific productivity. They examined the degree to which building social capital within the academic community signifies a valued resource for a scientist's knowledge creation process. They find that those academic scientists that build social capital by dominating chief positions in the community outperform their more secluded colleagues. However, they point out that scientific productivity declines beyond a certain level of centrality. It is clear how important it is to build social capital within the academic community, but at the same time, such processes need careful attention and balancing.

Gonzalez-Brambila (2014) studies the relationship between social capital and knowledge creation in academia across different areas of knowledge. The following are the important results of her study:

- What matters in social capital is having many ties, being in a central position, having partners from different areas of knowledge, and being part of a non-dense network.
- Governments and institutions should design policies to enhance higher openness and mobility, and discourage inbreeding.
- Science policies should encourage team collaboration.

- The impact of social capital differs importantly depending on the area of knowledge.

2.3.4.2. Inside the Firm

In their study, Tsai and Ghoshal (1998) assessed the way in which social capital affects the interior functioning of firms and how social capital contributed to a firm's ability to create value in the form of innovation. They use the three social capital dimensions (structural, relational and cognitive) proposed by Nahapiet and Ghoshal (1998) in their study. Their findings support the argument that social capital facilitates value creation. They also found that the three dimensions of social capital that they assessed (social interaction, trustworthiness, and shared vision) have significant effects (directly and indirectly) on resource exchange and combination within the firm.

Camps Martin and Marquès i Gou (2011) claim that even though the literature recognizes the importance of social capital, most research treats social capital as homogenous in terms of level and quality, irrespective of who has the capital inside the organization. According to them, this way of research may not represent the right situation because different social groups can be found inside a single organization. Therefore, in their study, they explore inter-group differences regarding social capital and how and why they may explain intra-organizational differences in innovation capabilities and innovation readiness. Their aim was to answer three main research questions: 1) to what extent are there differences in social capital between groups within the same organization? 2) Why do these differences exist? 3) How do these differences explain different capabilities and readiness for innovation between groups?

After conducting an in-depth case study and interviews within a firm, Camps Martin and Marquès i Gou (2011) came-up with three different groups within that firm: high-responsibilities group (HRG), medium-responsibilities group (MRG), and low-responsibilities group (LRG). They use some criteria to classify these groups, such as the current degree of responsibility, their involvement, and the type of reference group

that they had. After identifying the groups, they used social capital dimensions (structural, relational and cognitive) to analyze the similarities and differences between them.

For the purpose of this study, the focus was set on the findings of the first two questions of Camps and Marqués' study.

The following table (Table 2.3) summarizes the findings of the first question: To what extent are there differences in social capital between groups within the same organization?

Table 2-3 : Summary of Camps and Marques' Study's Findings

	HRG	MRG	LRG
Structural dimension	- Small and clearly defined reference group.	- More people with variable intensity of relationships and Some members have no contact with others.	- Delimited reference group. - Sub-groups inside the main group. - Members are isolated but closer to their small groups.
Relational dimension	- Trust group members and the organizations.	- Trust group members and the organizations.	- Only trust their reference group and have little confidence in other groups or the organization as a whole.
Cognitive dimension	- Have shared vision. - Presence of shared codes and narratives.	- Have shared vision. - Less presence of shared codes and narratives.	- More partial one. - Not observed since they did not take part in formal meetings.

Sources: Camps Martin & Marquès i Gou (2011)

In regards to the second question: why are there differences in the social capital? Camps Martin and Marquès i Gou (2011) claim that one explanation for such differences may be the diversity of social capital drivers, namely: stability, closure, interdependence and interaction. For example, by using the closure and interaction drivers, the differences in the network configurations of the structural dimension can be explained. Thus, they argue that structural dimension is mostly influenced by closure and interaction, and that stability and interactions are the most influential

drivers for the cognitive dimension. According to their study, closure, interaction and interdependence can impact the relational dimension of social capital.

The study by Camps Martin and Marquès i Gou (2011) has been relevant for defining this dissertation because it focuses on the intra-organizational differences of social capital which can be found in most organizations that include different groups of members, including the university. One feature of their study is the application of social capital dimensions between groups inside a single organization.

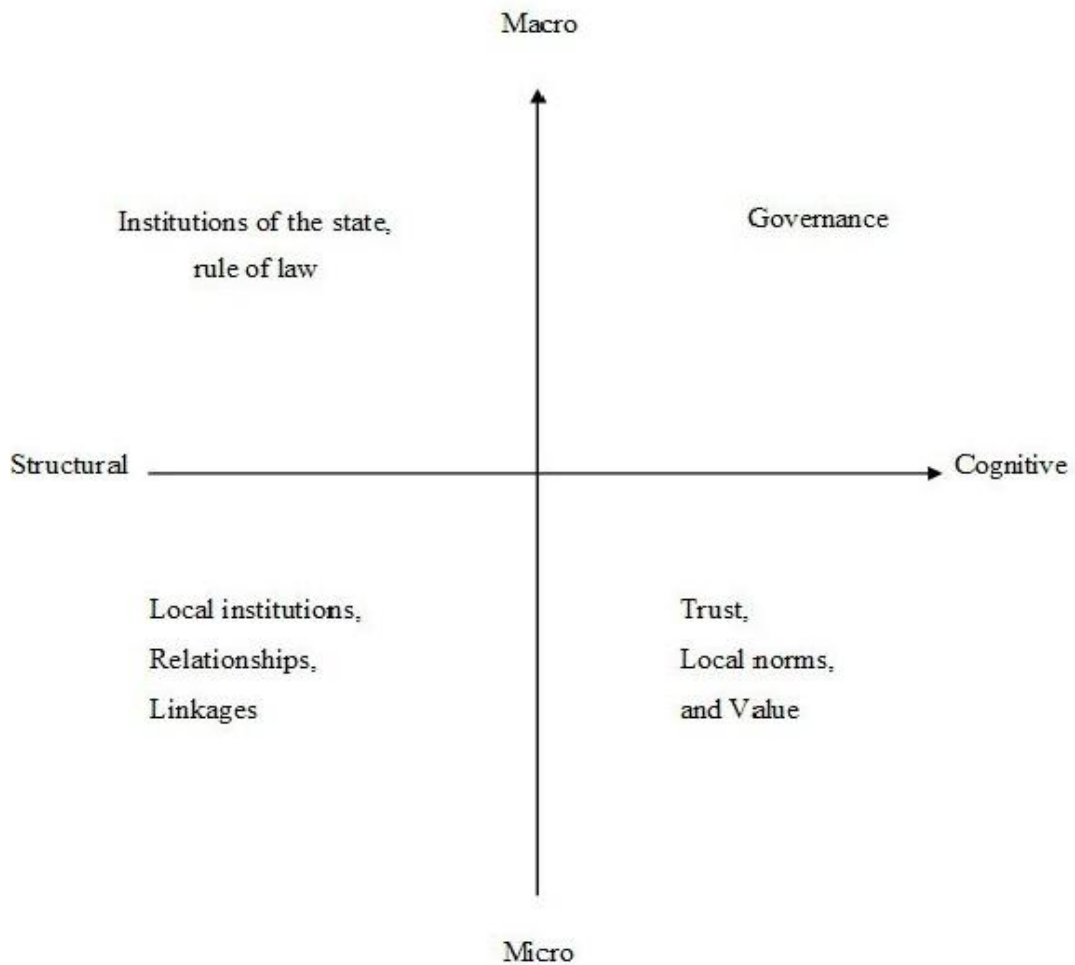
From the above discussions, it can be concluded that the internal social capital of the university and firm through its three dimensions can also directly and indirectly affect the university-industry collaboration by enhancing knowledge transfer and resource exchange between them.

2.4. Measuring social capital in different levels

The main inspiration behind analyzing social capital at different levels in this dissertation is the work of Grootaert and Van Bastelaer (2001) who proposed and build a social capital framework around two key dimensions of social capital: its scope (micro, meso, and macro) and its forms (cognitive and structural). According to them, the scope of social capital ranges from micro to the macro level. At the micro level, analyzing social capital is associated with face-to-face interactions between individuals, whereas at the macro level it includes social capital and the political environment which formulate the social structure.

Grootaert, Van Bastelaer, and others (2002) argue that the presence of micro, meso, and macro levels of social capital allows for important effects of complementarity and substitution between three levels (**Figure 2.1**). They state that "these various levels of social capital can complement each other, as when national institutions provide an enabling environment in which local associations can develop. However, local forms of social capital can be developed as a result of both good and bad government" (Grootaert et al., 2002, p. 4).

Figure 2-1 : The Dimensions of Social Capital



Source: Grootaert et al. (2002).

2.5. Chapter conclusion

Different issues related to social capital have been discussed in this chapter such as conceptualization, theories, benefits and its impact on different relationships. Also, the related connections between social capital and the purpose of this study were discussed, such as the role of social capital in inter-organizational relationships as well as in intra-organizational relationships.

In this thesis the consideration is made that social capital can ensure successful interaction and collaboration between government, university and industry, and that social capital can enhance innovation. Also, social capital through its three

dimensions (structural, relational, and cognitive) can affect successful collaboration by enhancing government effectiveness, and by building a strong relationship between all participants.

Furthermore, based on the previous discussion, it can be suggested that social capital through social interaction ties, trust and shared vision can affect university-industry collaboration, and that any organization, including a university, should give more attention to the social capital dimensions (structural, relational and cognitive) when formulating their policies, whether for internal or external collaborative activities. In addition, this dissertation considers that the internal social capital of a university or a firm is equally important and it is a prerequisite for interaction with other actors. Finally, the model proposed by Nahapiet and Ghoshal (1998) was chosen because its connection with intellectual capital provides the link between social capital and the role of universities in innovation.

In the following chapter the discussion will be on the different relationships that a university has with its environment, and how such relationships impact the firm and national competitiveness in forms of innovation, higher education and training, and technological readiness. The goal is to identify the relationships through which social capital can be developed.

Chapter 3: Main Relationships for University and its Impacts on Competitiveness

3.1. Chapter introduction

This chapter covers the main relationships for universities which include their relationships with government, industry, and their internal relations, and how such relationships are important in the innovation systems and for innovative activities. Universities are one of the main actors in innovation systems and have different relationships with other actors because such systems are both social and dynamic (Lundvall, 2007), and this refers to both the nature of the institutions that make up the system, as well as the linkages and flows that connect them to one another (Feinson, 2003).

Thus, this chapter explores what has been said about the nature of involvement of a university in such systems as well as about the relationships and interactions between universities and other actors like government and industries, especially in regards to the innovation processes. This was done by using the three main innovation approaches: National Innovation System (NIS), Regional Innovation System (RIS), and Sectoral Innovation System (SIS). The impacts of university's relationships on competitiveness are covered in this chapter.

There are six sections in this chapter. Section 1 discusses the role of a university. Section 2 outlines the university's relationship with national level (government). Section 3 talks about the university's relationship with industry and the intra-organizational relations are discussed in section 4. The impacts of a university's relations in competitiveness are covered in section 5. Section 6 provides summary of this chapter.

3.2. University's role

In this section the role of a university in general is addressed, and in the coming sections this role and the university relationships with government, industry, and internally are analyzed in more detail using the previously mentioned innovation approaches (NIS, RIS, and SIS).

Many researchers study the engagement and role that universities can play in fostering the creation of new knowledge as well as in transferring this knowledge or technology to other actors in the society (e.g. Benneworth & Osborne, 2014). Altbach, Reisberg, and Rumbley (2009) point out that in the past, higher education institutions like universities were part of social policy, but now that situation has changed and such institutions are considered to be a critical component of national policies, and their contribution and involvement are recognized by many countries.

According to Veugelers and Del Rey (2015), the contribution of universities to successful economies is quite evident. There are also better outcomes and achievements as a result of the successful collaboration between universities and markets in regards to, for example, the economic value (Audretsch & Lehmann, 2005; Calcagnini, Giombini, Liberati, & Travaglini, 2016; Link & Welsh, 2013). To some scholars, most university's units are seen as involved in three main activities: education, scientific production, and transfer activities to the public and private sector (Lepori, Wise, Ingenhoff, & Buhmann, 2016; Probst, Lepori, De Filippo, & Ingenhoff, 2011).

Aranguren, Guibert, Valdaliso, & Wilson, (2016); and Giuliani & Rabellotti (2012) point out that universities have a role as generators of new knowledge and as catalysts of change, as well as being actors that can interact with other actors in their environment, such as local industry, and contribute to its innovation. Charles, Kitagawa, and Uyarra (2014) highlight that the concept of "engaged university" refers to a broad range of activities including different engagements such as civic, public, and community engagements. They state that

This broader role includes the contribution of higher education to social, cultural and environmental development, by means of formal and informal participation and external representation as an institutional actor in regional networks of learning, innovation, and governance (Charles et al., 2014, p. 329).

Globally, as indicated by Roos and Pike (2011), policy-makers formulate new policies to strengthen the role of universities as the core agents of economic development (local, regional and national levels). Goddard and Vallance (2011) state that “universities are being attributed a changing role in public policy, where they are increasingly positioned as central to the building of ‘knowledge economy’ at regional or urban as well as national scales” (p. 426). Thus, universities through their academics and researchers are asked to contribute to the development in ways that extend beyond teaching and research. Instead, their contribution would be by creating knowledge and by contributing to change in other organizations, so that those organizations could adapt to a new environment in the knowledge economy (Karlsen et al., 2012). According to Aranguren, Franco, Horta, and Silveira (2016), such change requires an open and flexible organizational model that encourages and motivates researchers to interact with other actors in their environment, as well as to be agents that work and contribute with other actors strategically in the development process.

The traditional role of a university involves education and basic research but now this role is changing to include a significant and direct role in economic development by focusing on rigorous research that can contribute to economic development. As Johnston and Murray (2004) note: “There is potential for the traditional activities of universities in teaching, research, skill development and knowledge management to be rapidly refocused along market lines, with an emphasis on the particular needs of a knowledge economy” (p. 32).

Therefore, many countries in the world are focusing on developing the education sector more than ever in order to stimulate innovation, increase their competitiveness, and achieve high economic development. According to Deiacco, Hughes, and McKelvey (2012), universities act as outlets for the development of wider societal impacts, and to facilitate integration into wider social and innovation systems through what has been called its public space role, where “important reflective interactions can be fostered with a wide range of problem-based and problem-solving activities” (Kitagawa & Lightowler, 2012, p.3)

Currently there are many debates on the role of universities and their contribution in economic growth and development. Brundenius, Lundvall, and Sutz, (2009) list some debates on the role of universities in financing, relevance of university research, the quality of education, and social inclusion and social relevance. According to them, since finance of higher education comes (in most cases) from the general public budget, there are competing priorities and pressures on universities both to prove their social relevance and to prove their cost-efficiency for education as well as research.

Another vigorous debate concerns science and humanities research. Olmos-Peñuela, Benneworth, and Castro-Martínez (2014) ask, Are sciences essential and the humanities elective? They raise this question after noticing that there has been much policy discourse that suggests that arts and humanities research is perceived as being less useful to the public than that of other disciplines (e.g., science, technology and engineering). They argue that humanities have different kinds of social value that should be recognized by policy makers. They conclude their study by pointing out that humanities have a direct economic impact and there is no reason why humanities should be considered less useful.

In emphasizing the importance of humanities, Harvard President Drew Faust (2012) states that “the humanities ... teach you not a particular skill or technology, but to think and question. Conflict resolution and creating a better world do not come from an improved piece of software or a better engine or technology but from people who can break free from their rigid points of views” (p. 3). In regards to the social

scientists and their strategic engagement in development, Aranguren et al. (2016) point out that social scientists need to adapt their approach to research and to become ‘social researchers’ as facilitators of change processes, as well as having more active involvement and commitment with other actors in their region.

Universities can have different impacts in many fields beyond economy (Arbo & Benneworth, 2007; Charles et al., 2014; Goddard & Vallance, 2013; Kotosz, 2013). For example, Kotosz (2013) summarizes the general impacts of universities in the following table (Table 3.1).

Table 3-1 : General Impacts of Universities

Impacts on	Example
Politics	Changes in the political structure, an increase in citizen participation, improvement in the organization of political processes.
Demography	Impacts upon population growth, population structure and upon mobility.
Economy	Impacts upon regional/local income, industrial structure, job market, labor mobility.
Infrastructure	Impacts upon housing, traffic, healthcare services, retail.
Culture	Greater offer in cultural goods, influence upon cultural environment.
Attractiveness	Influence upon the region’s (local) image, regional (local) identity.
Education	Impact upon participation rate, changes in its quality.
Social aspects	Impact upon the quality of life, the influence of the students.

Source: Kotosz (2013, p. 45)

The conclusion from the above discussion is that universities can contribute to economic growth through different ways, such as the generation of knowledge, the production of basic and applied research, and the development of highly qualified and skilled graduates. Thus an emphasis on increasing knowledge transfer and technology commercialization performance is a key focus of many research universities. To realize such contribution, policies and initiatives to strengthen existing knowledge flows and collaboration linkage between universities and firms must be developed and

implemented and this cannot be achieved without a strong interaction between the different actors at the national, industry, and intra-organizational levels. However, according to (Al-Tabbaa & Ankrah, 2016; Ellegaard & Andersen, 2015; Omar, Leach, & March, 2014), such interaction and inter-organizational relationships are daunting and complex processes which require more effort and supportive environments.

The following sections cover the main universities' relationships with government, industry and internally as well as their role and involvement in more detail by using the three main innovation approaches (NIS, RIS, and SIS).

3.3. Relationships with government

As discussed in chapter two, the integration and interaction between the different actors from different levels are very important for the success of collaboration and they can result in many benefits for all participants. No doubt that the same applies to university relations with the government, for example. The government with its national plans and policies can influence university strategy and impact the way it interacts with other stakeholders in its environment. According to Dodgson and Staggs (2012), the policies that are formulated at the national level are very important for university decision making and its administrative and academic leadership process. Also, Van Der Steen and Enders (2008) point out that a high number of universities are managed and affected by national regulations and policies to do with higher education, innovation, and funds, for example. Whitley (2008) claims that universities as strategic actors depend on the government's structure and policies. He also highlights that organizational identities, powers and responsibilities of the universities are determined by the government.

Deiaco et al. (2012) raise three important issues relating to public policy and the role of university; the first one is related to the importance of being aware of how universities can eventually contribute to the overall innovation efforts and what their strategic role can be; the second one is about the need to have a holistic policy because universities' strategic roles cannot be implemented if they are not linked to other components in the innovation system; and the last issue concerns the contexts of

the policy, which can include regional, national and even international levels. Each level will require a clear path over time with a specific micro-meso-macro structure that will affect the nature of, scope for and reaction to particular policy intervention.

Seppo and Roolah (2012), and Gomez, Daim, and Robledo (2014) point out that government by its policies can play a critical role in bringing universities and industries closer together to enhance the collaboration process and expedite cooperative relationship successfully. Howells, Ramlogan, and Cheng (2012) conclude their paper by asking whether the governments put in place institutional and funding framework that reflects the new role of universities as important in the system. Van Der Steen and Enders (2008) state that

Government should be aware that their policy incentives have an impact on the strategic behavior of universities. There is a risk that scientists at the level of the research unit, who can respond quite effectively and flexibly to firm demands, are forced to change their behavior because of enforced strategies of university administration as a reaction to changed national policies (p.291).

Freitas, Marques, and Silva (2013) argue that public policies that enhance the collaboration between university and industry need to be aligned to academic values if they are to be effective.

Also, Kelly (2010) argues that by creating a university-centered bio-innovation ecosystem, for instance, the three-way dialogue between government-university-private sectors can dramatically be optimized. According to him, such an ecosystem will facilitate conversation between the stakeholders, and each one of the three elements will improve the connection between the other two. We think such ecosystem can remove or reduce many obstacles that hinder the university-industry collaboration. The ecosystem will also build strong links between the different levels from policy formulation (macro) to its implementation (micro). Kelly (2010) highlights other benefits of this triangulation structure: 1) generation of more user-

driven innovation in the universities, 2) increase in evidence-based regulatory framework, and 3) enhanced economic growth through job creation.

3.3.1. Contribution of the three Innovation Approaches (NIS, RIS, & SIS)

There is no doubt that creativity, skills, competencies of people, and having a quality higher education system are critical for the success of any national innovation system and for national economic development as well. NIS is considered to be a field in academia that addresses the relationship between the university and national level (e.g. government). Gao and Van Lente (2008) raise attention to some issues that influence the diffusion process of innovation at a national level; among them are the interactive learning process between the actors. Some scholars argue that the framework of this approach focuses on analyzing innovation at the macro level, and on conceptualizing and understanding the 'system' as a whole rather than the underlying system processes (Watkins, Papaioannou, Kale, & Mugwagwa, 2014). Chan and Daim (2012) deemed the NIS as an approach with a macro perspective when they categorized the innovation systems. Gao and Van Lente (2008) summarized the strengths of NIS in the following three points:

1. Focuses on studying macro-economy development and national innovation capability.
2. A useful means for analyzing and comparing innovation between countries.
3. Provides a comprehensive understanding at the national level for policy makers.

Universities play a critical role in national innovation systems because of the different contributions they provide in such systems in terms of educating and training people, as well as performing research that adds to the stock of new ideas in the economy (Datta & Saad, 2011). According to Gomez et al. (2014), "within the NIS, universities play a key role as the main source of knowledge that supports national productivity and as a system that seeks to improve the competitiveness of firms and to find answers concerning market needs in today's fast-changing and globalized economy"

(p.70). According to Klerkx and Gildemacher (2012), universities' effective contributions toward innovation and building capacity ensure the success of the innovation system and justify public investments.

In emphasizing the importance of universities as part of the national higher education system for the knowledge-based economy, Mowery and Sampat (2005) point out that national systems of higher education can be a strategic asset, if links with industry are strengthened and the transfer of technology enhanced and accelerated. Nelson (1993), who is considered to be one of the pioneers of NIS approach, and after he studied many national innovation systems in different countries, argues that:

One important feature distinguishing countries that were sustaining competitive and innovative firms was education and training systems that provide firms with a flow of people with the requisite knowledge and skills. For industries in which university-trained engineers and scientists were needed, this does not simply mean that the universities provide training in these fields, but also that they consciously train their students with an eye to industry needs" (p. 511).

Datta and Saad (2011) look into the evolution of the innovation system in India and the roles of the universities in the light of various system theories of innovation; one of them was the national innovation system theory. They argue that even though the importance of universities is well valued in the NIS of India, it focuses only on the materializing side of its research outputs which limit the university role.

Universities can do more than their traditional roles (teaching and basic research). They can produce many other outputs which can benefit the national economy, and some of them are: information in science and technology, advances in equipment and instrumentation, innovative skills or human capital, networks of scientific and technological capabilities, and samples for new products and processes (Mowery & Sampat, 2005). However, as pointed by Group of Eight (2011), there can be a danger that debates on how universities contribute to national development take too narrow a

view by focusing on short term and direct measures of commercial value, ignoring the broader economic, social, cultural and environmental impacts and the effect of these on national reputation and credibility.

Thus, it has been believed that such measurements will not present the right picture of the universities' involvement in the development process and will seriously underestimate their contributions. Therefore, all contributions should be considered (direct and indirect) when measuring the university performance. Roos and Pike (2011) argue that in various occasions the indirect support for innovation contributed by universities tends to be more effective than the direct contributions themselves. Indirect contribution includes for example, awareness raising conferences and workshops, and training programs.

Universities in NIS are critical institutional actors and the purveyors of basic scientific knowledge (Mowery & Sampat, 2005). They are also the generators of trained "knowledge workers" and ideas sources from research activities (Mowery & Sampat, 2005). The Academia in NIS conducts both basic and applied research with emphasis on the former; it educates and trains students, thus raising stock of human capital in the economy; and it plays a direct role in the innovation process by being an originator of new ideas and products through research.

According to the Group of Eight (2011), universities provide a learning environment and supply learned people; they contribute to cultural development (as one of the framework conditions); and they help cultivate a sophisticated society. In addition, Group of Eight (2011) points out that university research can be a source of information that contributes effectively toward the establishment of free trade agreements, as well as the elimination of trade barriers, to eventually introduce a new market opportunity for all participants within the economy. Florida (2002) has highlighted the importance of universities' roles in the creative economy by arguing that universities can attract innovative businesses and stimulate their development by contributing to creating the right environment.

The national context is important for the Regional Innovation System (RIS) as national policies (e.g. higher education) are connected to RIS approach (Karlsen, 2007); and it exerts huge influence over the regional systems (Schrempp, Kaplan, & Schroeder, 2012). Universities are one of the largest employers (Lester & Sotarauta, 2007). They deliver guidance to politicians and policy-makers, update general public debates, and determine the national spatial distribution of social opportunities and services (Benneworth, Coenen, Moodysson, & Asheim, 2009).

National policies are very important for the Sectoral Innovation System (SIS). SIS interacts with NIS not only in cumulativeness and path-dependency, but in novelty and change as well (universities are parts of the NIS) (Castellacci, 2009).

Based on the above discussion, NIS considers universities as important actors with a critical role at the national level, and that interact with the government to build national innovation capability and strengthen the national economy by providing educated and trained people, by performing research that adds to the stock of new ideas in the economy, by being a main source of knowledge that supports national productivity, and by providing answers concerning markets needs in today's fast-changing and globalized economy. Therefore, the university-government relationship, according to NIS, is very important and critical for the innovation processes and for other important areas at the national level. NIS focuses more on the national level and on the relationship between university and government, while RIS and SIS focus more on other types or levels of university relationships, as will be seen on the coming sections.

3.4. Relationships with industry

In emphasizing the importance of university-industry collaboration in knowledge economy, Edmondson, Valigra, Kenward, Hudson, and Belfield (2012) indicate that industry and higher education institutions have been in collaboration for more than a century, however due to the rising importance of global knowledge economy there is a need for rather more strategic collaboration that goes beyond the traditional funding from industry toward research projects. The increase of the interconnectedness and

interdependency of science, technology, business, and economy, and the rise of the global innovative knowledge economy have made such alliances imperative (Batarseh, 2013).

According to Lööf and Broström (2008), there are some empirical studies that support the assertion that using academic knowledge can add value toward innovation, growth, and technological change in the private sector through new techniques, new theories, and new skills that cannot be provided by the industry itself. According to Robin and Schubert (2013, p. 149), "Most lines of research agree on the fact that interactions between industry and science are among the most prominent institutional interfaces for knowledge diffusion". Also, De Fuentes and Dutrenit (2012) point out that the interactions between universities and industry is seen as a key element in National Innovation System (NIS).

Many researchers agree that universities, due to their knowledge establishment, have to participate in a direct way and with an active role in the development by serving as local knowledge outlets, bringing global state-of-the-art science, and facilitating industrial development (Benneworth et al., 2009; Isaksen & Karlsen, 2010; Karlsen et al., 2012). Many industries nowadays tend to look to the universities and other research institutions because they are incapable of responding to the rapid change in knowledge development. Such collaboration will enhance the industries' competitiveness and effectiveness through technology supply and specialized training of personnel.

Isaksen and Karlsen (2010) indicate that there are four possible functions for universities: 1) Being the foundation for the establishment and the development of new industries. 2) Contributing toward attracting new outside investment. 3) Supporting the technological expansion of existing industries. 4) Assisting the upgrade of existing regional industries. Other scholars consider the university as an important actor who acts as a facilitator and mentor for businesses linking with other firms and innovation partners (Howells et al., 2012).

The following sections cover what has been said about university-industry relationship based on the three main innovation approaches.

3.4.1. Contributions of the three Innovation Approaches (NIS, RIS, & SIS)

According to the narrow definition, NIS consists of multifaceted innovation actors that are only directly related to the generation, diffusion, and the appropriation of technological innovation. Research and Development departments, universities, and public research institutes can be taken as examples (Chung, 2011). According to Schoser (1999), formal institutions and networks within the narrow NIS, and which are considered to have a direct involvement in the innovation process, include companies, universities and non-universities, research institutes, technology transfer agencies, and technology policy and programs.

Also, Schoser (1999) mentioned some informal processes for interaction between companies, universities, research institutions, and other units, and some informal cognitive and behavioral forms in the innovation process:

- Quality of links between customers and suppliers, interactive learning,
- Degree of competition level or co-operative behavior among companies,
- Companies' willingness to co-operate with scientific institutions,
- Closeness of the relationship between companies and technology policy

Even though Schoser (1999) did not focus on the universities, what he mentioned is related to the universities' involvement in the innovation process at this level.

A considerable amount of literature has been published on the nature and roles of universities' engagement in their regions (many scholars classify regions as meso level). Universities are considered to be very important actors in regional innovation systems (RIS) and play a significant role in regional development. The traditional missions of universities (teaching and research) have been shifted from indirect to direct interactions with regional stakeholders – for example by providing a competent

workforce, locally adjusted research, and directly supporting technological change and development for less resourceful small to medium firms (Tiffin & Kunc, 2011). Many researchers agree that universities, because of their knowledge base, have to contribute in direct ways and with active roles in the development of their host regions by serving as local knowledge outlets, bringing global state-of-the-art science, and facilitating industrial development (Benneworth et al., 2009; Isaksen & Karlsen, 2010; Karlsen et al., 2012).

In regards to regional industrial development, universities can play an active role by: sourcing new industries; supplying customized graduates and high-quality research; assisting in the diversification of existing industries; and helping in upgrading activities in existing industries (Isaksen & Karlsen, 2010; Karlsen, 2007). Fromhold-Eisebith and Werker (2013) point out that universities contribute to regional innovation-oriented development through a set of local linkages with partners from both the private sector (manufacturing and service firms) and public administration.

According to Lester (2005), universities' roles can be grouped in their local innovation processes into four broad categories: education and training; adding to the resources of classified knowledge; increasing the local capability for scientific and technological problem-solving; providing space for open-ended dialogues about industry development pathways and new technological and market prospects.

Charles (2006) examines the part played by the universities in regional innovation by using two perspectives. The first one is about the different forms of knowledge and knowledge transfer (knowledge as commodity, human capital, and social capital). His conclusion in this perspective is that when connecting together these forms of knowledge, one can see the important role that university can play in RIS because it can provide such forms of knowledge. However, Charles indicates that innovation systems require all types of knowledge to integrate coherently to strengthen each other. However, a major challenge universities need to address is the difficulty to integrate in their regional engagement within the national and the international levels.

Charles' conclusion reveals the importance of coordination and integration between the macro (national) and meso (regional) in regards to the universities' roles.

The second perspective in Charles' study pertains to different governance and policy context and consideration of national systems of higher education (Anglo-American model and state-control model), national programs for regional innovation (for all regions, selected regions, and regionally initiated schemes, e.g. knowledge house-KH) as well as regionally specific iterations. Charles concludes that:

- There is no standard formula or package that can be suggested for an appropriate role or mechanism for the universities in their specific and individual RIS.
- Different universities in dissimilar national and regional contexts with different governances and different innovation contexts will need to adopt different combinations.

Gunasekara (2006) recommends a conceptual framework for analyzing dissimilarity in the roles performed by universities in the development of regional innovation systems. The proposed framework points to two types of roles performed by the universities, which Gunasekara labels as generative and developmental roles. Generative roles are focused on knowledge capitalization and other capital formation projects; developmental roles are focused on adaptive responses by universities, which embed a stronger regional focus in their teaching and research missions (Gunasekara, 2006, p. 103). However, Benneworth et al., (2009) argue that these two distinct forms fail to address and represent the institutional complexity associated with universities which indicates that universities can capitalize knowledge from various governance contributions.

Power and Malmberg (2008) review two comparable but related debates: the debate on competitiveness and prosperity in regions, and the debate about excellence in institutions of research and higher education. They argue that universities concurrently play various roles at global, regional, and local scales, but the major

concern is how to utilize university research for social and economic development, and this concern may not be a regional problem only. More than that, they suggest that “the regionalization of both innovation and universities’ roles in innovation processes might lead necessary attention away from other important spatial aspects of innovation” (Power & Malmberg, 2008, p. 234). While many scholars consider the university to be critical to the success of RIS, Power and Malmberg (2008) have an opposite opinion because they claim that the universities are perhaps not so tightly knit into regional systems of innovation, but this does not mean that the universities play no role for regional innovation.

Benneworth et al. (2009) point out that university commitment with RISs is not as direct as it may appear, and early confidence has caused doubt and skepticism in less successful regions. Thus, there are many factors affecting the successful involvement of universities (roles) in their regions. Fromhold-Eisebith and Werker (2013) suggest two reasons behind the less successful regions:

1. Unrealistic assumptions about what a university can contribute to the innovation-oriented regional development through knowledge transfer.
2. In some cases the type of analytical approaches used to examine the relevant relationships are not appropriate.

In recent years, many researchers have been studying the different roles of universities and how such roles and activities can impact the innovation process and economic development in regions. However, Uyerra (2010, p. 1227) states that "despite this interest, a clear picture is missing in relation to the roles universities are seen to play, the benefits of university activities and the mechanisms through which they occur".

After reviewing a sizable literature on the roles of universities and their associated policy implications, she identifies five models or five key "roles" of universities (Table 3.2) in relation to their contribution to regional innovation. Each model or key role includes a different set of activities of universities, interactions, and mechanisms

of university engagement. It can be noticed from the five models how interests and expectations placed upon universities have shifted from more indirect contribution to economic development and innovation (via spillover effects) to a more formal, institutionalized and proactive role (Uyarra, 2010).

Table 3-2 : Roles, Determinants, and Engagement Modes of Universities

Model	Knowledge "factory"	Relational University	Entrepreneurial University	Systemic University	Engaged University
Main role of universities	Production of scientific knowledge	Exchange of knowledge	Active commercialization role	Boundary-spanning role	Development role
Main unit of analysis	Innovation outputs	Linkages	Intermediaries (e.g. TTOs)	Systems/networks	Spaces of governance
Main partners/beneficiaries	High-tech firms located in proximity to universities	Large manufacturing firms	Large manufacturing firms. Spain-off firms	Regional clusters. Regional SMEs	Regional stakeholders
Directionality of engagement	Unidirectional (implicit)	Bi-directional (implicit)	Bi-directional (explicit)	Triple-helix	Responsive
Dominant methodology	Industrial surveys. Citation count. Production function analysis	Industrial surveys. Case studies	Surveys of university TT managers	National and regional innovation surveys. Case studies	Case studies
Key factors influencing impact	Research intensity/ outputs. Geographical proximity	Structural factors (size of firms, age, sector, R&D intensity). Innovation strategy	Organizational practices. Managerial practices. Faculty behavior/ incentives	Regional system configuration. Regional policy. Institutional capacity of universities.	Number and synergies between universities. University leadership. Joined up policies/ incentives
Policy implications	Co-location of firms and universities. Increased funding for research	Some links should be promoted vis-à-vis others	Intermediaries and organizational arrangements/ incentives are needed to ensure links	Institutional arrangements are important to ensure linkages	Joining up of universities missions and other policies at different levels.

Source: Uyarra (2010, p. 1230)

The same scholar points out that the multiple roles that she described in her paper do not necessarily substitute one another, nor are they successive, but they can be found in the same university to a lesser or greater extent. Scholars agreed with Uyarra (2010) that these multiple roles raise serious concerns over potentially unrealistic expectations about the ability of universities to balance a broad range of new tasks against their traditional core mission. Each role will require different policies and arrangements to be implemented, and the universities must act according to the environment surrounding them.

Tiffin and Kunc (2011) argue that there is relatively little awareness by the universities' managers and regulators about the specific roles and techniques universities employ to participate in regional economies and promote their development. They point out that the public regulators have an obligation to structure the system so that the burden of making these links (between universities and other actors like the industrial actors) does not fall solely on the universities. This study suggests that not only should the public regulators structure the system but all actors from different levels (macro and micro) should contribute in building it. Interaction and collaboration between the different actors within the system are critical to its success. Furthermore, there is doubt about the point raised by Tiffin and Kunc (2011) that in case the public regulators do not structure the system by including links, the universities will only activate those components that generate revenue, and focus on short-term gains, rather than long-term economic development.

Recently, Fromhold-Eisebith and Werker (2013) analyzed various functions of universities by using different conceptual frameworks; one of them is the regional innovation system approach. According to those authors, universities can enhance and generate human capital and entrepreneurship. They found that universities can help in overcoming the problem of having a lack of competent individuals to become entrepreneurs by teaching individuals to increase their motivation and ability to innovate. They also showed that generating human capital was not only important for the regional development level, but to the national level. The same authors claim that " While government support clearly advocates a regional focus, the two other groups ,

i.e. universities and industry, do not necessarily share that view but target wider spatial horizons" (Fromhold-Eisebith & Werker, 2013, p. 629).

SIS is affected by the NIS and RIS. The university role in any region or at the meso level can affect the innovation process or technological trajectories in some sectors.

As noticed above, NIS give more focus to the university-government relationship at the national level with very little focus on the university-industry relationship; RIS literature gives more attention to the importance of university-industry relationships and many studies have been published on the nature and roles of universities' engagement in RIS. SIS also gives little focus to university relationships with government and industry.

According to RIS, the university-industry relationship is critical to industrial development and competitiveness, and it provides universities with different roles such as sourcing new ideas and products as well as new industries, supplying customized graduates, increasing a firm's capability for innovation and scientific and technological problem-solving, and providing high quality research.

3.5. Intra-organizational relationships (intra-university)

The intra-organizational level (micro level) focuses on the internal capabilities of the university and on the relationships between its members. We believe that the behavior of individuals inside universities and their relationships with each other not only affect their performance inside the university but in the external environment too, when dealing or interacting with other external actors.

3.5.1. Contributions of the NIS, RIS, and SIS

Universities as national actors have the responsibility to equip their students with the knowledge and skills that businesses do not yet understand they need (Group of Eight, 2011). Universities should disseminate their knowledge not only internally but externally beyond their boundaries. Some of the ways universities use to disseminate

knowledge are: publishing articles, writing books, acting as public intellectuals, conducting interviews on TV and radio, participating in workshops and conferences, and other ways which result in knowledge diffusion.

According to RIS, the micro level is the concrete level where different actors meet (like individuals from firms or universities) (Karlsen, 2007). University students and staff may participate in important local social projects, and university graduates, if they remain in the area, will contribute to the lives of their communities in countless ways (Lester & Sotarauta, 2007).

According to (Benneworth et al., 2009), universities may create consultancy organizations, centers or departments; they may develop their curricula to require student placements; and they may hire advisers to identify particular applications which can be developed from the knowledge within the professoriate. Universities can help overcome the problem of the lack of competent individuals to become entrepreneurs, by teaching individuals to increase their motivation and ability to innovate (Fromhold-Eisebith & Werker, 2013).

Universities have played a key role in basic research and human capital formation (Malerba, 2007). They are also a source of start-ups and innovation and act as agents, either through individuals (scientists) or as non-firm organizations (university) (Malerba, 2007).

It is obvious from the above discussion that the literature of the three innovation approaches mentioned very little about the university's internal roles and relationships, and therefore this study may add more knowledge about the intra-university relations to the literature of innovation and other related areas.

3.6. Synthesis of university relationships

The following table (Table 3.3) summarizes what has been discussed in the literature of the three innovation system approaches (NIS, RIS and SIS) about the universities' relationships.

Table 3-3 : Relationships of Universities as Mentioned in the Three Innovation Approaches

	NIS	RIS	SIS
<p>National (Macro)</p>	<p><i>The board definition of NIS</i></p> <ul style="list-style-type: none"> - Nelson (1993), <ul style="list-style-type: none"> • Universities are critical to sustaining competitive and innovative firms because they provide knowledgeable and skilled people. - Florida (2002), <ul style="list-style-type: none"> • Universities can attract innovative businesses and stimulate their development. - Mowery & Sampat (2005), <ul style="list-style-type: none"> • Universities as a critical institutional actor in NIS and as the purveyors of basic scientific knowledge. • As sources of trained "knowledge workers" and ideas flowing from research activities. - Datta & Saad (2011), <ul style="list-style-type: none"> • NIS Focuses on commercializing the universities' research outputs (limited role). • Academia conducts both basic and applied research with emphasis on the former. • Educate and train students thus raising stock of human capital in economy. - Group of Eight (2011), universities: <ul style="list-style-type: none"> • Provide a learning environment and supply learned people. • Contribute to cultural development (as one of the framework conditions). • Help to cultivate a sophisticated society. 	<ul style="list-style-type: none"> - Karlsen (2007), <ul style="list-style-type: none"> • National policies (e.g. higher education) are connected to RIS approach. - Lester & Sotarauta (2007), <ul style="list-style-type: none"> • Universities are one of the largest employers. - Benneworth et al. (2009), <ul style="list-style-type: none"> • Universities advise politicians and policy-makers, inform general public debates and shape the national spatial distribution of social opportunities and services. - Schrempf et al. (2012), <ul style="list-style-type: none"> • National context is important for RIS and exerts huge influence over regional systems. 	<ul style="list-style-type: none"> - Castellacci (2009), <ul style="list-style-type: none"> • National policies are very important for the SIS/TIS (e.g. National Higher Education System – universities). • SIS interacts with NIS not only about cumulativeness and path-dependency, but about novelty and change as well (universities are parts of the NIS).

<p>Network (Meso)</p>	<p>The narrow definition of NIS</p> <ul style="list-style-type: none"> - Schoser (1999), <ul style="list-style-type: none"> • Universities are among those institutions which direct involvement in the innovation process. - Chung (2011), <ul style="list-style-type: none"> • According to the narrow definition, NIS is a complex of innovation actors that are only directly associated with the generation, diffusion, and the appropriation of technological innovation. For example, Research and Development (R&D) departments, universities, and public research institutes. 	<ul style="list-style-type: none"> - Lester (2005) <p>Grouped universities' role in their local innovation process into four broad categories:</p> <ul style="list-style-type: none"> • Education and training. • Adding to the stock of codified knowledge. • Increasing the local capacity for scientific and technological problem-solving. • Providing space for open-ended conversations about industry development pathways and new technological and market opportunities. - Charles (2006), <ul style="list-style-type: none"> • Universities can provide knowledge in different forms such as commodity, human capital, and social capital. - Gunasekara (2006b), <ul style="list-style-type: none"> • Two types of roles performed by the universities; generative and development roles. - Benneworth et al. (2009), <ul style="list-style-type: none"> • Universities engagement is important but it is not straightforward. - Uyarra (2010), <p>Five key "roles" of universities contribution in RIS:</p> <ul style="list-style-type: none"> • As producers of scientific knowledge. • Relational or collaborative role (U-I coll.). • Entrepreneurial role (commercial 	<p>SIS is affected by the NIS and RIS.</p>
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		<p>exploitation of university research).</p> <ul style="list-style-type: none"> • As boundary-spanning institutional “nodes”. • Developmental role (as actors actively engaged in the economic development in their regions). <p>- Isaksen & Karlsen (2010), Active role in regional industrial development through:</p> <ul style="list-style-type: none"> • Source for new industries. • Supplier of customized graduates and high quality research. • Assist in the diversification of existing industries. • Help in upgrading activities in existing industries. <p>- Tiffin & Kunc (2011),</p> <ul style="list-style-type: none"> • Universities move from indirect to direct interactions with regional stakeholders (e.g. locally adapted research and directly supporting technological change). <p>- Fromhold-Eisebith & Werker (2013),</p> <ul style="list-style-type: none"> • Universities can help overcoming some problems like the problem of having lack of competent individuals to become entrepreneurs. 	
<p>Intra-Org (Micro)</p>	<p>- Group of Eight (2011),</p> <ul style="list-style-type: none"> • Universities have to equip their students with the knowledge and skills that business do not 	<p>- Karlsen (2007),</p> <ul style="list-style-type: none"> • Concrete level where different actors meet (like individuals from universities or 	<p>- Malerba (2007),</p> <ul style="list-style-type: none"> • Universities have played a key role in basic research and human capital formation.

	<p>yet understand that they need.</p> <ul style="list-style-type: none"> Universities should disseminate their knowledge beyond their boundaries. 	<p>firms).</p> <p>- Lester & Sotarauta (2007),</p> <ul style="list-style-type: none"> University students and staff may participate in important local social projects. University graduates, if they remain in the area, will contribute to the lives of their communities. <p>- Benneworth et al., (2009),</p> <ul style="list-style-type: none"> Universities may create consultancy organizations, centers or departments. Universities may develop their curricula to require student placements and may hire advisers to identify particular applications. <p>- Fromhold-Eisebith & Werker (2013),</p> <ul style="list-style-type: none"> Universities can help in overcoming the problem of having lack of competent individuals to become entrepreneurs, by teaching individuals to increase their motivation and ability to innovate and to become an entrepreneur. 	<ul style="list-style-type: none"> A source of start-ups and innovation. As agent: Individuals (scientists) or as non-firm organizations (university).
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Source: Researcher's own elaboration

3.7. University and competitiveness

Universities, through the different roles already discussed in the previous sections of this chapter, become an important source for improving firms' and countries' competitiveness. Competitiveness is the final goal for which innovation is introduced and universities play a critical role in reaching and achieving this goal. In this section, first the impact of a university's relationships on the national competitiveness is highlighted, and then the impact on a firms' competitiveness will be discussed.

Universities, and particularly research universities, are perceived to be very important and interactive players in improving competitiveness. They participate not only with industry but with community and government to create new products and services through innovation and entrepreneurship activities. Such achievement requires the proper structure of interactions and networks between the different actors from the national level to the internal level of an organization. In focusing on the universities, Calcagnini et al. (2015) point out that the intensity of such collaboration and participation varies among sectors; therefore, the institutional differences among universities are crucial in collaboration and participation.

According to Trumbach, Hartman, and Lundberg (2009), universities can promote technological competitiveness and economic development by acting as drivers of innovation and as collaborators to transfer study results and innovative research to other actors in order to apply them. Such a transformation role can take different forms such as teaching students, creating and working with existing small business, and conducting the type of research that can help the decision makers to make the right decisions and formulate the right policies.

In emphasizing the important role that universities can play in supporting economic competitiveness in the UK, Eastwood (2012) states that the higher education sector "has a pivotal role to play in ensuring the country's economic competitiveness" (Eastwood, 2012, p. 1). In his speech, he focused on the following key areas where universities play a role in supporting economic competitiveness:

- Universities in the UK contributed £3.3 billion to the economy in 2010-11 through services to business (e.g. commercialization, consultancy, and training).
- Many new businesses can start up because of the world-class research carried out by UK universities. For example, in 2010-11, 269 new businesses were set up in the UK.
- Strategic partnerships and collaborative R&D build on research excellence. In the UK, many companies have structured and professional long term relationships with universities.
- The international profiles of UK universities attract inward investment.
- UK universities enhance the economic environment through regulation, infrastructure and public policy.
- Universities play an active role in promoting and teaching entrepreneurial skills to their academics and students.

This thesis considers that the use of social capital ensures the success of interaction and collaboration. Edmondson et al. (2012), after conducting a study on what makes a university's relationships and partnerships work, conclude with the following policy recommendations:

- Policymakers need to make sure that there is a foreseeable and steady environment for strategic partnership between the university and other actors like industry.
- University should be given more autonomy to make and form partnerships.
- Government should encourage and reward the strong partnership that can be formed between universities and other actors like industry.

There are many benefits that firms can gain from links with universities to improve their competitiveness. Muscio and Vallanti (2014, p.410) state that “there is

cumulative empirical evidence showing the positive impact of academic research on firms' innovation and productivity". The firms that have joint research projects with universities generate higher income from the new product sales than non-collaborating firms (Bramwell, Hepburn, & Wolfe, 2012; Lööf & Broström, 2008). A survey conducted on the UK's firms in 2009 shows that their engagement with the universities is to obtain access to facilities, to get training for their workforce, to enhance the possibility of making new products, and to employ qualified and skilled graduates (Her Majesty's Government, 2009).

Maggiore (2008) listed four benefits that encourage firms to engage with a university in a research activity: 1) gaining access to experts and their knowledge which may not be available in the industry; 2) getting assistance in the expansion and the renewal of the company's technology and science base; 3) gaining access to graduating students as potential employees, and to faculty members as consultants; 4) gaining leverage in internal research capabilities. Such benefits are among the main pillars for improving firms and national competitiveness.

Encouraged growth, decreased costs, improved organization image, increased learning capacity of the organization, and development of the firm's human capital are among the benefits that firms can gain by collaborating with universities (Kaymaz & Eryiğit, 2011). Collaboration can also have beneficial influence on a firm's product and its technology development and innovation (Ankrah & Omar, 2015; González-Pernía, Parrilli, & Peña-Legazkue, 2015; Perkmann & Schildt, 2015; Seppo & Roolah, 2012b). Steinmo (2015) points out that firms that collaborate with public research organizations (e.g. universities) are much more innovative than firms without links to universities. Roos and Pike (2011) identify the following ways by which universities contribute to business innovation and thus to competitiveness:

- Breeding more useful knowledge.
- Guaranteeing supply of skilled researchers and graduates.
- Generating new scientific instrumentation and developing new methodologies.
- Expansion of networks and encouragement of social interaction.

- Development of problem-solving capacity for firms.
- Establishment of new firms.

Universities, because of such collaboration and as mentioned at the beginning of this chapter, can contribute in developing the capability of knowledge-based economy, and in long run they contribute to the growth, development and meeting a society's demands (Khalozadeh, Kazemi, Movahedi, & Jandaghi, 2011). Ranga et al. (2013) and Seppo and Roolah (2012), based on some studies, list the following impacts on industry's competitiveness when collaborating with a university.

- Establishment of competitive advantage, increased competitiveness or performance.
- Access to new technologies.
- Development of suitable employees through curriculum development and delivery.
- Access to qualified and skilled workers from graduating students.
- Access to resources (e.g. knowledge, expertise, technology) that may be needed in the business but unavailable in-house.
- Lower R&D costs.
- Positive impact on the image of the firm.

The above impacts which enhance the industry's competitiveness will also improve national competitiveness especially in the areas of innovation, higher education and training, and technological readiness.

3.7.1. The impacts of a university relationships and the mode of innovation

In a related issue, this study considers that discussing the different modes of innovation is essential to understanding the impacts of university-industry's relationship on firms' competitiveness. Understanding the mode of innovation not only helps the university and firm but can also help policy makers in setting the right

supporting systems and policy tools which can strengthen the partnership between university and industry. The innovation literature distinguishes between three modes of innovation: STI (science, technology, innovation, DOI (doing, using, and interacting), and CCI (combined, complex, innovation).

The STI mode of innovation refers to the use of scientific knowledge that develops innovations through research and development. This mode has a strong focus on science-based learning and R&D activities aimed at developing more radical innovations. Such activities can take place in-house in R&D departments or by interaction with centers producing new knowledge – e.g. universities and research institutions (Doloreux, Isaksen, Karlsen, & Dionne, 2012; Fitjar & Rodríguez-Pose, 2013; Isaksen & Nilsson, 2013).

The DOI mode of innovation is mainly based on a synthetic knowledge base and by interacting between companies in the value chain (Isaksen & Karlsen, 2012). It refers to and pivots on know-how (how to perform tasks) and know-who (about who knows what) which is tacit and often highly localized (Isaksen & Nilsson, 2013; Jensen, Johnson, Lorenz, & Lundvall, 2007). The DOI mode of innovation is seen by some scholars (e.g. Isaksen & Karlsen, 2011) as essential in industries where firms do not build their innovation activities mainly on research-based knowledge but rather on experience-based learning.

Many studies indicate that those firms that combine both modes (STI & DOI) are more efficient when it comes to improve capacity and competitiveness, and more likely to innovate new products or services than those relying primarily on one mode only (Fitjar & Rodríguez-Pose, 2013; Jensen et al., 2007). In a related issue, Isaksen and Nilsson (2013) highlight the importance of having a policy that combines elements from the STI and the DOI in order to be more efficient and better equipped to contribute to innovation activities and competitiveness. Hence, it is believed that each mode is supported by specific institutional arrangements (Doloreux et al., 2012).

Recently, a third mode of innovation was proposed by Isaksen and Karlsen (2012): the combined and complex innovation (CCI) mode. CCI is intended to describe complex innovation processes wherein different kinds of knowledge (highly advanced, expert knowledge, both R&D-based and experience-based) are combined in innovation activities (Isaksen & Karlsen, 2012). Isaksen and Karlsen (2012) refer to CCI as a third ideal type mode of learning and innovation that put together elements from STI and DUI modes of innovation.

However, Isaksen and Karlsen (2010) argue that no single formula exists for how universities can stimulate innovation activity and industrial development. Thus, the formula of university-industry relationships and collaboration must be fine-tuned according to the knowledge base of the university and to the dominant mode of innovation in the industry. Therefore, from the university perspective, this thesis considers that an essential factor for the success of university-industry collaboration is to understand which mode of innovation is followed by the firms in that industry because, as shown above, the STI mode considers universities as one of the main external innovation partners while DUI does not, and in between, CCI demands both applied R&D and research-based knowledge (universities) as well as experience-based knowledge (industry).

3.7.2. Challenges facing the impacts of a university's relationships on competitiveness

The formulation of universities' relationships are not straightforward or simply formulated, instead there are many challenges facing the formulation of such collaborative relationship. In this section, different challenges and obstacles are highlighted. These challenges and obstacles can hinder the degree of university's relationships impacts on other actors like government and industry.

In regards to the collaboration between universities and industry, while universities tend to create and publish knowledge in research collaboration, industries are looking for more profit from such collaborations by getting new ideas and technologies for their business competitiveness. According to Perkmann and Salter (2012), there are

two fundamental issues that affect such collaboration: first, the open nature of academic science is at times in conflict with companies' needs to protect the technologies they use; and second, while academic research focuses on long-term challenges, industrial R&D is of a time-sensitive nature. Other challenges to firms include a fear that information about their research and development activities, as well as their technologies, may be publicly disclosed (Alexy, George, & Salter, 2013); other firms are afraid of losing IP-related incentives even though they are the ones who motivate outsiders to work on their valuable problems (Levine & Prietula, 2013).

Other scholars like Baycan & Stough (2013); Chandran, Sundram, & Santhidran (2014); and Khalozadeh et al. (2011) draw attention to other issues that can hinder collaboration between industry and universities; among them are conflicts of interest related to patenting and licensing, the degree of institutional support, differences in mission and administrative structure, the R&D gap between the entities, inappropriate capacity of human capital, shortage of capital and high expenses, lack of regulation, miscommunication between the two sides, and the lack of an intermediary role. In these circumstances and according to many scholars like Bruneel, D'Este, & Salter (2010); Kaymaz & Eryiğit (2011); and Muscio & Vallanti (2014), much more attention from universities and industry should be paid to strengthen mutual collaboration, and there is a real need for more formal systematic ways to measure and manage such collaboration.

As discussed in Chapter 2, this thesis considers that by using social capital, such challenges can be minimized and thus the impacts of university-industry collaboration can be increased; in turn, the impacts of a university's relationships on industry as well as on national competitiveness is improved. This study aims to explore and explain how social capital through its three dimensions (structural, relational and cognitive) can improve university relationships so that their impacts on competitiveness (industrial and national) will be increased.

3.7.3. Channels of collaboration

The channels of interaction between the different actors such as those between universities, government, and industry are very important for all participants (Niosi, Treurnicht, & Samarasekera, 2008). Universities as a key player in such systems move the borderline of science forward by conducting sophisticated research and using different channels to transfer the results of their research activities to industry and society in general.

There are formal interaction channels such as publications, staff exchange, collaboration contracts and informal interaction channels which include, for example, the personal level, friendship, and social network websites. According to Kaymaz and Eryiğit (2011), informal channels imitate stronger links between parties, but with higher frequencies of communication, and encourage agreements to be implemented at the formal level in the future. In a related issue, Bramwell et al. (2012) wrote about a study done in 2005 in Swiss firms that showed more than 50% of knowledge and technology transfer firms find informal, personal contacts to gain general information on technological opportunities combined with educational activities, and that these were the most important forms of knowledge and technology transmission in universities (Bramwell et al., 2012).

In a similar issue, and according to Giuliani and Rabellotti (2012), some previous studies show that connections with industry are based on informal contacts and personal interactions among researchers, industry representatives and professionals. In addition, Howells et al. (2012) consider informal links to be the most pervasive form of contact, and more significant than the formal links in terms of impact.

Selecting the right channels of collaboration that fit with the goals of university, government and industry are very important for the project results and for the impacts of collaboration on different areas related to competitiveness, such as innovation, higher education and training, and technological readiness. Greitzer, Pertuze, Calder, and Lucas (2010) claim that most of the previous studies have framed the analysis of

collaboration in terms of research project *outcomes* and not the *impacts*. According to them, what matters is not outcomes but *impacts of collaboration*. They stated that “industry-university collaborations often produce interesting outcomes – for example, an insightful technical paper, a proposed process, or a new computer code – but those outcomes have minor or no impact on company productivity or competitiveness” (Greitzer et al., 2010, p. 83). They called such a situation “outcome-impact gap” and they proposed a guideline in seven points that firms should follow to get the most value and have a positive impact that will reduce the outcome-impact gap. In this thesis, we interpret that some of the points proposed by Greitzer et al (2010) are directly related to social capital dimensions. For example, the following points highlight the importance of social interactions and building shared visions between the actors.

1. Share with the university team the vision of how the collaboration can help the firm.
2. Invest in long-term relationships.
3. Establish strong communication linkage with the university team.
4. Build broad awareness of the project within the firm.

Such guidelines are not only important for firms but also for other actors like the university and government because they can benefit all parties by focusing on the important issues, exchanging the right knowledge, saving time and building strong relationships. This study covers how the three dimensions of social capital (structural, relational, and cognitive) improve these kinds of relationships between university, government and industry and how such improvements can impact competitiveness.

3.8. Chapter conclusion

In this chapter, what has been said about the role of the university and its involvement, in the literature of the three innovation approaches (NIS, RIS and SIS) is explored, taking into account the three levels of analysis; macro (with government), meso (with industry) and micro (internally). The different relationships that a

university has with government and industry are also covered in this chapter, and how those relationships affect the firm and national competitiveness, especially in the area of innovation, higher education and training, and technological readiness.

Thus, the main contribution of this chapter to the rest of this thesis is the Table 3.3 in page 67 because it summarizes what has been said about the different universities' relationships, roles, and involvement in the literature of the three main innovation approaches. This table and the related issues from Chapter 2 were used to formulate the analytical framework and guideline table in the next chapter.

Chapter 4: Analytical Framework and Guideline Table for the Thesis

4.1. Chapter introduction

As mentioned in the introduction to this study, the purpose is to better understand and investigate how social capital affects a university's relationships, specifically between university-government, university-industry, and within the university itself. It focuses on the three social capital dimensions (structural, relational, and cognitive) manifested in social interaction ties, trust, and shared vision respectively, and aims to understand how these three dimensions can improve the relationships of universities with government, industry and its employees, especially in the areas of innovation, higher education and training, and technological readiness.

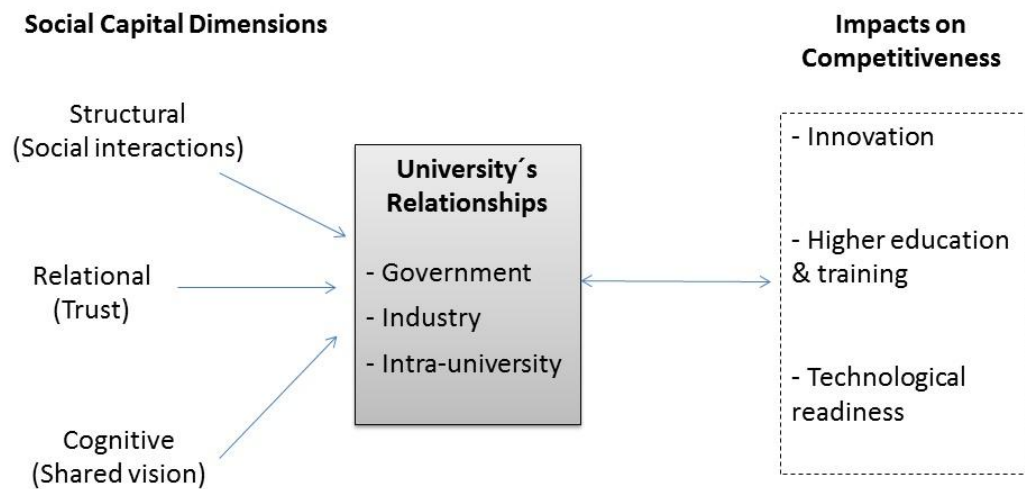
The common theme throughout this study is that social capital in its structural, relational and cognitive dimensions plays a vital role in enhancing interactions and collaboration between university and national level, university and industries, as well as between the staff within a university.

In order to fulfill the goal of this thesis, this chapter builds an analytical framework that will guide the later empirical part of this study. It is thus a bridge between the theoretical and empirical chapters.

4.2. The Analytical framework

The following (Figure 4.1) is the analytical framework of this study.

Figure 4-1 : Analytical Framework of the Thesis



Source: Researcher's own elaboration

In the next sections we present the main elements of the previous chapters that are used to construct the above analytical framework.

4.2.1. The elements from social capital review (chapter 2)

As we discussed in Chapter 2, social capital is critical to any organization that wants to succeed in its relationships with its internal and external environments. Social capital can facilitate the exchange of resources, transfer of knowledge, and improve organizational performance. The main part of this study uses the three dimensions of social capital (structural, relational, and cognitive) proposed by Nahapiet and Ghoshal (1998) as already mentioned and discussed in Chapter 2.

This is because the model proposed by Nahapiet and Ghoshal (1998) identifies the three dimensions that constitute social capital construct and which can significantly moderate the value of social capital. Social capital through the three dimensions expedites the creation of new intellectual capital. Also, the model proposed by Nahapiet and Ghoshal (1998) was chosen because its connection with intellectual capital provides the link for social capital with the role of universities in innovation. Social capital in this model refers to networks (structural), mutual trust (relational),

and shared values and goals (cognitive) which enable individuals and organizations to act and behave collectively.

4.2.1.1. Structural Dimension

As mentioned in section 2.2.6.1. of Chapter 2, structural dimension refers to connection and network settings, in terms of density and hierarchy, for example. This element will be used to know more about the university's networks and whether such networks are strong or weak, small or big, and internally or externally used. More focus will be given to social interaction ties.

4.2.1.2. Relational Dimension

According to section 2.2.6.2. in Chapter 2, the relational dimension describes aspects like trust, norms, obligations and expectations that affect relationships. In this study the focus will be on the trust in relationships because, literature shows that trust is very important and has been subjected to studies more than other aspects.

4.2.1.3. Cognitive Dimension

The cognitive dimension of social capital refers to the resources that provide shared representations and understanding among individuals or organizations. Some of those resources are shared vision, shared language, codes and narratives. The cognitive dimension constitutes shared vision, values and goals in this study (section 2.2.6.3. in Chapter 2).

4.3. The elements from relationships for university (Chapter 3)

No universities can work isolated from their environments; they naturally affect and are affected by the surrounding environment. As discussed in Chapter 3, there are many different relationships that universities have with actors from different levels (national, network, internal). No doubt that the nature, size, ties, and objectives are different in those relationships. For the purpose of this study, three types of university relations will be considered. They are:

4.3.1. University relationship with government

As discussed in section 3.3. in Chapter 3, government can affect a university's strategies and plans, and a university can affect and benefit the government. Therefore, building a strong relationship between a university and decision makers at the national level is important to ensure the implementation of national policies and the continuity of university activities. As we mentioned in Chapter 3, there are some roles and mutual impacts between university and government at this level. The social capital dimensions are used to examine such issues and how such interaction can be improved by using social capital, because as we discussed in section 2.3.2. in Chapter 2, social capital can enhance and improve relationships.

4.3.2. University relationship with industry

As mentioned in section 3.4. in Chapter 3, there are many benefits that university and industry can gain if they collaborate with each other. Building such collaboration with strong relationships is not easy because of the different vision, goals, and nature of activities between universities and firms. Later in this chapter, a “guideline table” is presented that was constructed based on the literature review in Chapter 3. That table includes different roles and involvements of a university at this level, as well as different impacts on both sides with mechanisms of interactions.

Since it is argued in section 2.3.3. in Chapter 2 that social capital can influence the collaboration between university and industry, the three dimensions of social capital (structural, relational, and cognitive) are used at this level (university-industry level) to examine the extent to which universities and industry have used the nature of social relations, mutual trust and shared vision.

4.3.3. Intra-university relationships

Section 3.5. in Chapter 3 shows how important the internal relationships are between university members. Such relationships not only affect the internal operations and activities of the university but also the external ones. Section 2.3.4. and section

2.3.4.1. in Chapter 2 shows that social capital can have a positive and significant effect on improving academics' work and in activating their networks and relationships. For example, if a university's members trust each other, they will exchange their knowledge and expertise with each other. Also, if they have common understanding and goals, they will work together and help each other to reach those goals.

Social capital dimensions will be applied in intra-organizational level to investigate the relationship between university' members and to know what they think or how they feel about the other two levels (government and industry).

4.3.4. Impacts of university relationships on competitiveness

As highlighted in section 3.7. in Chapter 3, the relationships which universities have with government and industry can result in improving firms and national competitiveness indirectly through many areas. For the purpose of this study, three areas are selected because of their relevance to the nature of this thesis, as explained in Chapter 1; they are innovation, higher education and training, and technological readiness. These three areas are also among the important areas that the World Economic Forum focuses on when measuring the competitiveness of countries.

The impacts of university's relationships on firms' competitiveness are discussed in section 3.7. (Chapter 3) and from that discussion, the importance of such relations for national competitiveness is explained.

Based on the literature review in Chapter 2, social capital can enhance relationships and collaborative networks, thus improving the impacts on industry and national competitiveness.

4.4. Guideline table for the analytical framework

In order to structure the contributions from the literature review as a guideline for the empirical work, Table 4.1 has been constructed. The goal of that table is to give insight into the literature on the three types of relationships included in the above analytical framework:

- a) University-government relationship.
- b) University-industry relationship.
- c) Intra-university relations.

For each type of relations the following issues have been considered:

- a) Who are the other relevant actors (besides university)?
- b) What is the role of university in the context of this relation?
- c) What are the impacts of university on the other actors?
- d) What are the impacts of the other actors on university?
- e) Mechanisms for interaction.

All of the above issues are explained in more detail after the table (4.1) in this chapter. The explanation is based on the previous literature review in Chapters 2 and 3.

Table 4-1 : Guideline for the Thesis

	Other relevant actors beside university	Role of university	Impacts of university on other actors	Impact of the other actors on university	How (mechanism for interactions)
University – government relationship	<ul style="list-style-type: none"> - National Government 	<ul style="list-style-type: none"> - Critical institutional actor and component of national policy - Delivering advice to politicians and policy makers - Provide a learning environment and supply learned people 	<ul style="list-style-type: none"> - Change in political structure - Increase of citizen participation 	<ul style="list-style-type: none"> - preparedness of universities to make bold decision - Universities' strategy, rules and regulation - Can hinder or support U-I collaboration 	<ul style="list-style-type: none"> - Institutional and academic leadership - National regulation, higher education, science and innovation policy instruments and funds.
University- Industry relationship	<ul style="list-style-type: none"> - Specialized agencies. - Funding organizations. - Business promotion agencies. - Industry (firms) - Other public and research organizations 	<ul style="list-style-type: none"> - As generators and originator of new knowledge, ideas and products - Entrepreneurial role - Developmental role - Intermediary or Facilitator role 	<ul style="list-style-type: none"> - Bringing global state-of-the-art science. - Facilitating the industrial development. - Help industries to respond the rapid change in the knowledge development. - Enhance the industries' competitiveness through technology supply and training specialized personnel. 	<ul style="list-style-type: none"> - Access to additional financing and find sponsors for research. - Test the practical application of the research theory and get feedback and experience of businesses. - Understand what really the university's needs. - Find and define new research questions. 	<ul style="list-style-type: none"> - Cooperation of education (providing scholarship, and sponsoring education). - Participation in professional networks (e.g. university boards, conferences and fairs). - Entrepreneurship related activities (start-ups, incubators). - Collaboration in consultancy, joint research, staff mobility.

Intra-university relationships	<ul style="list-style-type: none"> - Individuals within the university. 	<ul style="list-style-type: none"> - Teaching their students to increase their motivation and ability to innovate and to become an entrepreneur. - Disseminate their knowledge internally and externally. - Students and staff can participate in important social projects. - As source of start-ups and innovation 	<p>-Contribute in developing the capability of knowledge-based economy and assist in meeting the society demands.</p> <ul style="list-style-type: none"> - Disseminating knowledge and increasing the learning opportunities for students, academics, and researchers. - Equipping students with the knowledge and skills required for the development. - Preparing students to be as potential employees. - Building research and innovation capabilities to serve the university as well as outsiders actors. 	<ul style="list-style-type: none"> -Academics and researchers can contribute in increasing the ranking of their university. - Students and staff may participate in improving the university's image. - Universities may create consultancy organizations, centers or departments - University can be a source of start-ups and innovation. 	<ul style="list-style-type: none"> - Informal interaction channels - Co-publication and joint research projects. - Mobility of people within the university: mobility of academic, mobility of researchers , double appointments, and temporary exchange of personnel. - Cooperation in R&D: supervision of trainee or PhD students, and sponsoring research.
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Source: Researcher's own Elaboration

4.4.1. University- government relationship level

At this level, different national policies are formulated that directly influence the framework conditions of an innovation system. Such policies include laws and regulations which may often be ground-breaking, in a positive or a negative way (Seidel et al. 2013).

The other relevant actors

- *National government*

This part of the framework focuses on the national government or policy level responsible for formulating strategic plans for the whole country, in areas including education, research, innovation and others that can affect the university's policies directly or indirectly. Iizuka (2013) points out that innovation policy is not just a focus on science, technology and industrial areas, but it covers a much broader domain and involves a wider set of issues such as provision of infrastructure, resources (human and financial) and regulations. Such national plans, policies and regulations can support or hinder the collaboration between the university and industry, as already discussed in section 3.7.2. of Chapter 3.

There is no doubt that in order to increase the impacts of social capital in collaborative networks between the different actors, there should be a supportive environment at a national level with key factors in place, and one way to achieve this is by involving the other actors in the formulation of national plans. That is why the framework focuses on how national governments and universities interact.

Role of University

When focusing on the relationship with governments, the question arises on the roles of universities. The framework focuses on the following roles:

- *Critical intuitional actor and component of national policy*

A number of scholars highlight the importance of the university's role in this level. Altbach et al. (2009) consider the university as a critical component of national policy Mowery and Sampat (2005) also indicate that the university is a critical institutional actor in NIS (Section 3.3.1. in chapter 3); Florida (2002) emphasizes the importance of universities by arguing that they can attract innovative businesses by contributing to creating the right environment (section 3.3.1. in Chapter 3).

- *Advising politicians and policy-makers*

Universities can advise on education and training, research, cultural development, the latest technological changes and other important issues. As mentioned in sections 3.3. and 3.3.1. in Chapter 3, universities can advise politicians and policy-makers, inform general public debates and shape the national spatial distribution of social opportunities and services (e.g. Benneworth et al. 2009). Group of Eight (2011) point out that universities can provide information that facilitates the development of free trade agreements or remove technical barriers to trade.

- *Providing a learning environment and supply learned people*

According to Datta & Saad, 2011; Group of Eight, 2011; Mowery & Sampat, 2005; and Nelson (1993), universities act as providers of learned and trained workforces, thus raising human stock capital in the economy. However, as argued in section 3.3.1 in Chapter 3, universities should not focus on short term and direct measures, ignoring the broader economic, social and cultural impacts.

Impacts of the university on other actors

Once the roles are analyzed, it is important to understand what their impacts are. There are different impacts of a university on other actors at this level, but for the purpose of this study, the focus will be on the following:

- *Change in the political structure*

As discussed in section 3.2. and 3.3. in Chapter 3, universities can have a change in the political structure at the macro level because of their critical position in national plans, such as the national plan for innovation (Kotosz, 2013).

- *Increase of citizen participation*

Because of their capable and knowledgeable individuals, universities can increase their participation in designing and formulating national plans and policies in different fields (section 3.2. in Chapter 3). The framework considers that since the university interacts with its environments at the meso and micro levels, its people can represent a real picture of the situation. It can recommend the decision-makers to involve other people who are more familiar with specific issues, thus increasing opportunities for citizen participation.

Impacts of other actors on university

Universities not only influence or impact other actors but it is also itself influenced by the actors in its environment. For example, government by its national plans and policies can influence university strategies and the way they interact with their environments (section 3.2. and 3.3. in Chapter 3). Some such impacts are;

- *Preparedness of university to make bold decision*

In some cases universities need support for their decisions to ensure ease of implementation. Such support can be from the government. As Dodgson and Staggs (2012) point out, the national policy context is very important for university decisions and for its leadership (Section 3.3. in Chapter 3).

- *University's strategy, rules and regulations*

There is no doubt that national policies and plans can impact the internal environment of any university. For example, the salary and incentive scheme

must be approved by the concerned board in the government; the programs and specializations that university offer should also be approved by the government; the number of students and many other issues have to be approved as well. Van Der Steen and Enders (2008) argue that government should be aware of how their policies can impact the strategic behavior of universities (Section 3.3. in Chapter 3).

- *Can hinder or support university-industry collaboration*

As we noticed in Chapter 3, the collaboration between the universities and industries can result in many benefits to the whole country and not only to a university or industry. In order for such collaboration to be effective and efficient it needs a supportive framework at the national level with the right conditions (strategies, regulations, laws, and incentives). Seppo and Roolah (2012) stress the importance of government policies for U-I collaboration and claims that government by its policies can have a critical role in bringing universities and industries closer , and Kelly (2010) argues for the need to develop a three-way dialogue between government-university-private sector (section 3.3. in Chapter 3).

How such interactions or impacts happen

In order to learn from and improve situations like the ones studied in the two cases, it is important to understand the mechanism of how impact happens. Normally the mechanism for such impacts is through national plans and regulation, related, for example, to higher education, research, innovation, and human capital. As mentioned in Chapter 3, most universities in the world are governed by national regulations concerning policies for higher education, science and innovation (Van Der Steen & Enders, 2008).

This study considers that the coordination between the different decision makers and the involvement of universities at this level are crucial to social capital and to the effectiveness and efficiency of innovation policies and other related policies put into

action by the supportive institutions, agencies, universities and industry in meso (network) and micro (intra-organizational) levels.

4.4.2. University-industry (U-I) relationship level

This level is recognized by many scholars from different fields to be critical in implementing policies and coordinating between the other two levels (bottom-top and top-bottom interactions). As mentioned in section 3.4. in Chapter 3, universities at this level (network level) are among the actors within the innovation system who are responsible for implementing and converting innovation policy into practice. In the following sections we will use the five factors according to the guideline table.

The other relevant actors

The following are the relevant actors that interact with university at this level.

- Specialized agencies

This level includes the specialized agencies that are organized around a common knowledge base and which convert and apply the political decisions taken by the decision makers at the national level (Seidel et al., 2013). According to some scholars, like Schoser (1999), examples of these agencies are funding agencies, technology transfer centers, and technology policy and supporting programs (section 3.4.1. in Chapter 3).

- Industry

Industry is among the main actors in this level. It is emphasized by a number of studies and empirical evidence that collaboration between universities and industrial companies improves the success of innovation processes (González-Pernía et al., 2015; & Lööf & Broström, 2008). Therefore, we argue that provision of supportive policies and regulations is critical at the government level to enhance such collaboration not only for universities but such policies must be aimed at the industry as well. Facilitating collaboration and simplifying the process of knowledge and technology transfer between

university and industry is very important in the innovation system (section 3.4. and 3.4.1 in Chapter 3).

- *Other public research organizations*

Based on the discussion in Chapter 3, other research organizations (e.g. public research centers) are very important actors in all innovation processes because they coordinate and exchange knowledge with universities and other actors like industry.

Role of the university

It is important to understand the specificity of the roles that are assigned to universities in this level of relationship. According to the literature used in this thesis, such roles include the following:

- *Generator and originator of new knowledge, ideas and products*

University is seen by many scholars as a generator of new knowledge (Giuliani & Rabellotti, 2012), and as originator of new ideas and products (Datta & Saad, 2011; Gunasekara, 2006b), and as a knowledge factory (Uyarra, 2010), and as an embodiment of other concepts that emphasize the importance of the knowledge produced by universities for other actors (section 3.4.1. in Chapter 3).

- *Entrepreneurial role*

Uyarra (2010), after reviewing a sizable literature on the role of universities, identifies five key roles, among which is the entrepreneurial role. Furthermore, Fromhold-Eisebith and Werker (2013) found that universities can help in overcoming some problems relating to entrepreneurship (section 3.4.1. in Chapter 3).

- *Developmental role*

Many scholars agree that universities can play a developmental role (Benneworth et al., 2009; Gunasekara, 2006a; Isaksen & Karlsen, 2010;

Karlsen et al., 2012; Tiffin & Kunc, 2011; Uyerra, 2010) (sections 3.4. and 3.4.1. in Chapter 3). For example, Isaksen and Karlsen (2010) list four contributions by universities in industrial development: creation of new industries, acquisition of external investment, technological divarication of existing industries, and upgrading of existing industries.

- *Intermediary and facilitator role*

Another important university role, identified at this level (meso/network level) after reviewing the literature in Chapters 3, is that of linking the different actors with each other and providing the space for dialogue between them (Fromhold-Eisebith & Werker, 2013; Howells et al., 2012; R. Lester, 2005; Uyerra, 2010). There is no doubt that this role is important at this level and it could include individuals or organizations and be implemented by coordinating with associations, social networks and cross-border networks. Such a role can help in motivating people to be entrepreneurial and innovative by contact seminars, lectures, workshops and other activities that promote awareness of innovation and solve many problems within the society.

Impacts of the university on other actors

As discussed in sections 3.2. and 3.4. in Chapter 3, and according to Benneworth et al. (2009); Isaksen & Karlsen (2010; Karlsen et al. (2012; and Khalozadeh, Kazemi, Movahedi, & Jandaghi, (2011), the impacts of universities on other actors include:

- Bringing global state-of-the-art science.
- Facilitating industrial development.
- Helping industries to respond to the rapid change in knowledge development.
- Enhancing industry competitiveness through innovation, technology supply and training specialized personnel.
- Contributing to development of a knowledge-based economy and assisting in the growth and development of society and meeting its demands.

The above impacts not only affect the industries but the whole economy by, for example, increasing the job market and improving the quality of life (Kotosz, 2013) (section 3.2. in chapter 3).

Impacts of other actors on the university

Kaymaz and Eryiğit (2011); Ranga et al. (2013); and Seppo and Roolah (2012), identify many benefits that university can get from interaction with other actors like the industry at this level (Sections 3.2., 3.4., 3.4.1. in chapter 3). Some of them are:

- Access to additional financing and find sponsors for research which are tied to fewer restrictions (administrative) than are research programs funded by the government.
- Ability to test the practical application of the research theory and get feedback and experience from businesses.
- Understanding the university's real needs, this will result in more economic viability in academic projects.
- Finding and defining new research questions.

Both sides (universities and industry) need proper policies, regulations and support from macro level to interact strongly and to overcome some challenges as discussed in Chapter 3.

How such interactions or impacts happen

As has been discussed in section 3.7.3. in Chapter 3, the channels of interaction between the different actors are important for the diffusion and application of knowledge, and selecting the right channels is critical for the success of the proposed collaboration (Greitzer et al., 2010). Niosi et al. (2008) argue that the interactions between universities and industries are the most important among other interactions at this level. Some of the channels for such interaction are the following:

- Cooperation in university programs and curricula, providing scholarship, and sponsoring education.

- Participation in professional networks (conferences and fairs, and industry participation on university boards).
- Entrepreneurship-related activities (start-ups, incubators, science parks).
- Collaboration in consultancy, joint research, staff mobility.
- Informal interaction channels

Informal channels are considered to be stronger links between parties than formal channels (Kaymaz & Eryiğit, 2011), and the most pervasive form of contact and more significant in terms of impact than the formal links (Howells et al., 2012).

As argued in section 3.3 in Chapter 3, selecting the right channels of collaboration between university and firm is critical for the project results and impacts on both sides. Greitzer et al. (2010) claim that it is not the outcomes that matter more but the impacts of such outcomes on collaboration. Giuliani et al. (2008) argue that not all linkages are equally “valuable”. Schubert and Bjørn-Andersen (2012) identify five elements in selecting specific channels: scope, length, initiator, research object and research outcome. Even policy can influence the use of specific ‘formal’ channels (Van Der Steen & Enders, 2008). In summary, “the one-size-fits-all” approach does not work (this applies for all levels).

4.4.3. Intra-university relationship

The intra-organizational or micro level focuses on the internal capabilities of the universities and considers the policies that universities have to encourage their faculty to do research, transfer knowledge and interact with the environment surrounding them; and, how ready the academics are to interact with government and industry; and whether the universities provide enough incentives for them to interact internally and externally.

The relevant actors

- Individuals inside university.

Role of the university

As already discussed in Chapter 3, different scholars highlight different roles of a university at this level. For example,

- Teaching and building innovation capabilities (Fromhold-Eisebith & Werker, 2013).
- Disseminating their knowledge internally and externally (Group of Eight, 2011).
- As source of start-ups and innovation (Malerba, 2007).

Impacts of universities on other actors

As mentioned in Chapter 3, there are many impacts of a university on its internal individuals (Fromhold-Eisebith & Werker, 2013; Group of Eight, 2011; Lester & Sotarauta, 2007) identify the following impacts:

- Disseminating knowledge and increasing the learning opportunities for students, academics, and researchers.
- Equipping students with the knowledge and skills required for the development.
- Preparing students to be as potential employees (e.g. for government and industry)
- Building research and innovation capabilities to serve the university as well as outsiders actors.

Impacts of other actors on the university

At this level, a university can gain a lot of benefits and can be impacted through its individuals (Benneworth et al., 2009; Group of Eight, 2011; Lester & Sotarauta, 2007; Maggiora, 2008; Malerba, 2007) (chapter 3). For example,

- Academics and researchers through their research activities can contribute in increasing the ranking of their university.

- Students and staff may participate in important local social projects, thus improving the university's image.
- Universities may create consultancy organizations, centers or departments.
- University can be a source of start-ups and innovation and act as agents: Individuals (scientists) or as non-firm organizations (university)

How such interactions or impacts happen

According to (Group of Eight, 2011; Niosi et al., 2008; Perkmann & Salter, 2012), the following are among the channels that can be used to interact between the actors (section 3.3 in Chapter 3).

- Co-publication and joint research projects between individuals in the university.
- Mobility of people within the university: mobility of academic, mobility of researchers, double appointments, and temporary exchange of personnel.
- Cooperation in R&D within the university: supervision of trainee or PhD students, financing of Ph.D. research, and sponsoring research.

Even though some of the above listed channels were mentioned for university-industry collaboration, we think that they can be used in the internal university relations as well.

The above discussion has highlighted some of the important roles, contributions and impacts that a university has when collaborating with government, industry, and intra-university levels (or macro, meso and micro), but such roles strongly depend on national policies and it is strongly believed that the success of such roles and contributions also depend on the degree of social capital existing between the different participants. As argued by Whitley (2008), universities as strategic actors depends critically on the structure and policies of the government, especially in regards to their role in steering social and economic development as well as providing

institutional support (the active role of the government and other agencies) (Chandran et al., 2014).

To sum up, as mentioned before, the information in this table was used for the empirical part of the thesis as a guideline table for the interview questions. The empirical part of the thesis was applied in Oman and Rafaela, Argentina.

Chapter 5: Research Method

5.1. Chapter introduction

This chapter describes the research method used in the empirical part of this dissertation which focused on university relationships in Oman and Rafaela in Argentina, especially the collaboration with government and industry. The mediations of social capital in enhancing collaboration inside and outside the university, with other actors like government and industry, were studied following the analytical framework. Furthermore, the three dimensions of social capital: the structural dimension (manifested in social interaction ties), relational dimension (manifested in trust) and cognitive dimension (manifested in shared vision, values and goals) were tested to find how they affect the level of collaboration between university and other actors. The study also tests how the three dimensions of social capital affect competitiveness through university relationships.

5.2. Qualitative research

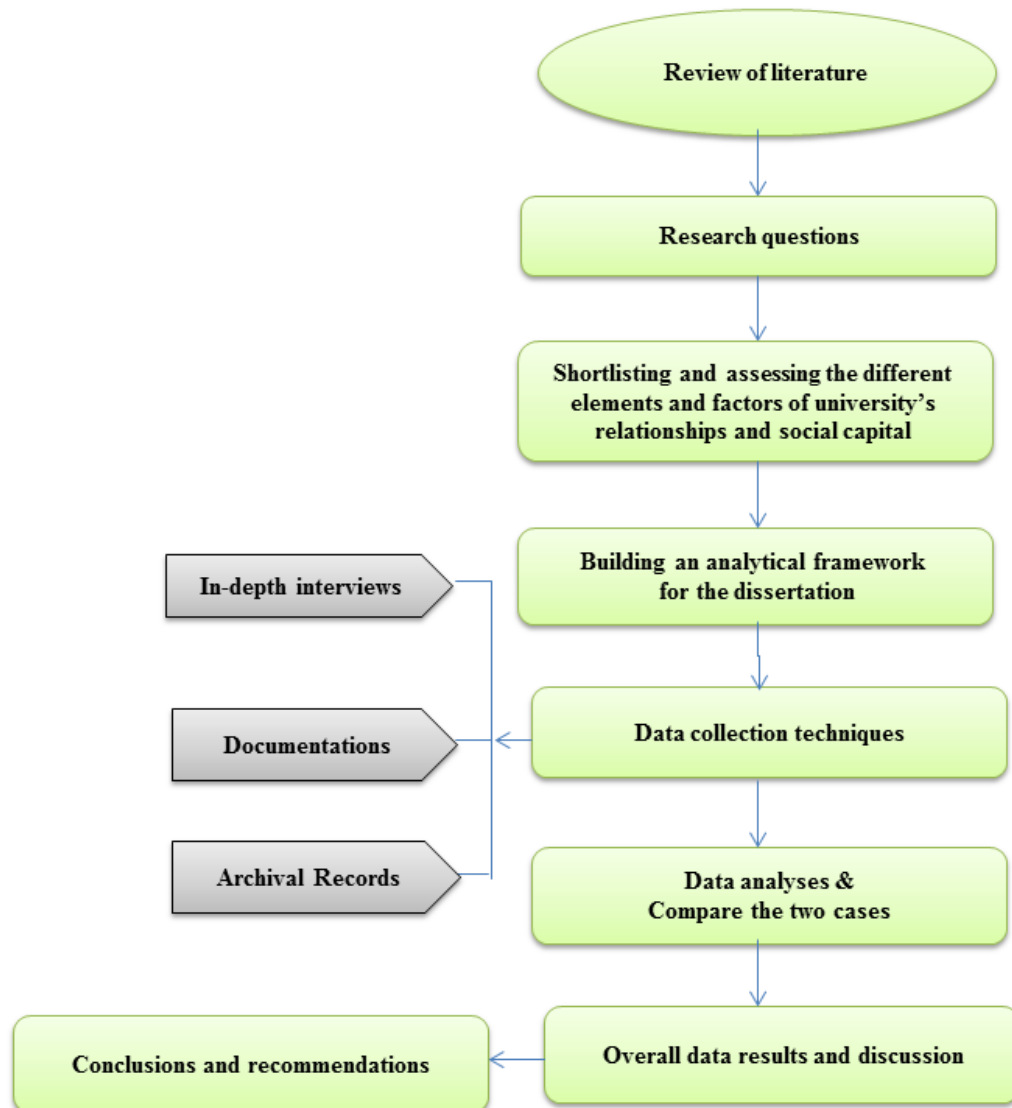
Qualitative research seeks out respondents' experiences and their interpretations of those experiences. Taylor, Bogdan, and DeVault (2015) state that "the goal of qualitative research is to examine how things look from different vantage points" (Taylor et al., 2015, p. 10). Moroz (2012) points out that qualitative research is better to deal with soft issues which are extremely difficult to quantify when searching for the meaning behind actions. Qualitative methods include action research, case study, interviews, observations, document content analyses, and focus groups (Patton, 2005; Yin, 2015). This study is mainly qualitative research, as explained in the coming sections.

5.3. Summary of the research process

Research in any field can be seen as a process of discovery of new information or relationships between different factors and variables in order to expand existing

knowledge in a specific field or solve problems which can be theoretical or practical. In this section the research process of this thesis are explained (Figure 5.1).

Figure 5-1 : Research Process and Steps



Source: Research's own elaboration

During the first and second stages, the preliminary research questions were set. For knowledge and information, the latest studies of the following were then reviewed: the literature of social capital, the university relations, and the role of the university as a higher education institution in improving national competitiveness by way of

innovation, higher education and training, and technological readiness (At this stage, research questions were modified).

In the third and fourth phases, the most relevant elements and factors of social capital and the university's relationships with government and industry were shortlisted and assessed. Thus, an analytical framework was formulated for the purpose of this thesis.

The fifth phase was to apply the formulated analytical framework in the case studies in Oman and Rafaela in Argentina. This phase involved gathering information by holding interviews with relevant academics, researchers, company managers and government officials. That was in order to know and learn more about the nature of the university's relationships with government and industry as well as internally from a social capital perspective.

Finally, the data was analyzed and results with recommendations were produced accordingly.

5.4. Case study method

Case study was used as a research method in this thesis. As Yin (1994; 2009) has famously pointed out, case studies are a preferred approach when “how” or “why” questions are to be answered, when the researcher has little control over events, and when the focus is a current phenomenon in a real-life context. Qualitative research (e.g. case studies) can provide a deeper understanding of collaborative processes (Smith, 2012), and case study allows researchers to retain the holistic and meaningful characteristics of real situations (Bhusal, Franco, & Wilson, 2015; Yin, 2003), like the one in this study. Brown (2008) points out that in the field of qualitative research methodology, case study is considered a significant qualitative strategy.

According to Yin (2009), "a case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context" (Yin, 2009, p.18), and it attempts to provide an analysis of the phenomenon's context and processes (Johnston, Leach, & Liu, 1999). The objective and the research questions of this study

fit within the previous definition of case study. As such, decisions are based on, and highly dependent on, the research questions (Yin, 2009). This study investigated the phenomenon of a university's relations in depth within real contexts, namely Oman and Rafaela, Argentina.

More specifically, this study used the Phenomenological Case Study Approach. This approach is considered suitable to identify and find out how individuals perceive the particular phenomena or situation they are dealing with (Lester, 1999; Moustakas, 1994; Osborn & Smith, 2015; Smith, 2015). As stated by Henry et al. (2008), "The purpose of a phenomenological approach is to understand the issue or topic from the everyday knowledge and perceptions of specific respondent subgroups" (Henry et al., 2008, p. 10).

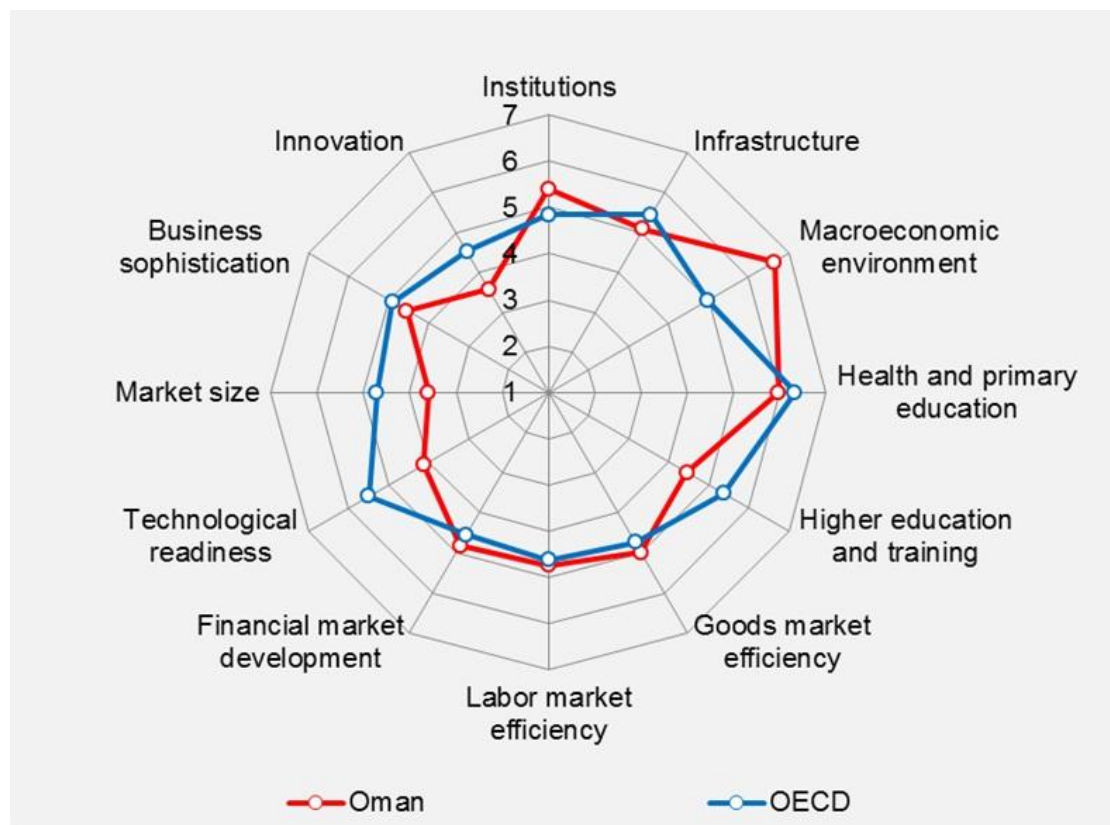
Case study approach, generally, focuses on a single case or multiple cases of a specific phenomenon - like the one in this research. Such cases (units of analysis) can be about individuals, organizations, processes or programs. Yin (2014, p. 56) states that "the subunits can often add significant opportunities for extensive analysis, enhancing the insights into the single study" and therefore, there are different subunits in this study from the government, university and industry. For the purpose of this study, two universities were selected from Oman and Argentina. There are more details about them in chapters 6 and 7, which are dedicated for each case.

There are many advantages in using the case study method, but there are also some limitations. One advantage is that it allows presentation of more detailed information than is available through other methods, such as surveys (Neale, Thapa, & Boyce, 2006). Its limitations include the possibility of being too long to hold a reader's interest, and it may be less systemic in data collection or have bias in the findings (Neale et al., 2006; Yin, 2009). Therefore, all involved in conducting and writing case studies should use care in being systematic in their data collection and take steps to ensure validity and reliability in the study. In the validity and reliability section we mentioned how such things were dealt with in this study.

5.5. Context

There are different factors that affect the selection of the research location, such as the relevance of the research questions to that location, and the accessibility of information. Even though such factors were considered in selecting Oman and Argentina, there were other factors like the economic situation in Oman. According to Drzeniek-Hanouz (2013), based on the World Economic Forum Report (2013), three of the main areas of competitiveness that the Omani government should improve are innovation, higher education and training, and technological readiness (Figure 5.2).

Figure 5-2 : Oman's Competitiveness Comparison with OECD



Source: Drzeniek-Hanouz (2013)

In addition, Oman's economy is highly dependent on oil and gas, and the industry contributes to the largest percentage of GDP. Taking into account that oil and gas reserves maybe close to exhaustion in about 20 - 25 years, it is important that strategies to economic diversification are defined Therefore, the Omani context is in

great need of more research in improving competitiveness in forms of innovation, higher education and training, and technological readiness, and in how higher education institutions like Sultan Qaboos University can contribute to improving those three areas. Still, the consequences of exhaustion of oil and gas are not exclusive of Oman, and the lessons learnt can help better understand other countries in this situation.

5.6. Data collection tools

Triangulation, also known as “mixed method” research, was used in this study. It refers to the possibility of using multiple sources for the data collection, and combines several methods to study one thing. Among the benefits of using the triangulation strategy are the many different views and large amounts of data that the research can gather, because each method is used in a way that is appropriate to it, and when combined they allow a degree of cross checking (Kennedy, 2009; Yin, 2009). Therefore, we were able to strengthen the findings of this study by using this strategy. Stake (1995) identified at least six sources of data: documents, archival records, interviews, direct observation, participant-observation and physical artifacts. However, for the purpose of this research, three sources of data were used. They are:

Interview

One of the most important and common sources of case study information is the interview (Merriam, 1998; Yin, 2003). It allows participants to propose solutions or provide insights, and have flexibility in answering the questions. Furthermore, the researcher can ask many questions and follow up each answer with prompts for elaboration.

In this study, the in-depth interview was used. According to Boyce & Neale (2006), in-depth interviewing is a qualitative data collection method that offers the opportunity to conduct intensive individual face-to-face interviews for collecting data about, for example, behaviors, attitudes, expectations and perceptions in regards to a particular idea or situation. Yin (2014) points out that through in-depth interview, respondents can be asked about facts of a matter as well as their opinions about

events. In-depth interview can be conducted with one type of respondent or with several types of respondents (Workbook, 2009) as was the case in this thesis (policymakers, academics, researchers, and representatives from industry). Legard, Keegan, and Ward (2003) highlight the following three features for in-depth interview:

- It combines structure with flexibility.
- It is interactive in nature.
- It permits the researcher to explore fully all factors that underpin a participant's answer: reasons, feelings, opinions, and beliefs.

The Ph.D. candidate personally knew many of the influential actors in the different organizations (public and private), this helped in conducting face to face in-depth interviews with them. Three groups of key informants were interviewed:

1. University employees: top management, deans, department heads, academics and researchers.
2. Managers and executive staff in industry.
3. Decision makers in public organization (e.g. the Research Council, Ministry of Commerce and Industry, and Chamber of Commerce). These three areas produce highly knowledgeable informants across a spectrum of hierarchical and functional areas and groups.

These three areas produced highly knowledgeable participants for this study. More details about the in-depth interviews that were conducted for the purpose of this study are discussed in section (5.9) of this chapter.

Documentation

This type of information can take many forms such as minutes, written reports, progress report, and letters. It is very important for the researcher to be careful while selecting the evidence from the documents as some can mislead the results or be

incorrectly interpreted. According to Yin (2015), systematic searches for relevant documents are important in any data collection plan. Such data was collected from different resources including the following:

- The Global Competitiveness Report 2013-2014
- Research at SQU 1986-2009
- Report of an Audit of Sultan Qaboos University (2010)
- Postgraduate Studies and Research Report 2010-2012
- Postgraduate Studies and Research Report 2013
- Tawasul_May2016

Archival Records

Archival records can be relevant and important for many case studies. For this research, archival records were very relevant because they included information about the different collaborations and innovation activities and other issues that relate to this field. For example, there were a number of joint research projects during different periods of time, a number of new products and services, amounts of supported funds, and many other records. Some of the main sources of information include:

- Sultan Qaboos University Archives
- The National Centre for Statistics and Data
- The Research Council Archive

5.7. Validity and reliability

Validity and reliability are very important for any qualitative study to improve the systemic way of data collection and to ensure the quality of the findings. Neale et al. (2006, p.4) define validity as “the degree to which a study accurately reflects or assesses the specific concept that the researcher is attempting to measure”, and they define reliability as “the extent to which an experiment, test, or any measuring procedure yields the same result on repeated trials”. Yin (2003) points out that the quality of a qualitative research design can be tested by four logical tests: construct

validity, internal validity, external validity and reliability. These tests are discussed below:

- ***Construct validity***

Construct validity pertains to ‘establishing correct operational measures for the concepts being studied’ (Yin, 2003). Yin also suggests three methods to achieve such validity. These are: 1) using multiple sources of evidence; 2) establishing a chain of evidence; 3) having reviews done by key informants. This research employed multiple sources of evidence, used the analytical framework to establish a chain of evidence, and the results were contrasted with experts in the field. During the different stages of this thesis, reviews were done by different experts in the field; for example, review was done on June 2015 with a professor from the Agder University, Norway, and that was before the empirical work.

Another two reviews were done during my research visit to Scotland on March with a professor at Strathclyde University and on April 2016 with another faculty member at Edinburgh University (during the empirical work), and after that the findings and results were reviewed by three experts on November 2016 (one professor from the University of Technology, Sydney (UTS), and two academics from Sultan Qaboos University, Oman).

- ***Internal validity***

According to Yin (2014), internal validity’s only concern is for causal (explanatory) case studies, in which an investigator is trying to determine whether event x led to event y . Though establishing a cause-effect relationship was not the goal of the empirical part, in this study, the aim was to discover how the social capital of a university with government and industry can improve competitiveness through innovation, higher education and training, and technological readiness, and identify the factors that may affect the development of relationships. Internal validity was sought by sending the cases to the interviewed respondents to see if

they find their perspectives. The following table (Table 5.1) shows the details of this step.

Table 5-1 : Respondents Details (for Internal Validity)

Respondents code	Case study (SQU or UTN)	Date of Sending
OUR-3	Intra-SQU	30/12/2016
OUR-5		
OUR-7		
OGR-1	SQU-government	
OGR-5		
OIR-5	SQU-industry	
AUR-1	Intra-UTN	2/1/2017
AGR-1	UTN-government	
AIR-1	UTN-industry	

- ***External validity***

External validity means establishing the domain to which a study's findings can be generalized (Yin, 2003). For example, are the results of this study applicable to other countries in the region? The validity of the framework has been tested by using it not only in the country that inspired the research questions (Oman) but in a quite different context in Rafaela, Argentina.

- ***Reliability***

The objective of reliability is that:

If a later investigator followed exactly the same procedures as described by an earlier investigator and conducted the same research study all over again, the later investigator should arrive at the same findings and conclusions (Yin, 2003, p. 37).

Yin also suggested a general way of approaching the reliability problem that is to make as many steps as operational as possible and to conduct research as if someone were always looking over your shoulder. That is

why an important effort has been made to develop not only the analytical framework but a detailed guideline table that will support reliability of the process. Besides that, in this study's interviews, notes and transcripts were taken. Such notes and transcripts were analysed and coded to identify emerging themes. Also, key points were listed after analysing the worksheets.

5.8. In-depth interviews

5.8.1. Choice of participants

Qualitative research, typically, focuses on depth probing of small samples, usually selected purposefully (Patton, 2002). The objective of purposive sampling is to select “information-rich cases whose study will illuminate the question under study” (Patton, 2002, p. 169). According to different scholars, there are many strategies for selecting the sample and more than one strategy can be used at the same time (Patton, 2002; Yin, 2009).

In this thesis, purposive sampling was used, which means selecting participants based on their relevance. To identify the purposive sample of relevant participants, various approaches were initiated. Such a targeted sample includes participants from university, government, and industry or firms. One strategy was to consult public documents in the university administration to check for data on institutional representatives who are members in the joint committees with the university. This strategy was used in order to select participants with institutional perspectives. A list was prepared which includes the relevant official joint committees and boards with their members between Sultan Qaboos University (SQU) and other governmental institutions and industry (big companies). These committees are the following:

- SQU and Ministry of Health
- SQU and Ministry of Education
- SQU and Ministry of Higher Education
- SQU and Ministry of Information

- SQU and Ministry of Oil and Gas
- SQU and Ministry of Heritage and Culture
- SQU and Ministry of Manpower
- SQU and Bank Muscat
- SQU and Petroleum Development Oman

After that the significant joint committees and advisory boards were selected based on the objectives of this study, activity and continuity of the committee, and their significance and involvement in the three areas of competitiveness (innovation, higher education and training, and technological readiness). Some of the selected official joint committees were the ones with the Ministry of Higher Education, Ministry of Commerce and Industry, Ministry of Agriculture and Fisheries Wealth, Ministry of Oil and Gas, Ministry of Manpower, and Petroleum Development Oman. Active members from these committees were selected for the interviews based on the following criteria:

- Nature of involvement in the joint committee.
- Years of involvement in the joint committee.
- Background and experience.

Also, the concerned departments in Sultan Qaboos University were contacted such as Deanship of Research, College of Engineering, College of Economics and Political Sciences, and some research centers to provide me with a list of those academics and researchers who were involved deeply in research teams or joint projects with government institutions and industry or firms as well as their partners' names from the other side. Then, organizations that collaborate with university departments were contacted, such as the Industrial Innovation Centre, Petroleum Development Oman, Shell Development Company, and Haya Company to propose some other names. After that the list was screened and filtered based on the following criteria:

- Field of the joint project (e.g. innovation, higher education and training).
- The significance of the project to the three areas of competitiveness.

- Nature of the project (e.g. consultancy, short term project, long term project).
- The expected results and outcomes of the project.
- Nature of the participant's involvement.
- Proposed participants should be actively involved in research, knowledge transfer, consulting, and other types of collaborative activities.
- Background and experience.

Even though 30 participants were targeted from the university, government, and industry, the proposed list of eligible candidates included a larger number. So, as recommended by Yin (2009), a two-stage screening procedure was used to reduce the number of candidates to 30. The first stage consisted of collecting relevant data about the proposed candidates from the statistical department in SQU (e.g. nature of involvement and number of research projects). Once the first stage was done, the criteria mentioned above were used as well as asking people knowledgeable about the candidates to reduce the number of candidates. Seventy expected participants were approached but only 20 of them were interviewed for the following reasons:

- No time
- No interest in participation
- Not available
- No response
- No longer a member of that committee or board.

The above criteria and the steps mentioned above were also used for selecting respondents from the second case study (The National Technological University of Rafaela in Argentina - UTN), and also through seeking advice and recommendation from the UTN's management. A list of nine respondents was prepared, three from government, three from industry, and three from UTN.

In regards to the second case study, and while the researcher was staying in Orkestra, he realized that Orkestra has a collaboration agreement with the National

Technological University of Rafaela in Argentina (the second case study). Thus, through that collaboration between the two sides, the researcher of this dissertation was able to find one researcher and one assistant researcher from Rafaela who agreed to collaborate in collecting data in the second case study. Therefore, all material including the interview guide and instructions were identified and prepared by the main researcher of this study (same interview guide and instruction as used for the first case study).

Thereafter, the whole process was explained carefully to the two collaborators and they were instructed as to how these materials should be used during the interviews. They agreed to conduct the interviews with the selected respondents from the second case study in Rafaela, and after conducting the interviews in Spanish, they prepared and translated the transcription from Spanish to English, which later on was used and analyzed by the main researcher of this study. This was because language and distance hindered the main researcher in conducting face-to-face interviews with the respondents from the second case study.

5.8.2. Pilot interviews

According to Yin (2009), pilot cases or studies are very useful to adjust and refine the data collection plans in regards to the content of the data and the procedures of collecting data. Such a pilot test can reduce the risk of data collection failure. In this study, two pilot interviews prior to the actual 29 interviews were conducted, the first one was at the end of October 2015 and the second one was on November 2015. This was to ensure that some concepts like “social capital” and “competitiveness” were easily understood by the interviewees and to adjust any content or procedures of the data collection process.

Before the pilot interviews, we consulted two experts on October 2015. The first was an academic and the second was an expert in the field of social capital. We discussed with them the proposed interview guide. They suggested minor changes and they gave me some recommendations on how to develop the interview guide and on how to conduct interviews.

5.8.3. Interview instrument

An interview guide was made for each level of relation; policy, industry, and intra-organizational. The interviews in each level were made to the key actors at that level. For example at the policy level, different politicians and policy-makers involved in a joint committee or advisory board in the university were interviewed.

The interview guide was adapted to the level and actor. The guide was adjusted to fit the different actors. In all interviews the questions' focus was under the title "University's relations and Social Capital".

As part of the preparation for the interviews and in order to increase the possibility of collecting good data, an email was sent to the proposed interviewee (participant) which included an interview request letter with a short summary about the study. In this way, the participant would be more focused in his/her responses. Some information about each participant (individual or organization) was also collected before the interview.

At the time of the interview and before it started, an introduction about the study (purpose, objectives and the expected benefits) was given. The participants were also assured of the confidentiality of the information provided by them and that it was to be used for the purpose of this study only. The interviewee was informed that the interview was voluntary and he/she had the right to refuse to answer any question or stop the interview if he/she wished.

The interviews' locations were selected according to the preferences of the interviewees. Each interview was recorded with a tape recorder and an MP3 device. The outcomes and transcriptions were written as soon as possible after completing the interview so that the chance of losing data from the interview was minimized and reactions not caught on tape could be written down. A letter of thanks was sent to each interviewee after the interview. The average time for each interview was between 40 minutes to one hour.

5.8.4. Arrangements of data collected

As mentioned before, 70 potential participants were approached, for the first case study, from government, industry and Sultan Qaboos University, but unfortunately most of them refused because they did not have time or they were not interested in the research topic or they were not familiar with the joint committee or team project, even though some of them were members on the joint committees. Different approaches were used to reach them such as visits to their offices, contacting them by email and telephone, and sometimes asking a third party to help. For the second case study, as mentioned above, nine participants were selected based on UTN and an expert recommendation from Rafaela. This university has a strong network with other actors in Rafaela due to trust relationships. All the approached actors were interviewed successfully.

The following table (Table 5.2) shows the different codes that were used to differentiate the respondents' country and the categories they belonged to (government, industry, or university).

Table 5-2: Coding for the Two Cases

	Oman	Argentina
Respondent from Government	OGR	AGR
Respondent from Industry	OIR	AIR
Respondent from University	OUR	AUR

Source: Research's own elaboration

We received 29 positive answers from participants. Twenty were for the first case study, and included 6 from governmental bodies, 6 from industry, and 8 from SQU. The other 9 were for the second case study, and included 3 from government, 3 from industry, and 3 from UTN. Tables 5.3 and 5.4 show the coded interviewees' names and the date and type of organization that the interviewee belongs to. The following codes were used to differentiate the respondents and to which type of organization they belong.

Table 5-3 : Respondents from Oman

Name	Date	Type of the Organization
1. OUR-4	21/1/2016	Sultan Qaboos University (SQU)
2. OGR-6	24/1/2016	Ministry
3. OUR-1	10/2/2016	SQU
4. OUR-6	14/2/2016	SQU
5. OUR-2	16/2/2016	SQU
6. OUR-3	23/2/2016	SQU
7. OUR-5	24/2/2016	SQU
8. OGR-3	25/2/2016	Ministry
9. OGR-4	2/3/2016	Ministry
10. OUR-7	7/3/2016	SQU
11. OGR-5	11/3/2016	Ministry
12. OUR-8	20/3/2016	SQU
13. OGR-2	21/3/2016	Ministry
14. OIR-1	22/3/2016	Industry
15. OIR2	22/3/2016	Industry
16. OGR-1	24/3/2016	Ministry
17. OIR-3	3/4/2016	Industry
18. OIR-4	6/4/2016	Industry
19. OIR-5	17/4/2016	Industry
20. OIR-6	19/4/2016	Industry

Table 5-4 : Respondents from Rafaela, Argentina

Name	Date	Type of the Organization
1. AGR-1	14/4/2016	Government
2. AIR-1	14/4/2016	Industry

3. AUR-1	14/4/2016	University (UTN)
4. AUR-2	28/4/2016	UTN
5. AGR-2	29/4/2016	Government
6. AGR-3	4/5/2016	Government
7. AUR-3	5/5/2016	UTN
8. AIR-3	9/5/2016	Industry
9. AIR-2	12/5/2016	Industry

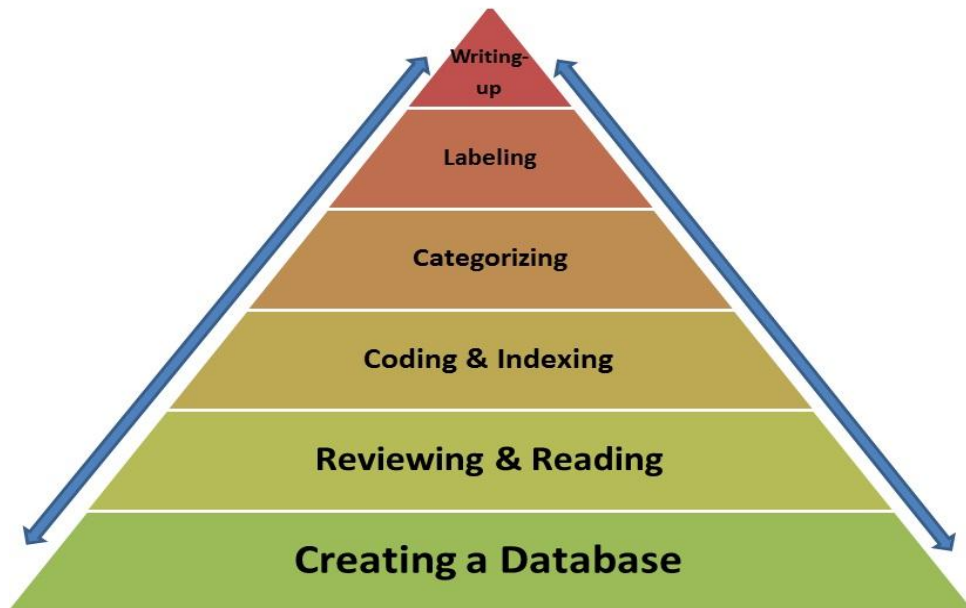
Some interviews were recorded and some were not because not all interviewees agreed to record their interviews. After each recorded interview, the process of transcription started. Also, the interviews that were not recorded were written down as soon as the interview finished. This was to ensure that all important data was recorded in some way.

5.9. Steps of analyzing the collected data

As mentioned in the section on Data Collection Tools, different sources and tools for collecting data were used and they are explained in that section. Multiple sources of evidence were used to strengthen the case study and to have a wider range of historical and behavioral issues (Yin, 2009).

Figure (5.3) shows the different steps used to analyze the data collected for the purpose of this dissertation. Databases for the two cases were created from all data collected as initiation step (first step) for the data analyses process.

Figure 5-3 : Steps of Analyzing of Interview Data



Source: Researcher's own elaboration based on (Löfgren, 2013)

The second step used to analyze the collected data was RR (Reviewing and Reading). We read and reviewed all information collected including the 29 transcripts carefully many times in order to evaluate and specify the most related information, especially the data collected by interviews. Then the most relevant data was selected in general and put in tables for each type of relationship (Appendixes B-G).

The third step was CODING and INDEXING. In fact this step was started when the most related data was selected because coding means that you select and code the information you think is most relevant to the expected outcomes of your study. The following criteria were used to code the data:

- The words and phrases were repeated by different respondents.
- The respondent stressed its importance.
- Unexpected or surprised information.
- Read about it in articles that were used in the literature review.
- If the word or phrase related to an important concept or theory that was seen and read about before.

The fourth step used in my analyzing process was CATEGORIZING which means creating categories or themes. This step involved reviewing and reading the coded data in order to combine two or three codes together under one category. In some cases unimportant data was deleted. Different categories were created under each type of university's relationships. For example, it can be noticed in the tables in Appendixes B-G that there are three categorizes under government-university relationship, and the same for the other two types of relationships.

The fifth step was called LABELING which means to assign a label and to give names to the categories that were created in the third step. So, the three main categorizes were called structural, relational, and cognitive (the three dimensions of social capital) and under each type of university's relationship you will find the three categories. Those three categories are related to each other and represent social capital. The relationships and connections between the three categories were explained in the previous chapters of this dissertation.

It is advisable to point out that the above process was not a linear process but non-linear, which means moving between the different steps to add, drop, modify, or combine some data.

5.10. Applying the three social capital dimensions in this study

As mentioned in Chapters 2 and 4, a high level of social capital results in extensive knowledge exchange, better use of resources, higher productivity, more innovation, and other important effects.

Nahapiet and Ghoshal (1998) study the importance of social capital in the creation of intellectual capital where they proposed three dimensions of social capital, which are: structural, relational and cognitive. The structural dimension of social capital was interpreted from data with regard to whether there was collaboration and relationships between SQU and other actors or not, and how strong such relationships were through variables such as stability, density, connectivity, ties and relationship configuration.

The second dimension (relational), which rather influences behaviors like respect, was interpreted with regard to whether trust existed between the members and how important it was in their collaboration. The third dimension of social capital is the cognitive dimension, which refers to the resources that ensure shared vision, was interpreted through variables like shared values, shared objectives, and solving shared problems.

Moreover, how such dimensions impacted competitiveness through the three forms; innovation, higher education and training, and technological readiness was also interpreted because as mentioned earlier in Chapter 2 and as stated by Macke, Vallejos, Faccin, & Genari (2010, p.519), “social capital can be considered the basic resource for a competitive strategy based on cooperation”.

5.11. Learning from Differences Approach

For the purposes of our research, as explained in the case studies, we chose to compare two case studies from two different countries, Sultan Qaboos University in Oman, and The National Technological University of Rafaela in Argentina. Sometimes, finding significant similarities are considered important in order to compare. In this dissertation the criteria were different and that is why, in this section, the approach named ‘learning from differences’ is presented.

Gustavsen, Nyhan, and Ennals (2007), in supporting this approach, state that “among practical actors, learning from differences is probably more important than learning from similarities”. Gustavsen and Ennals (2007) point out that in order to have more chance and opportunity to learn from differences, more diverse case studies should be involved. Therefore, based on Gustavsen and Ennals’ literature, and on Covarrubias (2015)’s utilization of this approach, and for the purpose of this dissertation, this approach was adapted to fit this study.

There is a slight difference between the ways Ennals (2014) and Covarrubias (2015) proposed to use this approach, especially in the second step, “living the experience”.

Ennals's interpretation of this step is to be deeply involved by working and living the case study at hand, while Covarrubias (2015) gives a simple interpretation by focusing on the different structures of the case studies. Covarrubias proposes a four-stage process to re-conceptualize the approach of "Learning from Differences". The stages are:

1. Identify the case studies
2. Live the experience
3. Compare different worlds
4. Learn from differences

The Learning from Differences approach was used in this study but in a way that was different from Ennals and Covarrubias. In this study, the case of Oman was analyzed which is our main case study and our lived experience because in the future, all recommendations will focus on Oman. However, we wanted to have another case which was culturally different in context where the same framework of Oman could be applied, in order to test the validity of the framework. So we interpreted the second case study "Rafaela" using the same framework as that used for Oman. . A university with a different culture was selected in order to ensure there were differences to learn from.

Furthermore, we were reading and analyzing the case of Rafaela from the perspective of Oman and having that cultural influence from Oman, so that we realized certain things from the case of Rafaela that are different from Oman. The differences could be useful for Oman or not; however, the perspective on differences helped make explicit some issues taken for granted regarding Oman.

The differences encountered within our case studies and the different learning opportunities that the main case study (SQU) can produce are stated in the discussion in Chapter 8.

Chapter 6: First Case Study: Sultan Qaboos University (SQU) – Oman

6.1. Chapter introduction

The main objective of this chapter is to present the empirical data in a manner that is replicable, manageable, and robust enough to allow for sample comparison and contrast among the two cases selected. As mentioned in Chapters 1 and 4, this study aims to examine the main relationships that university has with other actors like government and industry, as well as its own internal relations. Social capital dimensions (structural, relational and cognitive) were used to examine the relationships and how these relationships can be improved to increase their impacts on competitiveness in forms of innovation, higher education and training, and technological readiness. This chapter covers the first case study, Sultan Qaboos University (Oman).

6.2. Overview of the empirical investigation

The main empirical component of this thesis is presented as a multi-case study investigation in how social capital can enhance university's relations by interacting and collaborating with other actors like government and industry.

There are three main parts in each case: university relationships with government, university relationships with industry, and the intra-university relationships. The three dimensions of social capital are used to examine each relationship. As discussed in the analytical framework chapter, the three dimensions will focus on:

Structural dimension

Structural dimension is used to know more about the university's networks and whether such networks are strong or weak, small or big, and internally or externally used. More focus will be given to social interaction ties.

Relational dimension

Relational dimension is used to describe aspects that affect the relationships like trust, norms, and obligation and expectations. This study is focused on the trust of such relationships.

Cognitive dimension

Cognitive dimension of social capital refers to the resources that provide shared representations and understanding among individuals or organizations. Some of those resources are shared vision, shared language, codes and narratives. In this study, cognitive dimension is represented by shared vision, values and goals.

As mentioned in the Methodology chapter (Chapter 5), the following codes (Table 6.1) were used for the respondents representing the government, industry and university:

Table 6-1 : Coding for the First Case Study

	Oman
Respondent from Government	OGR
Respondent from Industry	OIR
Respondent from University	OUR

6.3. First case study: Sultan Qaboos University (SQU) - Oman

6.3.1. Introduction about SQU

Sultan Qaboos University is Oman's national university which commenced operation in 1986 with five colleges: Medicine, Engineering, Agriculture, Education and Science. In 1987 the College of Arts was established, followed by the College of Commerce and Economics in 1993. The College of Law joined the University in 2006 and in 2008 the College of Nursing opened. Therefore, total number is nine colleges in SQU, of which five are science-based and four are humanities-based (Sultan

Qaboos University, 2014). As the only national university in Oman, there is very high expectation about the role SQU can play in national development not only through education but also by other contributions, as indicated by the Oman Accreditation Council (2010):

The country expects that SQU will not only provide the highest quality education available in Oman (and at international standards), but that it will also serve as a source of expertise that can be readily called upon to assist with a broad range of scientific, governmental, educational and cultural issues (p.7).

The University is located in Al Khoudh in the governorate of Muscat, the capital of the Sultanate. It is constructed on an extensive area of land where the accommodation of both students and staff are also well placed. SQU is located close to Rusayl Industrial Estate which was established in 1983 and considered to be Oman’s flagship industrial estate. There are different companies and factories in this industrial estate that produce a wide spectrum of consumer and industrial products. Some of the companies are:

- National Biscuit Industries Ltd.
- Sweets of Oman
- Oman Textile Mills Co. LLC
- Oman Foodstuff Factory LLC
- Areej Vegetable Oils & Derivatives SAOG
- National Pharmaceutical Industries Co. SAOG

Programs

Sultan Qaboos University currently offers 63 Undergraduate, 4 Diploma, 61 Master and 31 Doctorate Programs. As a public University, the emphasis is on achieving excellence *in teaching and learning, research and innovation, and community service*. Research has been part of the learning process in its programs. As stated, “SQU continues to be the primary institution in Oman for research experts, research

students, research funds, modern research facilities and research output” (Sultan Qaboos University, 2013).

Faculties, research centers, and research chairs

The following table (Table 6.2) presents the nine Research Centers located at SQU which were created to work for the development of the national economy and the well-being of the society beside the nine colleges (Sultan Qaboos University, 2010).

Table 6-2 : List of Research Centers at SQU

Centre	Year	Key Objectives
Remote Sensing and GIS Centre (RSGISC)	1998	To educate and ensure the use of geospatial information for effective decision making and better understanding to improve the quality of life.
Omani Studies Centre (OSC)	1998	To preserve cultural heritage through research, documentation and cultural symposia and provide high quality education
Centre for Environmental Studies & Research (CESAR)	2000	- To raise awareness on environmental issues; - To help protect and maintain natural resources through environmental initiatives and research.
Earthquake Monitoring Centre (EMC)	2001	- To monitor earthquakes in and around the Sultanate; - To assess the seismic hazards and determine their characteristics and effects on civil constructions.
Communication and Information Research Centre (CIRC)	2001	To promote and enhance information and communication technologies in the Sultanate through applied research, consultancy and training.
Oil and Gas Research Centre (OGRC)	2002	To form a foundation to upgrade pedagogy, research and services in the oil and gas sector.
Water Research Centre (WRC)	2002	To conduct high quality research on strategic water related issues by coordinating research facilities and expertise in SQU, national and international institutions.
Centre for Excellence in Marine Biotechnology (CEMB)	2004	To build an accreditable marine biotechnology research centre and create opportunities to utilize marine raw materials and promote public health.
Humanities Studies Centre (HSC)	2004	To promote research in humanities and social sciences relevant to the nation.

Source: Adapted from Sultan Qaboos University (2010, p.5)

In September 2014, the tenth research center was established, called The Earth Science Research Center, to join the other nine centers at Sultan Qaboos University.

In addition to the above research centers, there are three Research Chairs at SQU for specific specializations:

1. UNESCO Chair in Marine Biotechnology, housed at the Centre of Excellence in Marine Biotechnology.
2. Shell Chair in Carbonate Geosciences, located in the Oil and Gas Research Centre.
3. The Research Council (TRC) Chair in Nanotechnology for Water Desalination operating at the Colleges of Engineering and Science and the Water Research Centre.

Research funding sources

Funding for research at SQU is available from six sources:

1. Internal Grants - Internal grants are taken from the University's annual budget and from other internally generated income. These grants are utilized to fund academic research projects.
2. Joint Grants - The University may allocate a budget to support a joint research project with other institutions which is governed by an agreement.
3. His Majesty's Trust Fund Grants – His Majesty Sultan Qaboos Bin Said funds long-term multidisciplinary research projects of strategic importance to the Sultanate and beneficial to the Omani society.
4. The Research Council Grants - Projects may be funded from the Open Research Grants or the Strategic Grants. The Open Research Grants support academic research expected to yield new knowledge leading to future applications, markets or social understanding. The Strategic Grants support strategic research activities on themes identified by The Research Council to address the social, economic, public health and environmental challenges of the future.

5. External Grants – External grants are received from sponsors, e.g. international agencies, industry, individuals, and other organizations, to support academic research in particular areas.
6. Consultancy Services - Private and public sectors sponsor this type of research to solve a problem or to develop new knowledge for their benefit.

SQU realizes the importance of creating a supportive research environment for its academics and researchers, as stated in one of its reports:

There is a need to provide a stimulating research environment for them, including not only research funding but also ensuring that researchers can allocate enough of their focus, time and efforts to undertake research work, avoiding overloading them with heavy administrative and service work (Sultan Qaboos University, 2013, p.31).

The following sections include the main SQU's relationships analyzed based on the three social capital dimensions (structural, relational, and cognitive).

6.3.2. SQU-government relationship

As already seen in Chapter 3, one of the main relationships that any university has is with its government. In this regard, SQU strives to engage relevant governmental and private organizations in its scientific events in order to disseminate research findings and new knowledge to the community (Sultan Qaboos University; 2014) thus it interacts with government in different ways and by using various channels. Some of these channels are the membership of some ministries in the University Council, and SQU itself is a member of different specialized governmental councils and committees. At this level, the focus was on the joint committees that SQU has with ministries which are related to the three areas of competitiveness (innovation, higher education and training, and technological readiness).

Participant who were members in the joint committees were interviewed from different ministries and Councils including the Ministry of Education, Ministry of Higher Education, Ministry of Transport and Communication, Ministry of Health, Supreme Council for Planning, and The Research Council. Members in such joint committees from the SQU side were selected and interviewed, as well, in order to gain both sides' perspectives.

6.3.2.1. The structural dimension in SQU-government relationship

This dimension of social capital, as discussed in Chapters 2 and 4, refers to the interactions, connection, and network strings, and how interaction takes place, how many times, and at which level. This dimension was used to know more about the university's interactions and networks with the government in Oman.

In general such committees are stable and operate at the top level. They are chaired by a Minister or Undersecretary of the relevant ministry, and the Vice Chancellor of SQU or one of his deputies. Five to seven members from each side meet two to three times a year. Meetings take place sometimes in the ministry or council and sometimes in SQU. Normally, common meeting topics from either side will be identified by members communicating with each other by telephone and letters and then the top level meeting will take place.

According to most respondents, SQU is expected to play a critical role in such joint committees because SQU is considered to be "An expert" (OGR-1) and "House of Excellence" (OGR-5). SQU is expected to provide knowledge, updating of new issues, new ideas and suggestions, solutions and recommendations for problems and challenges facing the government, skilled graduates, and professional training. On the other side, respondents from both sides mentioned many benefits that SQU can get when collaborating with other organizations from the public sector (e.g. ministries). These benefits include awareness of reforms in the education systems, more innovation, more training opportunities for SQU students, development of its academic programs, increased funds and extra cash, linking its curriculum with the

field, joining the practical with the theoretical, developing its knowledge and know-how, and having a better sustainable and cooperative way of communication between SQU and other actors (OGR-1, OUR-1, OGR-2, OUR-2, OGR-3, OUR-3, OGR-4, OGR-5, and OUR-6).

OUR-2 and OUR-3 point out that SQU considers that maintaining close and good relationship with government is essential and significant. OUR-8 adds that SQU is an important part of society; such interaction and relationship helps SQU to know society's needs. However, according to OUR-1, even though SQU has always been viewed as a “Think Tank” for the whole country, the real situation is far from that because so far SQU does not use its full potential to contribute and collaborate with government. OUR-1 states that “Every now and then, we hear that the government is approaching, let's say for example, a certain consultancy company while all the skills required are here at the university”. OUR-2 highlights that in some cases, the required support and means to maintain a relationship with government are not available for SQU.

In reference to the impacts of collaboration on development, OGR-3 points out that through collaboration, innovation can be improved and new ideas can be adapted and implemented in Oman. Also, OGR-5 highlights that joint committees can affect the development of Oman according to the vision of Oman and the 5-year development plans. By working together with the government, more innovation and skilled graduates will be produced to aid development. This will definitely improve the competitiveness of Oman (OUR-6).

With regard to the committees, respondents from the government side raised different suggestions for improvement:

- OGR-1 suggests that committees should include members from the private sector and other higher institutions.

- OGR-3 states that “The only weakness I’m noticing is that the members from SQU side are very busy and always over loaded which make them not capable for handling our researches. They need to include more members in the committee”. OGR-4 raises the same point of increasing the number of committee members and he/she highlights the importance of formulating subcommittees to look after specific issues such as innovation, training, and technology.
- According to OGR-4, a separate budget should be allocated for committees.
- OGR-6 points out that they deal with SQU through a focal point called ‘Technology Transfer Agent’ but this is only at a personal level, and he/she states that “We are looking more for organizational level of collaboration so that things become easier and more facilitated and better governed to function and make success”.
- According to OGR-6, there is no national policy for the university-government relationship or for the university-industry relationship, but such relationships as there exist are driven mainly by personal relationships. Also, he/she adds that “the relationships between government and the private and academic sectors are very important and this is how the knowledge base is evolving and developing and we are trying to capitalize on that in Oman” (OGR-6).
- OGR-3 points out that there is no evaluation in regards to the committee’s outcomes, and it is a good idea to evaluate them.

6.3.2.2. The relational dimension in SQU-government relationship

The relational dimension of social capital was used to learn more about some aspects that affect SQU-government relationships, such as the level of trust, and how important trust is for the members and organizations, and how easy it is for members from both sides to work with each other. Furthermore, respondents were asked about their suggestions for maintaining a high level of trust.

Almost all respondents agree that trust is very important in joint committees and is a cumulative factor (OGR-2). By trust the actors understand that: the failure of either side will affect the other side (OGR-1); trust leads to a healthy and supportive environment (OUR-2); without trust, there will be a delay and thus productivity will decrease (OGR-4). OUR-4 claims that trust must exist between both sides for better productivity and motivation.

According to OGR-2, previous social and personal communication will help in trusting the committee's members. In supporting OGR-2's views but in a different way, OGR-6 states that

We need to capitalize on the personal relationships but at the same time having a national policy would facilitate that and make it more aligned with vision and complimentary roles will be clear (OGR-6).

In emphasizing the importance of trust when collaborating in innovation, training, and technology, OGR-1, OUR-2, OUR-5 and OGR-6 point out that trust definitely improves competitiveness. OGR-4 states that “if I do not trust an organization, I will not send my people to that organization; as simple as that”. In regards to trust in SQU, OUR-8 points out that if there is no trust in SQU, other organizations from the government will seek help from outside the country. So, trust should be between organizations as entities and not only on a personal basis as it is now (OGR-6 & OUR-8). In a related issue, OGR-3 comments on their joint committee by stating that “we don't have that trust ... there will be no participation in innovation with this approach”.

OUR-5 gives a practical example from his experience about the important trust. His/her academic department noticed that there is a gap between SQU and one of the ministries; even though the scientists from both sides know each other, they were not collaborating or working very closely. Therefore, OUR5's department decided to interact more by arranging visits for their academics and students to the related Center

of that Ministry as well as inviting scientists and officials from that Ministry to give lectures and participate in workshops, seminars, and conferences. The result of this interaction was building more trust, breaking down the walls and reducing the gaps between both sides, thus opening doors for more opportunities for collaboration.

About possible improvements to ensure the high level of trust between the actors in the committee, respondents raised different comments and suggestions, such as:

- OGR-2 and OUR-5 suggest that more interaction and joint activities are required because, according to the respondent, “the more we work together, the more we establish trust between members and organizations” (OGR-2).
- OUR-4 thinks that such relationships between SQU-government should be strengthened by making the objectives clear and agreed between them.
- OGR-3 points out that in order to increase or ensure the level of trust between their organization and the university, SQU should separate the academic staff from researchers’ staff and include more researchers in the committee. This is because, according to the respondent, the academic staff are overloaded with their academic duties, and therefore take a long time to reply to the ministry’s inquiries.
- OGR-6 emphasizes the importance of having a national policy to ensure the commitment and trust between the actors in any committee. He/she states that

If we have a national policy, I think that would enhance the kind of collaboration and trust between industry, academia and the government ... and it will improve the competitiveness in a very significant way (OGR-6).

6.3.2.3. *The cognitive dimension in SQU-government relationship*

As mentioned in earlier sections, this dimension of social capital is represented in this study by the shared vision, value, and goals between the joint committees' members and organizations (SQU and other governmental bodies). The respondents gave different answers to the questions related to this dimension of social capital.

According to OGR-1 and OGR-2, the committee's members share vision and work to solve national problems and this will improve competitiveness. OGR-2 points out that if one side is selfish, the other side will stop collaborating. OGR-4 gives a similar answer and indicates that both sides of their joint committee consider the interests of Oman and how to serve Oman better. He states, "It is not us and you, it is WE".

OUR-1 and OUR-2 points out that sharing SQU's vision, values and goals with other actors like the government is essential because it provides information to others about what SQU can do and how it can help them (OUR-3) as well as helping actors to work together more efficiently (OUR-6). For example, OUR-1 claims that when most outsiders think of SQU, they think of it as a teaching machine and "they always focus on two things: they focus on your graduates and how to improve your curriculum".

There are other respondents with different views; for example, OGR-5 states that "it depends on the people of the committee. If they're willing to collaborate then they'll be able to solve shared problems", and according to OGR-3, sharing is depending on the subjects raised by both sides. In a broader view, OGR-6 states that "The shared vision or goal will come with a national mandate, but without national policy then it's difficult because the university members have their own priorities". The same respondent points out that if both sides have different visions and policies, then competitiveness is weakened. OUR-2 highlights the importance of alignment of vision; the department's vision needs to be aligned with the college's vision, which needs to be aligned with the university's vision, which needs to be aligned with higher education and government's vision.

In answering a question about what both sides should do to ensure and improve the shared vision, values, and goals between the main actors in joint committees, some respondents raised different comments and suggestions, such as:

- OGR-1 indicates that there should be more communication and collaboration between not only the two sides but also other stakeholders like the private sector.
- OGR-2 suggests that shared vision can be ensured by specifying the strategic objectives of both sides because this sharing and common understanding between them will strengthen their relationship along with proper planning and implementation (OUR-2).
- OUR-4 points out that an efficient communication channel is needed with the right tools for SQU to interact more efficiently with other actors such as the government.
- OGR-6 emphasized the importance of introducing a national policy to ensure the shared vision between both sides in their relationships, because SQU and other universities each have their own policies, and other actors have their own policies, too. Furthermore, according to the same respondents, more incentives are needed to improve the involvement of academics.

Other issues raised by the respondents

OGR-6 suggests that if all universities – whether public or private – are aligned to collaborate with each other and also aligned to support and promote R&D and innovation at the industry level, and aligned also with the governmental obligation to support innovation and incentivize the industries to support innovation and R&D, he/she thinks such alignment can result in strong collaborating network which can make things happen.

6.3.3. SQU-industry relationship

Scholars, as already discussed in Chapter 3, point out that collaboration between universities and industry (firms) is very important not only for both sides (university and firm) but also for the national economy and its competitiveness. There are many benefits which can be gained from collaboration and interaction. Based on the analytical framework, the three dimensions of social capital were used to examine the SQU-industry relationship in Oman.

SQU interacts with industry in different ways, such as joint research and projects, membership in colleges' boards and technical committees in the research centers, participation in sponsoring some activities at SQU, and through student training, as well.

6.3.3.1. *The structural dimension in SQU-industry relationship*

The way and structure used by SQU when interacting with industry are very important. The structural dimension of social capital represented in social interactions ties was used to learn more about SQU-industry relationship. What kind of collaboration and interactions there are, how many members from both sides, stable or not stable, and many other issues were covered in this part.

There are different views and feedback in regards to this dimension, some joint technical committees, joint advisory boards, and joint projects' teams are stable and some are not. OIR-1 points out that they have a liaison committee at senior level and meet three times a year. According to OIR-5 experience, they meet once at the beginning of every quarter, and when matters are stable, they meet bi-annually. OIR-6 states that "members are divided equally between the university and the industry and they meet once per year at SQU and have been stable for the past three years". However, OIR-3 and OIR-4 say there is no stability in relationships and collaboration, no framed collaboration with SQU, and if there is collaboration it is very limited and it only focuses on creating training opportunities for students.

According to the respondents, SQU is expected to provide different roles, contributions and benefits to the other side of collaboration which is the industry. SQU is expected to accept feedback on its programs and graduates, to be willing to cope with company requirements and challenges, to be proactive in sharing the latest advancements in education and science with companies, to be proactive in approaching the industry whose facilities may cater to university needs, and to share its labs (OIR-1, OIR-2 & OIR-5). SQU is also expected to lead the process of modernization and development (OIR-4) and to keep abreast with workplace requirements (OIR-5). OUR-4 points out that one of the main roles SQU can have with industry is in shaping its graduates into the requirements of industry.

On the other side, according to the respondents, there are many different benefits that SQU could get from interaction and collaboration with industry. Such benefits include: access to high level feedback from industry, thus bridging the gap between both sides; improvement of SQU programs to meet industry's needs; improvement of its graduate employability; getting more training opportunities for its students; access to practical application and experimentation; solving of cases and problems; securing of more funds and support for its research projects; collaborative research and consultancy; delivery of lectures to students by industry practitioners (OIR-1, OUR-2, OIR-2, OUR-3, OIR-3, OUR-4, OUR-6, OIR-6 and OUR-8). Overall, such collaboration will improve SQUs' competitiveness (OIR-2) and enhance its role in society, thus increasing its support (OIR-4).

According to OUR-2 and OUR-3, SQU is very keen to build and maintain collaborative relationships with industry in Oman because of the above expected benefits. OUR-8 indicates that SQU is doing well because it is forming committees and has different interactions with industry; such interaction is at personal and university level.

According to OIR-3, linking educational institutions with development plans, and matching complementary trajectories will enhance the community's competition and innovation, thus improving competitiveness. Based on OIR-1 experience, such

collaboration between SQU and Industry helps them to improve their production through the implementation of new technologies, and such improvement will impact the competitiveness. OIR-2 and OIR-6 add that interaction and collaboration leads to a higher level of innovation and higher education and training which will improve competitiveness of the country (OIR-4 & OIR-6). Collaboration will result in more innovation which means more new products and higher quality, thus strengthening the industry generally (OIR-4).

OIR-4 provides the following evaluation of university-industry collaboration based on his/her experience (Table 6.3).

Table 6-3 : Evaluation of U-I Collaboration in Oman

Weaknesses	Strengths
<ul style="list-style-type: none"> - Weak linkages between universities and industry (firms) - Focus on specific aspects such as aspects relating to oil and gas - Lack of awareness among companies of the importance of the role of universities as a source of innovation - Poor social communication means between the universities themselves and between them and the surrounding community. - Focus on promotional aspects in student activities and neglect the practical aspects. - Closure of laboratories and research centers and restricted to students only. 	<ul style="list-style-type: none"> - Geographical proximity between universities and firms. - The availability of capital for innovation catalyst. - Availability of expertise. - The existence of laboratories and research centers - Support of the Omani society for innovation

Source: Researcher's own Elaboration based on OIR-4's answer

The interactions and collaboration between SQU and industry can be improved by “meeting more with better follow up. Focus to get a wider representation from the industry with fewer but focused members of the university” (OIR-6). OIR-5 states that “if dedicated teams with clear mandate and empowerment are put in place for such collaboration it will definitely improve efficiency and speed”.

About possible improvements in university-industry collaboration, respondents raised the following comments and suggestions, which if implemented will improve collaboration and its impact on competitiveness.

- The picture of such collaboration is not clear (OIR-3). He also claims that what they are seeing now is that universities (like SQU) are issuing graduation certificates but not producing efficient students with critical minds, and this is one of the greatest weaknesses. The same issue is raised by OIR-5 by stating that “Unfortunately, the tendency is often that the academia teaches syllabus which either obsolete or no longer what the industry requires.
- An agreed stakeholder engagement plan and clear Terms of Reference (ToR) between SQU and industry must be in place for collaboration (OIR-5). He adds that “the top management support is very important to move things in the right directions” (OIR-5).
- OIR-4 highlights that, based on their experience, companies are reached by the university in a random way; students are sent without a clear plan, and with no follow-up. He adds that companies’ financial support to the university should be addressed to support innovative ideas and creativities and not for unimportant projects. Also, companies should get benefit through the media from such collaboration.
- OIR-2 suggests that people from SQU spend some time in the company environment (about two weeks) in order to experience the struggles and challenges faced there.
- OIR4 suggests that collaboration and cooperation concepts be part of education courses, and some criteria be formulated so that collaborative activities are considered when evaluating any educational institution and the

company. The same respondent suggests that constructing joint research centers can improve collaboration between industry and university.

6.3.3.2. The relational dimension in SQU-industry relationship

As discussed in Chapter 2, trust is one of the relational dimension's aspects which are considered to be crucial for the success of any collaborative relationship. Trust was used in examining the relationship between SQU and firms in Oman, its importance for both sides, how the level of trust can be increased, and how it can impact the areas of competitiveness like innovation, training, and technology.

The respondents show and describe the importance of trust in SQU-industry relationships by using strong phrases like “Trust is essential” (OIR-1), “Trust is extremely important” (OIR-2), and “Trust can make or break any relationship and initiative” (OIR-5). OIR-1 highlights that trust and business ethics are the core of any collaboration agreement. Also, OIR-5 states that “once trust is established, anything is possible. People can share their know-how, experience, information, ideas and solutions”. However, OIR-6 has different views; he states that “Trust is important; however I don't see this as an issue in such forum”, by which he meant the forum of technical and advisory boards at SQU of which some representatives from industry are members.

The absence of trust can result in poor outcomes (OIR-2), such as extremely fragile relationships (OUR-2), difficulties in collaborating with industry (OUR-3), hindrance to openness, transparency and collaboration (OIR-5), and low quality and more conflicts (OUR-5). Without trust, it is impossible for any company to accept the exposure of its capabilities to others (OIR-1). OUR-6, based on his/her practical experience, states

We always had a problem with the industry when they say ‘ahh I want a westerner to do this study for me rather than an Omani’ but nowadays it's not like that. Actually, now they give you the preference. Why? Because there is a

lot of social interaction: and that social interactions built trust – like ‘alright, we can produce,’ it improved their expectations (OUR-6).

In some cases, according to OIR-1, a confidentiality agreement has to be signed between both organizations (SQU & the company) to ensure the protection of data, and such an agreement should be based on the main principles of international business ethics and copyright laws. In a similar view, OIR-5 points out that agreed ground rules of do’s and don’ts with clear Terms of Reference (ToR) in the collaboration are required to ensure and increase the level of trust. In addition, evidence and time are required for maintaining trustworthiness (OIR-2). OIR-3 points out that the clarity of vision, unity of purpose, and transparency lead to a higher level of trust. Transparency and recognition are also important in increasing the level of trust (OUR-2).

Higher trust can lead to a higher chance of innovation, higher education, technological readiness (OIR-2) and higher productivity (OUR-4), thus affecting competitiveness positively (OUR-5 and OIR-6). According to OIR-3, working together with trust leads to the growth of society as a whole and not just for one party. Therefore, OUR-1 points out that his/her college tries to maintain trust with industry by inviting members from different firms to be members of the College Advisory Board, to produce a kind of ownership and encourage commitment from the private sector.

In answering a question regarding how the degree of trust and trustworthiness can be increased between the members and organizations of university and industry, the following suggestions and comments for improvement were raised by the respondents:

- OIR-1 points out that for them as an industrial organization, the protection of national data and the interest of their contractors, partners, and stakeholders are their main priorities, thus they expect the other side to respect such priorities. The same respondent indicates that trust in such collaboration must

represent the values of both sides, not only at an individual or personnel level but at the organizational level.

- OIR-2 highlights the importance of showing evidence of what has been agreed on, so that over time, trustworthiness will be maintained. In relation to the same issue raised by OIR-1, OIR-5 indicates that members of both organizations must adhere to the agreed ground rules and the “Terms of Reference” of their collaboration.
- OIR-3, OIR-4 and OIR-5 underline the importance of having and ensuring clarity of vision, clear goals and responsibilities, unity of purpose, and transparency and credibility in dealing between the two parties in order to definitely increase the level of trust.
- There must be a mutual awareness of the importance of university-industry collaboration throughout all Oman, and not only a focus on a specific area or part of the country (OIR-4).

6.3.3.3. The cognitive dimension in SQU-industry relationship

The cognitive dimension of social capital represented in this study by the shared vision, values and goals was used to learn and know more about the importance of sharing vision in SQU-Industry relationship and to what extent SQU and firms collaborated to solve shared problems. It was also used to learn how sharing vision, values and goals can impact competitiveness through, for example, the collaboration in innovation, higher education and training, and technological readiness.

It seems that different respondents have different experiences in regards to the shared vision, value, and goals. For example, OIR-2, OIR-5 and OIR-6 point out that they have a clear vision and goals, such as human resource development, that benefit both sides, while OIR-3 and OIR-4 say that the sharing of visions and goals does not exist in their collaboration, or if exists at all, it is not clear. Also, OIR-4 does not think that industrial zones in Oman are reaching the stage of sharing vision, values and goals

with other actors like SQU. OIR-4 suggests that the question of ‘why’ should be addressed to The Research Council or Industrial Innovation Center.

OUR-2, OUR-3, OUR-4, and OUR-5 agree that sharing SQU’s vision, mission, and goals with industry is important, and it can strengthen the trust and the system of exchanging information with industry. They also agree that SQU is sharing its vision through meetings, conferences and other gatherings with industry. OUR-6 states that “If I tell the industry my vision and mission, they can also think how they can fit in that formula, how they can play a role in it. So, once they know we can work together”.

According to OIR-1, their collaboration with SQU resulted in many successful joint projects like the MSc scholarship program, and such success is because of the compliance of vision, values and goals which helps to enrich cooperation between the two organizations. OUR-6 highlights the importance of SQU-industry collaboration to increased competitiveness. OIR-5 points out that collaboration and interactions between SQU and industry are pivotal to identifying, diagnosing and solving problems. According to OIR-5,

The industry is an implementer/user of technology and innovation while the university is the developer of the solution and if the implementer does not help communicate problems and anticipated technology needs to the university, how can the university in turn be able to innovate? (OIR-5).

With reference to how shared vision, values and goals can be ensured and improved, respondents provide the following suggestion for improvements:

- OIR-1 indicates that the support and follow-up of top management on both sides is very important in boosting joint teamwork.
- In a wider view, OIR-3 thinks that the process of ensuring shared vision and goals should start from the government’s vision and its clarity.

- OIR-4 points out that a common ground exists, but it needs to be strengthening by adequate legal framework as well as by the joint technical framework. OIR-4 further suggests the following activities that government, universities (e.g. SQU) and industry should consider in order to ensure and improve shared vision.
 - ✓ Government
 - The introduction of incentive systems and support of innovation within the companies' evaluation system.
 - Building joint regional research centers.
 - Embracing innovation and support to find ways into the market.
 - Raising awareness of the importance of innovation in all society's actors.
 - ✓ Universities
 - Giving more attention to innovators and coordinating with government and the private sector to place these innovations in the market.
 - Opening their research centers to the private sector.
 - ✓ Industry
 - Consideration of innovation as a means to increase competitiveness.
 - Allocating budget for innovation.
 - The relentless pursuit of cooperation with universities and research centers in order to resolve technical problems according to the mechanisms of innovation.

6.3.4. Intra-SQU relationship

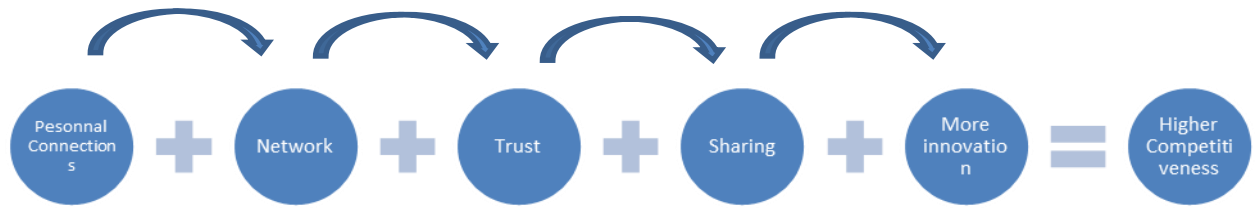
6.3.4.1. *The structural dimension in intra-SQU relationship*

Social interaction is an aspect of the structural dimension of social capital. It is used in this part to investigate the importance of knowing people on a personal level for relationships as individuals as well as for SQU's internal and external relationships. Also to examine how such interactions benefit SQU and how SQU can maintain close relationships with its employees.

Most of the academics and researchers who were interviewed indicate that knowing people on a personal level, either from inside SQU or outside, is very important not only for their personal benefits but also for SQU's relationships because of the expected benefits of those relationships. OUR-1, OUR-2, and OUR-6 answer the question about the importance of knowing people at a personal level by stating that "It is actually very essential", "It is very important" and "I think it is very important because systemic things do not work always", respectively.

According to OUR-1, OUR-4 and OUR-8, if you know people at a personal level, barriers will be broken, hesitation will be reduced, work will move faster and smoothly, while if you do not know them, official communication exists which requires more time and bureaucracy. Also OUR-2 stresses the importance of personal relations by stating "It's very important because it helps you understanding other people's personalities well and on a deeper level helps you to know how to deal with them and aids you in decision making". OUR-6 points out that it is important because systemic way doesn't work always and they use a lot of their social networks to set up meetings with external entities. He summarizes his opinion on shared vision in the following order (Figure 6.1).

Figure 6-1 : Vision Alignment According to OUR-6



OUR-3 and OUR-7 are more cautious about personal level relations because their opinions are that the relationship in general should be professional; they say the personal aspect should not matter but that it actually does, and therefore should be used in a positive way, such as in the case of personal disagreements.

There are many different benefits for individuals and SQU from personal level relations. The following table (Table 6.4) summarizes the different benefits collected from participants' answers from the first case study.

Table 6-4 : Summary of Personal Relationships Benefits

Respondent	Benefits of personal level relations for individuals and SQU
OUR-1	<ul style="list-style-type: none"> - The companies will do business more with SQU if they have personal contacts. - Universities and companies will work better together and things will go smoother for the overall performance of the whole university.
OUR-2	More financial support, sharing knowledge and ideas, exposure to up-to-date technology, increasing awareness, exposing the colleges to outside industries.
OUR-3	Better communication, better sustainable and cooperative way of communication between SQU and other actors (public or private).
OUR-4	Upgrading the education system, giving more opportunities, access to industry, thus technology can be further developed.
OUR-5	<ul style="list-style-type: none"> - Positive impacts on innovation and higher education and training by new ideas and knowledge also will facilitate the sharing of technology.

	- Promote SQU, people will be more familiar with SQU’s activities, more credit to SQU from inside and outside the country, more exchange of ideas and technology, even between Omani institutions.
OUR-6	Bridging the gap with industry, more skilled students, collaborative research, and consultancy.
OUR-7	Good connections with outsiders can help SQU in getting approvals and implementing projects.
OUR-8	SQU is an important part of the society, such interaction helps it to know society’s needs, and helps in shaping its education and directs its staff to serve the society.

Source: Researcher’s own Elaboration based on Respondents’ answers

Some respondents talk about the current internal situation in SQU as well as its collaborative networks with external actors. According to OUR-1, even though SQU has always been viewed as a “Think Tank”, this is far from reality because “unfortunately in order for it to be a real think tank it has to produce something that is practical, and so far the university is not getting its full potential to contribute, for example, to the private sector or the government sector”. The same respondent highlights that there are still governmental bodies approaching certain consultancy companies with their problems and challenges while all skills required are available at SQU. OUR-7 thinks that SQU doesn’t doing a good job in having good connections with outsiders which will help SQU in getting some approvals and other services.

OUR-5 indicates that there are two components in SQU; administration and academics (researches and scientists), and SQU administration follows the top-bottom approach which, according to OUR-5, is not appropriate for academics who think it should be a bottom-up approach and the whole communication should start from the bottom. He states that “what they are doing is a top-down approach; so they are facilitating something and then they bring it to us. The best is a bottom-up approach because that will work” and he describes academics like soldiers who should simply follow orders and if they do not, they must be considered failures.

According to OUR-6 and OUR-8, SQU is trying to maintain close relationships and to bridge the gap with other actors by forming committees with, for example, government and the private sector. However, according to OUR-2, there is not enough support and the required means are not available, even though SQU encourages creating such relationships.

According to the respondents, there are different things that can be done by SQU in order to maintain close relationships with other partners like government and industry. For example, in OUR-4's opinion, an ecosystem is required where government represents the demand side (as a regulator), industry represents the supply side, and SQU is the tangle of knowledge and information through which both sides interact. OUR-4 states that "once a good strong and coherent ecosystem is established then good interaction between the two parties will benefit us in terms of creating a more knowledgeable economy and higher regional competitiveness as well as pushing the university to have the initiative and to be at the edge of development". Other suggestions are the following:

- OUR-1 thinks that SQU top management should include something in its structure which indicates the benefit of gaining contact and that more encouragement is required in all departments. There must also be something within SQU's culture that emphasizes the importance of personal relations with other organizations.
- OUR-2 recommends that SQU work to raise the awareness among faculty and staff of the importance and requirements of maintaining relationships.
- OUR-3 and OUR-8 suggest that SQU should hold more frequent and unofficial meetings with different parties, conduct joint workshops, and re-organize 'open days' with other actors as it has done before (OUR-6).

- OUR-4 suggests that in order for SQU to maintain close relationships, it needs to have a strong unit, which is hard to achieve since SQU should have high innovation, patenting, and an easy process of links to reduce bureaucracy.
- OUR-5 points out that more incentives and financial support are required (e.g. for attending more conferences and hosting conferences).

6.3.4.2. The relational dimension in intra-SQU relationships

The relationship dimension of social capital was presented by trust and was used to examine the importance and level of trust in intra-SQU relationships, and find if there is a high level of trust between individuals, department, and faculties in SQU. Further examination was to determine to what extent trust is facilitate the process of collaboration between SQU's employees and other partners and how this impacts competitiveness through innovation, higher education and training, and technological readiness.

There is an agreement between all respondents about the importance of trust, not only within SQU but also when collaborating with external actors. With trust, actions will flow and happen because it encourages individuals to work and interact with each other in a productive way. . OUR-1 emphasizes the importance of trust by rhetorically asking “How likely am I going to work with a colleague if I don't trust him/her?” In academia, according to OUR-4 and OUR-5, both trust and ethics are very important because knowledge is based on ethics (universal ethics) and trust is considered to be a research pillar, thus they give the individual a sense of empowerment and motivation to work harder and better. As OUR-3 states, “without material there is no engineering, so without trust there is no collaboration”.

Trust among people leads to a healthy and supportive environment, greater motivation and productivity, working without surveillance, having spaces for innovation, getting new ideas (OUR-2, UR-4, OUR-5, OUR-7, and OUR-8), and gaining confidence to give, and willingness to provide information (OUR-3). According to OUR-6 and

OUR-8, trust is extremely important in breaking down the silos and working collaboratively inside and outside SQU. Trust will improve communication and strengthen ties, and create better support, and more motivation (OUR-2). Most of the benefits mentioned in this section and the previous section can positively result in higher competitiveness through improving innovation, education and training, and technology (OUR-2, OUR-5 and OUR-6).

Without trust, it is difficult to reach consensus due to clashes; thus, relationship would be extremely fragile (OUR-2), and result in difficulties in collaboration within the department, college, university, and outside the university (OUR-3). Without trust, there is no productivity, low quality, no publication, more conflicts, and no continuity in research (OUR-5). Furthermore, there is no sharing of information and there is no collaborative work or research (OUR-6). Ultimately, if there is no trust on SQU, other organizations will seek help from outside the country (OUR-8).

OUR-6 claims that the philosophy of trust is the same within SQU and with outsiders; successful collaboration and everything it entails can only really happen with trust. OUR-1 indicated that his college had already started to establish trustworthiness with outside parties by inviting members from the private and public sectors to be members of the College Advisory Board, to produce a kind of ownership and encourage more commitment from private and public sectors.

OUR-5 also provide another example from their department experience; they noticed that there was a gap between their academic department and one of the ministries related to their department's activities, so they started to occasionally visit that ministry, taking their students to the specialized center there, and inviting members to the college to participate in workshops. So, according to OUR-5, all those personal and social activities helped them break down the walls, reduce the gaps and build trust which resulted in more collaboration between them. So, as OUR-6 said, "it is the philosophy of trust".

Respondents from SQU suggest some activities to build trust and increase the level of trustworthiness among SQU's members and between SQU and outsider actors, because, according to OUR-3, "Trust is something that needs to be earned; it is not something that is guaranteed". OUR-6 points out that other actor give SQU preference because there is a lot of social interaction that has built trust. Thus, OUR-1 and OUR-6 thinks that within SQU, more social interaction is required to increase the degree of trust. OUR-1 adds that SQU should provide common places for all faculties to get together, and that more social involvement with activities in the universities would be better.

In a related issue, OUR-5 points out that social life between members of their college is not strong, and he thinks that adding some sort of social events to the research team might improve trust. He states that "a simple example, you may assign a tea hour where all faculty or all researchers sit together and they discuss with each other any problem they are facing to bring them close". Other suggestions included in the following table (Table 6.5).

Table 6-5 : Suggestions for Improving Trust

OUR-2	More transparency and recognition are required for increasing the level trust.
OUR-3	The relationship should be strengthened not only at a professional level but also at a personal level.
OUR-4	- Be realistic, do not over-present your abilities, meet your promises. - Objectives must be clear and agreed upon between parties.
OUR-7	Having a clear vision and objectives, a clear strategy, good election of employees, more interaction between employees ... all will result in TRUST.
OUR-8	By showing and telling others about SQU knowledge and products, historical and past joint projects, SQU can obtain more trustworthiness.

Source: Researcher's own elaboration based on respondents' answers

6.3.4.3. The cognitive dimension in intra-SQU relationship

Based on our discussion in Chapters 2 and 3, sharing vision, values, and goals are important for inter and intra-organization relationships. The cognitive dimension (shared vision, values and goals) was used to know how far SQU is sharing its vision, values and goals with its employees as well as with other partners. Also, to learn more about what both the employees and SQU should do to ensure the shared vision and goals and how this can impact the competitiveness.

According to OUR-2, OUR-3 and OUR-4, SQU shares its vision, value and goals with all staff members and it has strong communication with staff as well as welcoming criticism and comments. It also has very good links for sharing, and a transparent system of exchanging objectives and vision (OUR-4). However, OUR-6 and OUR-7 think that SQU is not doing a good job really in sharing its vision, values and goals, especially with its staff. OUR-6 said “if you go outside and ask my secretary: What is the vision or mission of the university? I don’t think she knows. It is extremely crucial to share the vision with all employees”. OUR-1 supports OUR-6 and OUR-7’s views by pointing out that vision and mission are only communicated to people who are working on strategic plans, and if many people at the college were asked, many of them would not know what SQU’s vision and the mission are. He comments that vision, mission and goals should be made explicit to all.

OUR-5 has a different opinion; it is not important for him whether SQU publicizes its vision or not, because he knows what is expected from him as an academic staff member. OUR-8 states that “It happens rarely and mostly at the first meeting only, and that’s what makes parties lost sometimes”. According to OUR-1, many committees in SQU start their first meeting by stating specific goals, but the goals that are finally reached are not the same.

Many benefits are expected if the vision, values and goals are shared within SQU and with outsider actors. Some respondents like OUR-1, OUR-6, OUR-7, and OUR-8 link shared vision and goals with important concepts such as unifying, focusing on, and

ensuring for example; unifying the projects and activities, focusing on the real goals of the organization, and ensuring that all look toward a specific point with clear individual responsibilities (OUR-2). According to OUR-2, OUR-7 and OUR-8, shared vision can lead to more innovation activities, increased productivity of the organization (SQU) and improved higher education and training, all of which will strongly impact competitiveness in Oman. OUR-4 thinks that shared vision, values and goals are prerequisite for any development.

In addition, OUR-1, OUR-3 and OUR-5 highlight that clear shared vision and goals are important for the collaboration process with outsider actors because it provides information for others about what university can do and how it can help them. OUR-6 indicates that if SQU tells the industry about its vision and mission, the industry then will think how they can fit into that formula and once they know we can work together. OUR-6 states that “we were always taught when we were kids the example of the father going to his children and giving them one stick and ask them can you break it and they did and then he gives them a bunch of sticks and they cannot break it”. He also points out that if the industry worked together with an academic institution with the same vision we believe that competitiveness and the ranking of SQU would be higher (e.g. in terms of more research funding, more projects, and more skilled students).

OUR-3 points out that sharing the vision, mission and objectives can strengthen the trust with others, and OUR-4 states that “I think this goes with trust. If the sharing is trustful then the process is better”.

The following are suggestions to improve and ensure the shared vision, values and goals.

- OUR-1 thinks that the committee chairmen or the team leaders should control the committee members in regards to following the shared vision and goals, and he/she should continuously remind members of the shared vision and goals to ensure unity of effort and direction.

- OUR-5 divides his views into two levels: the individual level and the university level. As an individual academic or researcher, shared vision can be improved through his/her collaboration, whether in publications, journals affiliated with the university, promoting the university in conferences, or by doing good research. At the university level, he suggests that consistency in communicating well with people is important in ensuring shared vision.
- In a wider view, OUR-2 indicates that it is important to ensure that the department's vision is aligned with the college's vision, which should also be aligned with the university's vision, which in turn should be aligned with higher education and the government's vision.
- OUR-4 suggests that SQU should have an efficient communication channel, between insiders and outsiders, and one of its responsibilities would be to improve competitiveness in each area (innovation, higher education and training, and technological readiness).
- OUR-7 and OUR-8 think that SQU should put its vision in each corner and on its website in a clear banner, and on SQU social media's accounts. It should then communicate earnestly with employees to ensure the shared vision and goals.
- OUR-6 point out that SQU should organize more open days, interactions and social gatherings and involve all its employees.

OUR-5 points out that an important issue related to SQU's vision is the current debate about whether SQU is a teaching university or a research university, and this is something academics and researchers at SQU need to know. According to him, it still not clearly stated and delivered. This causes a lot of inconsistency in among academics and researchers.

Chapter 8 will present the discussion of this case together with the second case study (The National Technological University in Rafaela, Argentina), which is presented in Chapter 7.

Chapter 7: Second Case Study: The National Technological University of Rafaela (UTN) - Argentina

7.1. Chapter introduction

The main objective of this chapter is to present the empirical findings from the second case study, which is The National Technological University of Rafaela, Argentina. As mentioned in earlier chapters, the three social capital's dimensions (structural, relational, and cognitive) were used in this study to examine the university's main relationships, which include its relationship with government and industry as well as its internal relationships, and to examine how such relationships can be improved through social capital's dimensions, so that their impacts on competitiveness can be increased. The structural dimension of social capital was represented in this study by social interactions, relational dimension by trust, and the cognitive dimension by shared vision and goals.

In addition to the following case study introduction, there are three main sub-sections under the empirical findings section: university-government relationship, university-industry relationship, and the intra-university relationship. In each sub-section, the three dimensions of social capital were used to examine that specific relationship of the second case study. Furthermore, as mentioned in the Methodology chapter (Chapter 5), the following codes (Table 7.1) were used for the respondents from Argentina who represented the government, industry and university:

Table 7-1 : Coding of the Second Case Study

Respondent from Government	AGR
Respondent from Industry	AIR
Respondent from University	AUR

7.2. Second case study: The National Technological University of Rafaela (UTN) – Argentina

7.2.1. Introduction about UTN

The National Technological University of Rafaela (Spanish: **Universidad Tecnológica Nacional, UTN** – this abbreviation represents the university in this study) is an Argentinian regional university located in Rafaela in the province of Santa Fe’.

According to (Universidad Tecnológica Nacional, 2016c), UTN’s vision is to create, preserve and transmit the scientific, technological, and cultural fields’ products to the community. Also, to extend its activities to the community to contribute in the development and transformation. UTN has the following purposes:

- To prepare professionals in the field of technology to meet the needs of the industry, without neglecting the cultural and humanistic training that makes them suitable to the industry and society.
- To promote investigations, studies, and experiences necessary for the improvement and development of the industry, and advise, within the sphere of its competence, public authorities and private companies in the Organization, on direction, development and promotion of the national industry.
- To establish close links with other universities, technical and cultural, and with national and foreign institutions, and with industry and economic forces of the country.

UTN’s location and features

The UTN is located in Rafaela, State of Santa Fe in the Argentinian Republic, in South America. Rafaela is a city located in the Department of Castellanos. The city

has around 100,000 inhabitants and the distance from Buenos Aires to Rafaela is about 540 kilometers.

Carmona (2003), Costamagna & Larrea (2011), and Kantis, Carmona, & Ascúa (1999) point out that Rafaela is considered to represent a successful story in the field of territorial economic development from perspectives of business competitiveness and environmental conditions. Rafaela's politics is considered significant in fostering communication between the various actors involved because such process was seen as a social construction process that would be continuous and dynamic, leading to long-term results. Costamagna and Larrea (2011) highlight that the economic performance of firms was not only because of the firms themselves but because of the dynamism and capabilities of the municipal government and other public and private organizations such as associations, technology centers and the university to collaborate together.

Ferraro and Costamagna (2000) observe that one of the important features in Rafaela's development of public-private cooperation is that all organizations involved achieved the recognition of the other actors and their place in the local structure was known and respected. According to them, other features of Rafaela include the clear pursuit of continuous rethinking of the region through policy design, the continuous dialogue, and the style of leadership. Pablo Costamagna, Aranguren, and Larrea (2015) state that "some of the features of Rafaela today are the result of a learning approach that was initiated in the 1990s, so we can clearly see how the decisions made more than twenty years ago are having an effect at the present time" (p.170).

Staff, Faculties, Programs, Research Centres

Since it was founded, the university has produced 256 professionals. It has 135 teachers, is attended by 850 students, and has a staff of 18 non-teaching people.

There are 3 Engineering Faculties:

1. Civil Engineering
2. Mechanical engineering

3. Electro-mechanical engineering

Bachelor's Degrees

1. Farm management
2. Industrial Organization
3. Educational technology

Technical Programs

1. Food industry
2. Programming

Post-Graduation Courses

1. Masters in Territorial Development:
2. Post-graduation course in Hygiene and Industrial Safety:

Research

UTN Rafaela provides a series of services to the community through its laboratories (e.g. Civil Engineering Laboratory and Laboratory of Food Microbiology) and through other dependencies like the Praxis Research Institute (Universidad Tecnológica Nacional, 2016a). Praxis Research Institute of Technological and Social Research for Territorial Development, Praxis, was created as a centre of analysis and research to encourage innovation in the Territorial Development of the Region, with an academic reflection shared with other centres and agents who participate in the development.

7.2.2. UTN relationships and collaboration with government and industry

Since its inception, UTN has been linked to the government and industrial sector of the region. One of UTN's strengths is that many of its teachers are professionals from government and industries, and that creates a type of interaction because there are people from different organizations who make the links and increase confidence in each other.

Furthermore, the Secretary of Bonding Technology in the region has a series of programs designed to promote technological links with government and companies in each Regional faculty including Rafaela (Universidad Tecnológica Nacional, 2016b).

These programs are:

1. Strengthening: the programme promotes and categorises the work of the technology transfer office of UTN and strengthens the equipment for best results of the experiences made with the local environment. Also, disseminates the achievements and lessons from experiences carried out internally.
2. Formatec: this is one of the internal programs of the University, whereby the UTN have been able to assemble teams and present results of interest according to the annual call for proposals since 2007. This call is financed with a budget contribution of 50 per cent from each of the regional powers interested in participating.
3. The Entrepreneur program is intended to promote entrepreneurship and technological innovation with academic strength and confidentiality, taking into account the particularities of each of the regions of Argentina to foster their development.
4. Transfer technology: The transfer has different potential demands, for example, the need of the Governmental bodies in developing legislation or regulation based on the scientific and technological knowledge and requirements of stakeholders.

Beside the above programmes, UTN has labs that work for local industry offering:

CHEMISTRY LAB: This is where students and teachers conduct practice and research, and where a team of professionals serve the requirements of private

and public companies and organizations. One of the goals of the laboratory is to provide services and conduct research on environmental issues.

CIVIL ENGINEERING LAB: On-site students and teachers conduct practice and research here, and a team of professionals serve the requirements of companies and public and private bodies. Some services are related to the areas of concrete, aggregates, and soils.

7.3. UTN's relationships

The following sections include descriptions of the main university's relationships examined by using the three social capital dimensions (structural, relational, and cognitive).

7.3.1. UTN-government relationship

One of most important university relationships is the one with its government because government by its plans and policies can affect the university's structure and system, as already seen in Chapter 3. The three dimensions of social capital manifested in social relations, trust, and shared vision and goals were used to examine the UTN's relationship with its government.

In reference to the second case study, and based on the empirical findings, UTN is interacting with its local government in different ways and by using various channels. Some of these channels are The Universities Council (sometimes called Committee Universities Rafaela – CUR) and The Local Development Agency which includes the universities, the companies, and the City Hall in Rafaela.

7.3.1.1. *The structural dimension in UTN-government relationship*

The structural dimension manifested in social interaction was used to learn more about the interaction between UTN and government, and whether, for example, such

interaction is strong or weak, stable or not stable, and is between specific departments or acts more openly to include different departments. The dimension was also used to explore the expected benefits of such interaction for both sides. Also, to examine how such interaction impacted competitiveness, and how it could be improved by using social capital to increase the impacts of such relationship in competitiveness.

UTN interacts with its government through The Universities Council, or as called by AGR-2, The Committee of Universities Rafaela, which was created by the government, and is where representatives from all Argentinian universities and government meet every month (AGR-1 and AGR-2). The council enables all universities to communicate between each other and between them and the government. According to AGR-2, all universities and other Higher Education Institutions (HEIs) conduct meetings between themselves and with a representative from the City Hall to discuss different shared issues. According to AUR-2, there are different interactions and projects between UTN and its government, for example, in regards to the supply of drinking water and the construction of an industrial park. In showing the strength of UTN-government relationship, AUR-3 states “here in Rafaela, when we go to a meeting we already know each other, and this context makes conversation and discussion more relaxed”.

It seems that UTN has different kinds of relationships, including formal ones, e.g. with the minister, while others are non-structured relationships with universities and departments as highlighted by AGR-1. However, AGR-3 has a different view and indicates that there is no pre-established schedule for meetings and no formal committees; instead there are different and specific topics for the productive area, like entrepreneurship and higher employability.

AGR-3 highlights that The City Hall works as a facilitator to link the universities and companies, and is the one who leads and promotes these meetings through specific policies for specific projects. The same respondent adds that there is a Development Agency which includes representatives from the universities, companies, and The

City Hall. We can notice from the respondents' feedback that there is a good level of interaction between UTN and its government.

According to all respondents from both sides, UTN is expected to play a critical role in such Councils, committees or agencies because UTN is considered to be “A big consultancy firm” (AGR-1) and as stated by AGR-3 in emphasizing the importance of UTN, “Rafaela is becoming a University City”. According to AGR-2, there are two main contributions that are expected from UTN: knowledge and training. UTN is expected to provide new ideas and knowledge (AGR-1), making professional practice in real cases as well as in students' theses, and that knowledge should be related to the city necessities and requirements (AGR-3). Thus, UTN is considered to be an important participant and critical actor in the government's plans and projects.

On the other side, the respondents mentioned many benefits that UTN can get when collaborating with governmental organizations. Some of these benefits are resources, awareness, generating of new knowledge, and training opportunities for students. , joining practice with theory by participating in daily projects, research about real situations, and more participation in development. (AGR-1, AGR-2, AUR-2, AUR-3 and AGR-3). No doubt that because it realizes the importance of such benefits, UTN is constantly developing its relationship with its government.

In reference to the impacts of such collaboration on development and competitiveness, AGR-1 points out that such impacts cannot be measured, and AGR-2 states that “It impacts positively; in which degree, we do not really know, but it definitely has impacts” through providing highly-trained employees and producing local professionals and knowledge. AGR-3 highlights that such impacts can be through the collaboration with companies in innovation, technological demand, and design requirements. The respondents were aware of the importance of such interactions for the competitiveness of their organizations and for national competitiveness.

The following are some of the weaknesses raised by AGR-1 and AGR-3:

- According to AGR-1, one of the main weaknesses is the slow response of the university to the government requirements because faculty is busy with other responsibilities. A further weakness lies in the university bureaucratic system and culture that have a different concept of 'time'. The same respondent states that "there is a culture inside the university which is not worrying about time; they don't have the firm's concept of time ... There is a gap between government and university in regards to time; it should not be misunderstood; it is not as fast as in the firm and not as slow as in the university".
- AGR-3 claims that even though some universities are open and always looking to build relationships with other actors, there are other universities that find building such relationships is more difficult.

About possible improvements in university-government relationships, two respondents made different comments and suggestions:

- AGR-1 suggests that Universities (e.g. UTN) should be very sensitive about the new changes in order to respond to the government needs. Also, there must be more improvements in dialogue between the university system and the political system to find out what kind of university they want, not just requests for specific concrete projects but wider discussion about the university.
- AGR-3 and AUR-3 suggest that more meetings should be organized between students and other actors to explain some real problems which need to be investigated by the university's students and researchers, so all participants will gain more knowledge. "We need to oil the mechanics of these committees" (AUR-3).

- AGR-3 points out that even though they have a dialogue culture and there are examples where it has worked well, more things can be done in this regard. The university must get more involved with dialogue and development by identifying demands and proposing courses of action through research and technical assistance.
- AUR-2 suggests that UTN should work more on shaping aspects that the environment demands.

7.3.1.2. The relational dimension in UTN -government relationship

Trust represented the second dimension of social capital. This dimension was used to know how much trust there was in UTN-government relationships and whether it is easy for members from both sides to work and trust each other. The importance of trust for the outcomes of such interactions and the impacts of such outcomes on competitiveness were also examined.

Almost all respondents agree that trust is critical in interacting with other actors like the university; different respondents use different statements to emphasize the importance of trust (e.g. AIR-1, AIR-2, AUR-2 and AUR-3). For example, “Trust is very critical when interacting with the university ... it is one of the main critical elements to make relationships more efficient” (AGR-1), and “Trust is crucial because an articulation and dialogue process demands high levels of trust ... it is an intangible characteristic that is fundamental” (AGR-3). AGR-2 points out that the level of trust is very high in their relationships, and social capital is important for all actors. Such answers indicate how important it is to build a strong relationship between any university and government. However, both individuals and organizations should work to build strong relationship (AUR-1).

Trust brings down transaction cost, reduces doubts, lowers disagreements, allows more for mistakes and facilitates solutions to problems (AGR-1 and AUR-2).

According to AGR-3, trust can help in gathering information, respecting agreements, and attending to an idea of integral development. AGR-3 states that “trust is a key factor to participate in a collective strategy ... someone who does not trust these institutions cannot be part of the project”. In addition, having some agreements and trusting each other will surely result in more solid development policies (AGR-3). AUR-3 points out that trust is the first thing that should be built before creating teams or sharing activities with other institutions like the ones from government.

AGR-2 points out that previous interactions and personal communication will help build and strengthen trust. Trust is also a natural attribute between former partners (AGR-2). AGR-1 highlights that a level of transparency is also important to build and ensure trust between actors. AGR-3 claims that building trust is not simple because each actor has their own positions and interest, but having culture and space for dialogue can simplify building it. As highlighted by AUR-3, total trust is represented by personal trust and institutional trust together, and both are important for building relations and both require time and continuity.

AGR-1 connects the relational dimension of social capital (trust) with the cognitive dimension (shared vision); he/she states that “Above all, trust can be built when building a shared vision”. In supporting AGR-1’s views but in a different way, AGR-3 states that “Our local policy is based on a constant possibility for dialogue. All the actors know it clearly ... we always reach an agreement because the needs of the territory are more important than our personal interests”. AGR-2 highlights that their young professionals have been working in an open and natural relationship with a high level of trust between their universities, government, companies, and other actors, and because of that, working in such a culture becomes part of their DNA.

About possible improvements to ensure the high level of trust between the actors in the different committees like the one for the development, some respondents raised different comments and suggestions:

- AGR-1 suggests that fulfilling promises and being consistent in what you say in public and private, as well as sharing the results are all important in ensuring trust.
- AGR-3 emphasizes the importance of involving all actors, generating democratic dialogue, respecting agreements, and getting formal agreements with clear contributions from each institution in order to generate a high level of trust.
- AUR-2 suggests that both sides need to work together more to generate more projects. AUR-2 gives the example of the Rafaela Productive Plan 2020 which integrates different actors from Rafaela.

7.3.1.3. The cognitive dimension in UTN -government relationship

The cognitive dimension manifested by shared vision, values and goals was used to find out how fairly UTN and government are sharing their vision, values and goals, and whether both sides are collaborating to solve shared problems. In respondents' opinions, the dimension (shared vision, values and goals) can be improved to increase its impacts on competitiveness. The second case study's respondents gave different answers to the questions related to this dimension of social capital.

In answering a question about whether UTN and government interact and collaborate to solve shared problems, AGR-2 and AGR-3 point out that the committee's members share vision and they are working to solve common and national problems with common objectives. AGR-2 states that "We have a permanent relationship with the university with regard to many problems of the city like the water supply and the design of the sewage system". AUR-2 states that "I believe that to work together in different projects that have a similar driving point of views of the development is fundamental".

There was one respondent with a different view; AGR-1 indicates that shared vision is not yet built at a higher strategic level. According to AUR-3, sharing vision, values, and goals is more complex in public institutions, which are democratic and participative.

AGR-2 claims that even though the decision of what to research is private for the university and researchers, other actors like government and companies need their help to solve different problems, so that innovation and competitiveness of the city can be improved and promoted. AGR-3 supports this point but with a different view; he/she highlights that it is necessary to be clear about the action of each participant so that agreement between the participants and more commitment results. Two out of the three respondents also point out that having relationships in several projects promotes trust and creates a readiness for new challenges.

In answering a question about what both sides should do to ensure and improve the shared vision, values, and goals between the main actors, AGR-2 and AGR-3 raised different comments and suggestions:

- AGR-2 indicates that even though they trust each other and they share history, they just need resources to continue the interaction. He/she states that “It is important to constantly build this culture of interacting”.
- Another issue raised by AGR-2 is the difference in the sense of urgency between the university and private companies; therefore, more dialogue and interaction is required to institute a working culture in this respect.
- AGR-3 raises an important point and he/she emphasized the importance of having more commitment from the government and university as well as from other actors, and indicates that more commitment is required to deal with and develop complex projects.

The same respondent suggests that more commitment can be generated by properly documenting agreements.

- AGR-2 suggests that university should give more attention to the external problems in its environment and not only to its internal problems such as the ones related to the teaching of degrees and other educational courses.

7.3.2. UTN-industry relationship

The interaction and collaboration between university and industry is very important not only for both sides but also for the government and for national competitiveness. As we noticed in previous chapters, building relationships is not easy because of the different interests, goals and nature of activities between a university and industry. Social interaction, trust, and shared vision, values and goals were used to examine the relationship between UTN and firms in Rafaela because, as shown earlier in Chapter 2, social capital can influence relationships.

Based on the findings, UTN interacts with industry (firms) in different ways, such as through joint research and projects, membership of college boards and technical committees in the research centers, participation in sponsoring some activities at UTN, and through student training.

In the following paragraphs, the empirical findings from using the three dimensions in UTN-industry relationship are presented separately.

7.3.2.1. *The structural dimension in UTN-industry relationship*

Under this dimension, the structure of the interaction and collaboration in UTN-industry relationship was examined. Inquiry was made into whether interactions were stable and formal, and whether there was awareness between the respondents about the importance of interaction for the university, industry and the whole country. The

impacts of interactions between UTN and industry on competitiveness were also examined.

Based on the empirical finding of the second case study, there are different views and feedback in regards to this dimension. AIR-3 points out that they used to have meetings with the university and Small Business Chamber of the Commercial Centre of Rafaela (CAPIR) once a month in the Commercial Centre, and they worked according to specific objectives. However, AIR-2 claims that there is no stable committee but only specific projects, e.g. with City Hall in waste management or with the university in training and employment courses. Interactions between UTN and industry include the study of some companies' needs, training programs, organizing student visits to some local companies, and having specific programs like in information systems (AIR-2). According to AUR-2, interaction with industry creates richer dialogue between both sides.

AIR-1 points out that there are differences between dealing with the public and dealing with private sectors. In the public sector, most of the time, you are dealing with one department, but the private sector has very diverse ways. Some firms have few contacts, others have no contacts, and some have many contacts with the university. According to the same respondent's experience, sometimes the university approaches the firm and in other cases the firm approaches university for collaboration. However, according to AUR-1, personal level relationships with industry are also very important because they facilitate communication with industry as a whole.

According to the respondents, UTN is expected to provide different roles, contributions and benefits to the other side of collaboration, which is industry. UTN is expected to produce and exchange new knowledge, provide consultancies, conduct specific training programs, study the company's requirements and challenges, and help small business owners (AIR-1, AIR-2 & AIR-3). AUR-3 comments that what UTN can provide is not only important for the government but also for companies as well.

On the other side, according to the respondents, there are many different benefits for UTN when interacting and collaborating with industry. Such benefits include learning about practical problems, access to student training opportunities, and access to funds (AIR-1, AIR-2, AUR-2, and AUR-3). AIR-3 indicates that there are other benefits like the opportunities to apply practice the theoretical knowledge that students learn in their classrooms, thus mixing theory and practice.

AIR-1 points out that both long-term and short-term collaboration between university and industry are important in building coherent and strong collaborations. Such collaboration has different impacts on the productive development of a company and is always positive; thus, it does not only impact the external or local competitiveness but also the internal competitiveness of the companies such as by improvements in production (AIR-3).

Regarding one of the main strengths, AIR-3, based on his/her experience states that

We are on the right path; the interactions between universities and companies are for the economic development ... we are just starting in interacting with universities and other companies through the City Hall, and this, years ago, was completely unimaginable (AIR-3).

However, respondents provide the following weaknesses of university-industry relationship in Rafaela:

- There is an offer problem as well as a demand problem in the interaction between university and companies. The offer problem is in what the university offers and in how it offers it. The demand problem is in what industry focuses on in their daily work and by short term objectives. So, dialogue is needed to change the two problems (AIR-1).

- AIR-2 claims that one of the weaknesses is the shortage of institutionalization in university-industry collaboration. The same respondent states that “we should work on-calendar with clear objectives and deadlines”.
- Lack of a systematic structure in this relationship between the city hall (government), companies, and the university (AIR-2).
- AIR-3 points out that almost 80% of businesses are small companies in Rafaela and some ideas are good for big companies and not for small companies. Sometimes, it is very difficult to apply some theories to small businesses.

About possible improvements in university-industry collaboration, AIR-1 and AIR-2 raised the following comments and suggestions, which if implemented will improve the collaboration and the impacts of collaboration on competitiveness.

- University must create spaces for dialogue (AIR-1).
- Companies must innovate to cope with the changes but they do not have all necessary resources and knowledge. Therefore, the university should help them. “It is strategic” (AIR-2).
- AUR-3 suggests that more meetings are needed between UTN and industry to discuss the different shared issues.

7.3.2.2. The relational dimension in UTN-industry relationship

The relational dimension of social capital was represented by trust in this study. This dimension investigated how important trust is in UTN-industry relationships and how easy it is for their members to work with each other in joint projects and research. It also investigated whether trust has impacts on competitiveness and how the level of trust can be improved in UTN-industry relationship.

It was clear from the findings that all respondents were agreed on the importance of trust in their interactions, for example, when interacting with UTN. They used strong phrases in their answers to describe the importance of trust for the collaboration between UTN and their companies. Examples of such answers were, “Trust is a fundamental concept and all actors need to trust each other” and “Without trust there is no relationship”(AIR-2), and “Trust is very important” (AIR-3 and AUR-2).

As was the case in UTN-government relationship, according to the respondents in this part, the previous personal interaction is important to build trust - even by being a student in that university before. Such previous interactions can simplify the process of building trust between the actors but if there are no contacts before, it may take more time to build a good level of trust (AIR-3). AUR-2 points out that changing authorities or staff can result in losing some of the relationships because both sides need to trust each other and this process requires time and continuity (AUR-3). AIR-3 states that:

I trust them, I was a student of UTN, and I know that UTN teaches good things for the companies. But other entrepreneurs that did not attend UTN have this question: what can a young professional know about the reality of our business? It is really necessary to change these ideas; you have to be broad-minded and be prepared for new concepts (AIR-3).

AIR-2 supports AIR’s view about the importance of previous interactions by stating that:

In Rafaela, participants have had a long lasting reliable relationship between them. We know each other. We know our trajectory and our daily activity and it gives a basis for trusting each other, which makes the process of building this relationship clearer and faster (AIR-2).

AIR-2 and AIR-3 linked trust (relational dimension) with shared vision and goals (cognitive dimension). For example, according to AIR-2, trust is fundamental to start

a relationship but it is not enough; there must be common objectives; all should work together, participate in joint researches, and share knowledge. In an important point about trust and commitment, AIR-3 highlights that commitment from both sides with trust are both important for continuing joint projects and improving the relationship between students and businessmen. AIR-3 claims that sometimes it is difficult for both sides to trust each other because they need to see or wait for the results first.

Two out of the three respondents pointed out that trust is critical for competitiveness. Higher trust can lead to higher levels of competitiveness through innovation, higher education, and technological readiness (AIR-3); and through trust, both sides will have honest human relationships (AIR-2). AIR-2 points out that the degree of trust impacts innovation directly because high levels of trust must be built when collaborating in innovation with people that you do not know.

In answering a question regarding how the degree of trust and trustworthiness can be increased between the members and organizations of university and industry, the following suggestions and comments for improvement are raised by the respondents:

- AIR-1 points out that conducting and evaluating a process are very important but the process must be facilitated. The same respondent emphasizes the importance of all actors understanding the process of their collaboration because the market will not do it for them; instead individuals and organizations should do that.
- AIR-2 underlines the importance of writing up calendars with clear objectives including the ways to accomplish them. Also, it is important that every participant do their best by using the necessary resources as well as sharing the achievements. The same respondent states that “sharing objectives is very important in a society like Rafaela, with a high level of exposure to information”.

- AIR-3 indicates that talking and negotiating between the actors and participants are required to increase the level of trust.

7.3.2.3. The cognitive dimension in UTN-industry relationship

Sharing vision, values and goals are among the important aspects of the cognitive dimension of social capital. This dimension was used in this section to examine the existence of the shared vision, values and goals in UTN-industry relationships and whether UTN and firms were working to solve shared problems with common objectives. There is also consideration of what both sides (UTN and Industry) can do to ensure the shared vision between them and how improvement in this dimension of social capital can impact competitiveness.

It seems that different respondents have different experiences in regards to the shared vision, value, and goals. For example, AIR-1 states that they have “a very big sick shared vision”. Also, AUR-1 points out that UTN has a vision to be close to the productive sector but each department in UTN has a different interpretation of the meaning of this vision and how it can be shared with outsider actors like industry if internally not working well. AIR-3 has a different experience; according to him, both sides are sharing their vision and goals, and this is good because five years back, there was low sharing and thus nowadays are much better compared with five years ago.

According to AIR-2 and AUR-2, It is very important to share objectives and to make them clear to enable all participants to work towards achieving them. In that way, it is easy to soften disagreements, ideological, practical and operative differences and so diminish obstacles. AIR-2 states that:

One interesting example is the Strategic Plan of Rafaela. When this plan defines objectives for the next 5 or 10 years, it is simpler to start it up and to build detailed plans to reach those objectives. The more strategic objectives are, and the more people know them, the easier it is to work together (AIR-2).

AUR-3 supports AIR-2's view in that the Plan Rafaela 2020 is a tool for sharing vision and it gives partners not all the vision but objectives as well; it is a collective construction.

In reference to how shared vision, values and goals can be ensured and improved, respondents provide the following suggestion for improvements:

- AIR-1 underlines the importance of knowing and specifying the competitiveness they must focus on and to make it clear how it can be achieved. Facilitators are important in such process, too.
- AIR-2 points out that when you have a clear strategic plan with clear shared objectives, and when the government shares that strategic plan with both public and private actors, it will be easy to communicate and discuss things with them. Thus, commitments, agreements and a solid base can be achieved and generated quickly.
- According to AIR-3, more joined and developing projects are required from the common committee to generate more sharing of vision. The same respondent suggests also:
 - Businessmen have some good ideas but they need support because it is much more difficult to do it alone. Therefore, interactions and discussion must take place with other actors like the university to create joint projects and determine common ground. AIR-1 supports this view by stating that “University can help firms to be more competitive”.
 - Sometimes, the proposed projects are good for companies but not for other actors like the university, and vice-versa, so such projects must be built in a way that benefits all participants and ensures the shared vision and objectives.

- A commission or committee with other business owners should be established to work on the above idea. This will help to improve the competitiveness of Rafaela's companies.

7.3.3. Intra-UTN relationship

This is the third main part under the empirical findings, and it moves focus from the external relationships of the university to its internal environment. The targeted respondents in this section were the university people themselves. The three dimensions of social capital were used to examine the intra-UTN relationship between its people and between them and the outsiders as well. The focus of this section is on the relationship between UTN's members and on their views about UTN relationships with government and industry.

The three dimensions of social capital (structural, relational, and cognitive) are represented in this section as social interaction, trust, and shared vision, values and goals. There is a separate section for each dimension in the following sections.

7.3.3.1. The structural dimension in intra-UTN relationship

As mentioned earlier, the structural dimension of social capital is presented in this study by the social interactions. This dimension was used to investigate the importance of knowing people from inside or outside UTN on a personal level, and how such personal interaction can benefit the individuals and the university, and, based on the respondents' perspectives, how UTN can maintain close relationship with its members and with other partners.

Based on the findings, around 70% of interviewed people indicate that knowing people on a personal level, either from inside UTN or outside, is very important not only for their personal benefits but also for UTN's relationships because of the expected benefits of such relationships. For example, AUR-1 answers the question

about the importance of knowing people at a personal level by stating that “It is very important”. AUR-3 gives an answer based on his practical experience by stating that:

If you go to one place where you do not know the people, first you need some time to get to know them and to interpret them, and then you feel more comfortable. But here in Rafaela, when we go to a meeting we already know each other, and this context makes conversation and discussion more relaxed. For me, it is very important (AUR-3).

AUR-2 points out that a lot of projects such as the supply of drinkable water and the creation of the industrial park were successful because of such relationships between their university and companies and government. According to AUR-1 and AUR-3, if you know people at a personal level, it is easier to contact and talk and have faster access to information, and it creates richer dialogue. In highlighting the importance of personal interactions to the UTN relationships, AUR-1 states that “personal interactions strengthen the university relationships”.

According to AUR-2 and AUR-3, there are many different benefits that individuals and UTN obtain through personal level relations. The following table (7.2) summarizes the different benefits collected from participants of this study.

Table 7-2 : Summary of Personal Relationships' Benefits (second case study)

Respondent	Benefits of personal level relations for individuals and UTN
AUR-2	<ul style="list-style-type: none"> - With the companies: the possibility to talk with each one of the companies and to visit them, to do exercises there, and to investigate new problems and challenges. - With the government: UTN is teaching in programmes like <i>Rafaela Emprende</i> and <i>Rafaela Exporta</i>. Also, more opportunities for UTN's students to visit, work, and to be part of government. The exchange is the same with the government and the companies.

AUR-3	Many benefits come from interacting - a simple actor, an important actor, a leader of the project – the university is part of this environment where it can have different roles and this constant change is important.
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Source: Researcher's own elaboration based on respondents' answers

In regards to the current internal situation in UTN as well as its collaborative networks with external actors, respondents provide different views based on their experience. For example, AUR-1 shows that UTN is not doing well in its internal relationship. The same respondent states that “The University (UTN) sometimes tells others what to do but it does the same things inside quite badly; it is not coordinated, has very little innovation capability, and has many daily issues ... University has to change”. However, AUR-3 points out that UTN has its own networks and it is very important what the university can give, not only for the City Hall but especially for the companies. In opposition, AUR-2 indicates that in UTN, all the relationships' aspects are constantly worked on.

When asking for suggestions that UTN should consider to improve its internal and external relationships, respondents provide different suggestions and actions to maintain close relationships with other partners like government and industry. Those suggestions include the following:

- AUR-1 thinks that the university should improve itself by, for example, building strong innovation capability and developing coordination with other actors.
- AUR-1 highlights the importance of change not only in the university's management and its system but also among departments and people inside the university. AUR-1 states that “very deep reform process is required ... Some departments inside the university start to change but most do not want to change”.

- AUR-2 recommends that UTN should work more on meeting the demands of the environment by offering postgraduate courses and training in, for example, new contributions like computer engineering with a postgraduate course in robotics or mechatronics.
- AUR-3 suggests that UTN needs to oil the mechanics of its committees and more meetings are required to discuss the different issues more frequently.

7.3.3.2. The relational dimension in intra-UTN relationships

The relational dimension of social capital is not only important for the university's external relationship but it is critical for its internal relationships between its academics, researchers, technicians, and administrators. Therefore, the relational dimension was represented by trust and was used to examine trust in intra-UTN relationships and to know whether trust is important between the university's members and the external partners. The interviewed people were asked about the possible impacts of trust on competitiveness through improving trust in the university's internal and external relationships.

According to the empirical study of intra-UTN relationships, there was agreement between all respondents about the importance of trust not only within UTN but also when collaborating with external actors. For example, AUR-2 and AUR-3 claim that all the relational aspects depend on trust. AUR-2 states that "Trust is very important because all the relational aspects are based on trust, on knowing each other, in the recognition, and in the value of what the people do". AUR-3 supports AUR-2's view by stating that "I think trust is important in all aspects, because the technical things can be solved; but how you do it depends on the people involved and there comes the issue of trust" (AUR-3).

In regards to the process of building trust, which is the responsibility of both individual and organization (UTN), AUR-1 claims that both individuals and organizations should work to build strong relationships and trust is fundamental in such a process. In supporting this view, AUR-3 shows that there are two main

components of total trust: personal trust and institutional trust. The same respondent states that

There are personal trust and institutional trust that integrates the total trust. The institution has its own trustworthiness because it is the university or the city hall. And then you have the people who represent them and there is where you need time and continuity (AUR-3).

AUR-2 and AUR-3 point out that there are some problems which can affect relationships and the level of trust negatively. According to AUR-2, one such problem is the change of authorities and change of people in an organization because this results in losing some relationships. AUR-3 indicates that there are other problems related to political and institutional issues and these negatively affect trust between participants, so that projects cannot continue as expected.

Suggestions for improving the level of trust

- AUR-1 thinks that within UTN, trust can be generated and increased, and shared vision ensured, by providing common spaces , and also by conducting more social activities involving individuals, department, and the university's top management. The same respondent point out that more informal interaction is required to build trust.
- AUR-2 highlights the importance of working more, which means greater involvement so that more projects are on the go at the same time.
- According to AUR-3, building trust is not easy and it requires continuity of interaction to build it.

7.3.3.3. The cognitive dimension in intra-UTN relationships

The cognitive dimension was used through the shared vision, values and goals to examine intra-UTN relationships. Such examination includes how far UTN is sharing

its vision, values and goals with its members, and how such sharing can impact UTN's relationships internally and externally, and its competitiveness. Furthermore, possible improvements were considered that would help to ensure shared vision internally and externally.

AUR-1 points out that UTN is not sharing its vision with all staff members, or any sharing that exists is very basic and there are different interpretations of the vision between the individuals and departments of the university. The same respondent thinks that many employees do not know what the university vision is. As an example, AUR-1 said that part of UTN's vision is to be close to the productive sector, but each department has a different idea about what that means. However, AUR-2 points out that UTN is doing very well in sharing its vision, but he/she thinks that it is difficult in a big organization like UTN, with so many areas, to share points of view. Moreover, in AUR-3's opinion, it is easier to share visions, goals and objectives within an organization, because it has its own plans and people.

AUR-2 indicates that sharing values and goals are important to improving relationships and to reaching the objectives of a high-quality education and innovation system, and he/she states "I believe that to work together in different projects that have a similar point of view of the development is fundamental". The same respondent thinks sharing is good and it is an added value to the institution's common objectives of innovation, excellence, growth, and quality, and generates development. According to AUR-3, having shared visions, values and objectives already enshrined in the agreed goals can give you a continuous common thinking that saves a lot of time.

AUR-2 claims that sometimes there are internal problems that make things difficult. The universities (e.g. UTN) are public organizations with a political character and an elective direction, so a political management sometimes makes problems difficult to solve. AUR-2 gives an example from his experience by stating

We have elections and change of authorities every four years. We need a political construction with the new management, the working idea, and the goals for the university. Without that political building we cannot have the university we want. Sometimes appear opposite groups that have a different look and that is an obstacle for the things that we are doing (AUR-2).

AUR-3 has a similar view:

This is more complex, because of our institution it's democratic and participative ... I don't decide as the owner of a company. But because it's a public institution, the transition in our case would take more time (AUR-3).

Suggestions to improve and ensure the shared vision, values and goals

- AUR-1 thinks that shared vision can be ensured by facilitating the processes and by giving more attention to informal relationships.
- AUR-2 suggests that it is important to consider the political change in the university because it can affect trust and shared vision which required years to be built.
- AUR-2 underlines the importance of focusing on the areas of shared vision that benefit all actors including the whole city or the country, for example the areas related to competitiveness.
- AUR-3 thinks that shared vision is very involved with time, presence, and participation, and that the individuals members of UTN should spread their vision inside to other members and outside to other actors at all possible times. Based on his/her experience, AUR-3 states that “I always tried to transmit it to the people who work with me: our university always was seen as a closed system, difficult to get in, a little dark, and I say that you need to open it, to show other pictures” (AUR-3).

Chapter 8 discusses the findings of the two case studies and answers the research questions of this study.

Chapter 8: Discussion

8.1. Chapter introduction

As mentioned earlier in this dissertation, this study examined the role of social capital dimensions in enhancing the collaboration between university, government, and industry as well as the intra-university relations. In addition, it looked into the impacts of a university's collaborative relationships on competitiveness. The findings identify the main dimensions of social capital which can improve a university's relationships internally and externally, for example, with other universities, government, and industry.

Even though some themes and ideas covered by the theory have been confirmed in this dissertation, some critical opinions of participants were expressed and therefore possible suggestions for improvements can be proposed.

This chapter discusses the findings presented in Chapters 6 and 7 with the following goals:

- a) Connect the perceptions of the interviewed participants with the theoretical background to check the consistency of the framework and the theoretical learning.
- b) Detect the weaknesses and areas of improvements in the two cases.
- c) Construct recommendations for such improvements.
- d) Synthesise what was learnt from experience.

Section 2 covers the first theoretical research question. Section 3 includes the answer for the second research question. Sections 4 and 5 include the answer to the third and fourth empirical research questions where section 4 covers the practitioners' perceptions of the two cases in the effects of social capital on a university's

relationships, while section 5 covers the possible improvements in a university's relationships, which are discussed in two levels: general and specific. Learning from differences is discussed in section 6; and section 7 includes the synthesis of the whole discussion. Finally, section 8 presents the conclusions of this thesis.

8.2. The first research question

As mentioned earlier in this study, universities and particularly research universities are perceived to be very important and interactive players that participate not only with industry but with community and government to create new products and services through innovation and entrepreneurship activities. Universities, because of their knowledge base, have to contribute in a direct way and with an active role in development by serving as local knowledge conduits, bringing global state-of-the-art science, and facilitating the industrial development. Universities cannot achieve such contributions without having strong relationships with other important actors like government and industry.

The integration and interaction between the different actors from different levels are very important for the success of a university's collaborations and they can result in many benefits for all participants. Thus, the first research question of this study was,

What are the university's main relationships studied by the literature on innovation?

This research question has been answered in Chapter 3 where the main relationships for university with outside actors were discussed, including its relationships with government and industry as well as its internal relations. In that chapter, the exploration and discussion was based on what has been said about the role of university and its interaction and involvement in the surrounding environment, especially in regards to the innovation processes. This was done by using the three main innovation approaches: National Innovation System (NIS), Regional Innovation System (RIS), and Sectoral Innovation System (SIS).

The whole discussion about what has been said about the role of university in the three innovation approaches is summarized in Table 3.3 presented in Chapter 3, p.67. That table includes three types of university relationships. The first one is the university-government relationship at the national or macro level and the table shows what has been said about this relationship as well as about the nature of university roles and involvement in such relationship in the three innovation approaches' literature including the scholars names. The same was applied for the other two relationships with industry at meso level and the intra-university relations at the micro level.

8.3. The second research question

In order to fulfill the goal of this dissertation, an analytical framework was built that guided the empirical part of this study. It was based on the theoretical discussion in Chapters 2 (social capital) and 3 (university relationships). Related elements from both chapters (as described in the following section) were selected to construct the analytical framework for the empirical work, so the constructed framework was considered as a bridge between the theoretical and empirical chapters.

Thus, the following research question was answered in Chapter 4; however, the following section provides a brief explanation about how the analytical framework and guideline table were constructed.

How can the previously detected relationships (in the first research question) be analyzed in terms of social capital?

In regards to the social capital part in the above analytical framework and as discussed in Chapter 2, social capital is critical for success in any organization's relationships in its internal and external environment. Social capital can facilitate the exchange of resources, transfer of knowledge, and improve organizational performance. The main part of this study is to use the three dimensions of social capital (structural, relational, and cognitive) proposed by Nahapiet and Ghoshal (1998). Their proposed model

identifies the three dimensions that constitute social capital and which can significantly moderate the value of social capital. Furthermore, the model its connection with intellectual capital provides the link between social capital and the role of universities in innovation. The following are the three dimensions of social capital used in this dissertation to examine the three types of university relationships.

1. **Structural dimension:** this element was used to know more about a university's networks and whether such networks are strong or weak, small or big, and internally or externally used. More focus was given to social interactions ties.
2. **Relational dimension:** this element was used to describe aspects that affect the relationships, like trust, norms, and obligation and expectations. In this study the focus was on trust in such relationships.
3. **Cognitive dimension:** this element was used to know more about the resources that provide shared representations and understanding; such resources include shared vision, shared language, codes and narratives. The focus was given to shared vision, values and goals in this study.

In regards to the university's relationships in the analytical framework and based on the discussion in Chapter 3, there are many different relationships that universities have with actors from different levels. For the purpose of this study, three types of university relationships were considered. They are:

1. **University-government relationship:** government can affect the university's strategies and plans and the university can affect and benefit the government. Thus, building a strong relationship between university and decision makers at the national level is important to ensure the implementation of national policies and the continuity of university activities. Social capital dimensions were used to examine university-government relationships and to know how such interaction can be improved by using social capital, because as we

discussed in Chapter 2, social capital can enhance and improve such relationships.

2. **University-industry relationship:** there are many benefits university and industry can gain if they collaborate with each other. Building such collaboration with strong relationships is not easy because of the different visions, goals, and nature of activities between universities and firms. As argued in Chapter 2, social capital can influence the collaboration between university and industry, the three dimensions of social capital (structural, relational, and cognitive) were used at this level (university-industry level) to examine the extent to which university and industry have used the nature of social relations, and the degree to which they trust each other and have some kind of shared vision.

3. **Intra-university relationships:** the internal relationships between university members not only affect the internal operations and activities of the university but also the external ones. Social capital dimensions were applied at intra-organizational level to investigate the relationship between university members and to know what they think or how they feel about the other two levels (government and industry).

In regards to the third part of the constructed framework and in Chapter 3, the relationships that universities have with government and industry can result in improving firms and national competitiveness indirectly through many areas. For the purpose of this study, three areas were selected because of their significance and relevance to the nature of this dissertation: innovation, higher education and training, and technological readiness. Based on the literature review in Chapter 2, social capital can enhance relationships and collaborative networks, thus improving the impacts on industry and national competitiveness.

In addition to the above analytical framework, a “guideline table” was constructed based on the literature review in Chapter 3 (for more information go to Table 4.1. in

chapter 4, page 87). That table includes different roles and involvements of university at different levels, as well as different impacts on both sides with mechanisms of interactions. The goal of that table was to give insight into what the literature has said about the following three types of relationships that this dissertation aims to analyze:

- d) University-government relationship.
- e) University-industry relationship.
- f) Intra-university relationships.

For each type of the above relations, the following issues have been considered:

- f) Who are the other relevant actors (besides university)?
- g) What is the role of university in the context of this relation?
- h) What are the impacts of university on the other actors?
- i) What are the impacts of the other actors on university?
- j) Mechanisms for interaction.

All of the above issues of the main university relationships were explained in more detail in Chapter 4.

8.4. How do the practitioners in the two cases perceive the effect of social capital in university relationships and competitiveness?

The third and fourth research questions of this study dealt with examining the practitioners' perception of the nature and importance of social capital (specifically through the three dimensions) in a university's collaborative relationships by using the two cases studies (SQU and UTN). Participants in this study were also asked for suggestions on improvements in university relationships. The third and fourth research questions were:

What is the perception of practitioners in university relationships in Sultan Qaboos University about social capital and how can relationships be improved?

What is the perception of practitioners in university's relationships in The National Technological University in Rafaela, Argentina about social capital and how can relationships be improved?

As mentioned above, there are two main parts in each of the above research questions; therefore, the first part, which is about the perception of practitioners, is answered in this section (Section 8.4), while the second part of both questions, which is about possible improvements, is answered in section 8.5.

The first part of both questions (third and fourth research questions) was answered from three different perspectives: government, industry and university.

8.4.1. Government perspective (inter-university relationship)

As we noticed in Chapter 3, and according to the guideline table in Chapter 4, which was constructed based on Chapter 3, the government with its national plans and policies can influence the university's strategy and the way it interacts with other stakeholders, thus it plays a critical role in formulating universities' relationships (Gomez et al., 2014; Seppo & Roolaht, 2012a; Van Der Steen & Enders, 2008; Whitley, 2008). For example, in this regards, OGR-6 states that

I think you need a national mandate to support that kind of collaboration and commitment, and if we have a national policy, I think that would enhance the kind of collaboration and trust between industry, academia and the government (OGR-6).

On the other hand, universities are considered to be an important actor for the government because they can provide a learning environment, supply learned people,

attract innovative businesses, and deliver guidance to politicians (Benneworth et al., 2009; Florida, 2002; Group of Eight, 2011; Lester & Sotarauta, 2007; Mowery & Sampat, 2005). As stated by one respondent from the government, “We always expect two big contributions from the university. The first is the knowledge of the university besides the training, specialists or specific actions on technical assistance and a mutual benefit” (AGR-2). Furthermore, as we discussed in Chapter 2 social capital is enhances the effectiveness of the Triple Helix network and is considered as the active ingredient of that network (Yokakul et al., 2011). Thus, no doubt that the relationship between university and government, and the impacts of such relationships on competitiveness, depends on how strong the network is, how much trust there is, and whether the actors share the same vision, values and goals or not.

In regards to the university-government relationship, the findings of the two case studies support the constructed guideline table (based on the literature review in Chapter 3). The university could contribute to improving competitiveness in the forms of innovation, higher education and training, and technological readiness through its collaboration with the government. However, such contributions depend to a large extent on the social capital that exists in the relationship between the university and the government, because social capital plays a critical role in the quality and quantity of such contributions.

As mentioned in Chapter 2 and 4, the structural dimension of social capital mostly describes the relationship stabilities, ties and connectivity. With the relationship ties, the universities provide knowledge and consultancies to government and industry; at the same time they get many benefits, like more funds for research, practical applications, and higher employability for their students. Thus the ties between the three actors are very important because of the mutual benefits.

In reference to the case study’s findings, both universities (SQU and UTN) have strong ties with government through the different joint committees with many ministries and other governmental bodies. Around 90 % of respondents indicated that their committees are stable and have continuous meeting through the year. As stated

by OGR-1 “The committee meets two times a year ... It is stable and some themes can be discussed without meeting, just by letters”; and as highlighted by AGR-1 and AGR-2, the universities in Rafaela have meetings every month with representatives from the local government.

As already seen in Chapter 2 and 4, relational dimension refers to the trust among organizations in this study. The inter-university trust is very important. As stated by AGR-1, “trust is one of the main elements to make relationships more efficient”. Thus, mutual trust is critical for the success of any relationship between a university and other actors, such as governmental bodies, and it should be a significant part of any collaborative network or relationship.

As we noticed in Chapter 2, and based on the case studies’ findings, trust produces many benefits, like reduced transactional cost, reduced disagreements, greater performance and productivity, and relationships of even higher trust; furthermore, members of trusted relationships are more willing to exchange information and work together (Maskell, 2000; Nahapiet & Ghoshal, 1998; Steinmo, 2015; Villena et al., 2011; Zheng, 2010). For example, AGR-1 and OGR-4 point out that trust brings down the transaction cost, reduces doubts, and without it, productivity is decreased.

The results of empirical work show that universities and government in both case studies are more willing to collaborate in innovative activities, higher education, training, and technology. Moreover, they can easily communicate with each other and with transparency. The trust between most of the governmental bodies and the two cases (SQU and UTN) is strong enough for collaboration without signing confidentiality agreements or other contracts.

Based on the findings of this study, through social capital, a university can help the government to come up with new ideas, solve difficulties, and suggest programs for improvements. If the level of trust and shared vision, values and goals is high, the impacts of university-government relationships will be stronger and more targeted to solve problems and share ideas and knowledge, which will improve and strengthen

innovation, higher education and training, and technological readiness, thus improving national competitiveness. In emphasizing the importance of trust to competitiveness through the three mentioned areas, one of the respondents states that:

Definitely trust will improve them. For example, if you need to transfer some technology from abroad to Oman. If you have highly qualified academics, it will make it easier to assess the technology, bring it to Oman, test it and validate it, and then adapt it so that it can help the industry. That is a simple example (OGR-6).

The results of this study shows that social capital can ensure that the interest of a country like Oman is a top priority for both sides (university and government) and that both are concerned with how to serve the country better. Such involvement will result in many important outcomes, such as shared resources, shared problems and solutions, improved quality, a more innovative and skilled workforce, and increased productivity. No doubt that all these outcomes will impact competitiveness positively.

Even though some respondents from both cases are happy with their universities' involvement in the national development plans, there are others who think that universities can give more if involved more, and if they are given the chances to participate. Thus, they recommend and suggest that universities through the national policies should have more opportunities to participate in national projects and development plans.

Based on the results of this study, there are some weaknesses which can hinder the collaboration between university and government. The slow response of the universities to government requirements and the university's bureaucratic system are among them. Thus, there must be more improvements in the dialogue between the university system and the government to find ways which simplify the collaboration between them.

Overall, the respondents' answers support the argument of Yokakul et al. (2011) for the importance of government intervention and ability to ensure the creation and effectiveness of social capital by, for example, providing a suitable framework and continual support.

8.4.2. Industry perspective (inter-university relationship)

According to the guideline table in Chapter 4, the university-industry collaboration is critical to national competitiveness and to its mutual benefits and outcomes. As discussed earlier, the increase in the interconnected and interdependent nature of science, technology, business, and economics, and the rise of the global innovative knowledge economy, have made such alliances imperative (Batarseh, 2013; Edmondson et al., 2012). The interaction and collaboration between university and industry is seen by many scholars as a key element in any innovation system, and one of the most prominent institutional interfaces for knowledge diffusion (De Fuentes & Dutrenit, 2012; Robin & Schubert, 2013). Such collaboration will enhance industries' competitiveness through technology supply and training of specialized personnel.

In line with previous studies, this study shows that university-industry collaboration is critical for both sides as well as for the development of any country, and that social capital is critical in such collaboration. According to the respondents, social capital impacts their companies' competitiveness in different ways, such as by improving their production through the implementation of new technology, increasing the level of innovative activities, providing skilled and specialized personnel, and by helping their companies to respond to changes in the markets (e.g. AIR-1, OIR-1, AIR-2, OIR-2, OIR-4, and OIR-6). No doubt those impacts not only affect the companies' competitiveness but also the national competitiveness, as stated by one of the respondents:

There is no doubt that there is a direct impact on the competitiveness of the country, more innovation means more new products and higher quality level and thus strengthens the industry generally. This also creates new working relationships between companies and educational institutions based on

common interests; it creates employment and training opportunities, and marketing opportunities and export (OIR-4).

Social capital through its three dimensions (structural, relational, and cognitive) helps and facilitates the interactions between both sides. Based on the findings from both case studies and in contrast to what is happening in university-government relationships, there are not many connections between university and industry in both cases, and if there is a connection, it is limited, as stated by OIR-4,

Currently there is no coordinated cooperation and framework between our firms and between universities, but there is co-operation in the form of receiving college students as interns and visitors, and we receive requests for sponsorship of some student activities (OIR-4).

AIR-2 supports OIR-4's view and claims that there is no stable committee but only specific projects. OIR-5 emphasizes the need for planned and framed collaboration between university and industry. I think this depended on the organization's social structure, either of the university or the firm, because according to many scholars like Chung et al. (2000); Gulati, (1995), and Xu (2016), social structure, networks, and interactions affect the strength of inter-organizational relationships as well as its ability to form alliances. Also, government intervention can ensure the creation, effectiveness, stability and continuity of university-industry interactions, as argued by Yokakul et al. (2011).

In linking the structural dimension of social capital (social interactions) with the relational dimension (trust), the respondents indicate that without social interaction and trust it would be very difficult for them to collaborate, which means that trust establishes the foundations for collaboration (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998), and trust with social interaction can improve the effectiveness and mutuality of participating universities and firms within collaborative settings (Larson, 1992). In these regards, OIR-5 and OIR-2 state that:

Trust can make or break any relationship or initiative. Once trust is established, anything is possible. People can share their knowhow, experience, information, ideas and solutions to achieve competitiveness in all fronts once trust is established. Absence of trust will definitely hinder such openness, transparency and collaboration (OIR-5).

The higher the level of trust between the team members, the higher the chance for innovation, higher education, and technological readiness (OIR-2).

In comparing the way that some respondents from government and industry use to ensure trust when dealing with university, and based on the findings, it seems that ensuring trust in writing is more important in university-industry relationships than in university-government relationships because it requires documents which must be signed by the university and the company, such as a Confidentiality Agreement and Terms of Reference (ToR). In emphasizing the importance of such documents when collaborating with university and in gaining trust, two respondents from the industry sector state that:

It is essential, and therefore a Confidentiality Agreement has to be signed between the two organizations to ensure the protection of data input and output (OIR-1).

A clear Terms of Reference (ToR) would have to be in place to govern the structure, objectives and deliverables, as well (OIR-5).

We think such importance of written agreements in university-industry collaboration is because some firms fear public disclosure of their research activities and technologies, and losing IP-related incentives (Alexy et al., 2013; Levine & Prietula, 2013; Perkmann & Salter, 2012).

Weaknesses in university-industry collaboration

Based on the findings of both case studies, there are different weaknesses which should be considered to develop the collaboration between universities and industry. Such weaknesses include:

- Absence or lack of a systemic structure for collaboration between university and industry. Systemic structure is very important because, for example, it can ensure the commitment from the participants as well as ensure the shared vision and goals which are critical in any collaboration.
- Weak linkages between universities and industry (firms). There are some public and private universities and colleges that do not have any interaction or collaboration with any company, and vice-versa.
- Focus on specific aspects such as those relating to big companies or the Oil and Gas industry.
- Lack of awareness among companies of the importance of the role of universities as a source of innovation.

As mentioned in the introduction chapter, one of the main problems facing the Omani government is the low innovative activities in Omani industrial estates (zones) which affect the national vision to diversify the economy and reduce the dependence on oil and gas (Al Mahroqi, 2013).

- Poor social communication between the universities themselves and between them and the surrounding community.
- Closure of laboratories and research centers or restricted to students only. The weakness is more in the first case study and barely applies to the second.

In order to overcome the above weaknesses in university-industry collaboration, and as discussed in Chapter 3, more attention from universities, industries, and government in strengthening mutual collaboration and creating systematic ways to support and manage such collaboration are essential to ensure its success (Bruneel et al., 2010; Kaymaz & Eryiğit, 2011; Muscio & Vallanti, 2014).

8.4.3. University perspective (intra-university relationship)

As we noticed in Chapter 2, social capital is important for both internal and external relationships of any organization, and as we discussed in Chapter 3, internal relationships between the members of an organization are important for both the internal and external organizational performance and productivity. According to the guideline table in Chapter 4, which was based on Chapter 3, many scholars pointed out that universities, because of their capabilities and internal relations, can play a crucial role in enhancing the performance of other external actors like government and industry, thus improving their own competitiveness as well as national competitiveness (Audretsch & Lehmann, 2005; Calcagnini et al., 2016; Deiacio et al., 2012; Karlsen et al., 2012; Link & Welsh, 2013; Veugelers & Del Rey, 2015).

In line with previous studies, and according to the findings of this study, presented in Chapters 6 and 7, the internal social capital of an organization can enhance and ensure the successful collaborative relationships with other actors like government and industry. Furthermore, respondents from both case studies strongly believe that their personal social capital affects their organization's abilities to approach external actors. When asked about the importance of knowing people at a personal level from inside or outside the university, and how such knowing impacts competitiveness, some respondents said:

Personal interactions strengthen the university relationships (AUR-1).

It is actually essential, because if you start to get to know people, or if you know them personally, things will work out faster ... Definitely it's going to increase the competitiveness (OUR-1).

It's very important ... This can affect and impact innovation and higher education by ensuring a good connection and relationship between people, which is important to enhance any collaborative work (OUR-2).

Thus, the respondents confirmed that social interactions, knowing people on a personal level, organization and competitiveness are important. This is supported by Bertrand et al., 2011; Gulati, 1995; Steinmo, 2015; Tsai & Ghoshal, 1998; and Xu, 2016 .

Other respondents (e.g. OUR-3 and OUR-7) were more careful and thought that knowing people at a personal level should not matter, even though they agree that such interaction can impact the three areas of competitiveness positively. In this regards, OUR-3 states that “It is my point of view that the relationship in general should be a professional relationship; so the personal aspect of it shouldn't matter. But, of course, whether we like it or not, it does” (OUR-3).

There are some scholars who recommend that individuals and organizations should be more careful when using their social capital at work because there are some negative effects (Kwon & Adler, 2014; Villena et al., 2011), as discussed in Chapter 2.

In regards to the personal trust generated through a personal level and according to the findings, it has been pointed out that knowing people at a personal level can improve and strengthen relationships inside and outside the organization. Such improvements simplify and speed up the process of collaboration and interaction between members inside and outside the university, thus, enhancing and improving competitiveness. OUR-2 state that “Trust would strengthen collaboration and better the outcome as both sides invest and input work with confidence”.

Such responses support Leana & Van Buren, (1999); Nahapiet & Ghoshal, (1998); and Rousseau et al. (1998) in the importance of trust for internal relationships between individuals within an organization, as well as for the collaboration at organizational level. In a related issue, 2 out of 11 respondents point out that there are two kinds of trust, and any organization like a university should be aware of them because they complement each other (AUR-3 and OUR-4). Personal trust and institutional trust represent total trust. Any organization has its own trustworthiness, and the people who represent them have their own way of trust.

Based on the findings, sharing a university's vision, values and goals with its employees is crucial for university relationships internally as well as externally. . As Coleman (1990) points out, shared vision and goals help promote integration and create a sense of shared responsibility and collective action. As expressed by many scholars, like Bao (2009); Curry & Moore (2003); Li, et al. (2014); and Tsai & Ghoshal (1998), the cognitive dimension of social capital (e.g. shared vision and goals) is very important in the exchange of resources and information as well as for ensuring common understanding. The findings of this study show that sharing vision, values and goals impacts innovation, higher education and training, and technological readiness positively, and in a better way, by facilitating the ability to exchange resources (AUR-2, OUR-2, AUR-3, OUR-6, OUR-7 and OUR-8). For example, as stated by one respondent:

When visions and goals are known and shared among employees then they'll all look toward a specific point ... Having shared visions will improve the productivity of the organization as well as innovation and higher education and training (OUR-7).

In regards to the first case study, according to OUR-1, SQU communicates its vision, values and goals to specific people, for example, those who work on its strategic plans, but many other people inside SQU do not know the vision, values and goals of the university (OUR-1 & OUR-6). As stated by OUR-6, "I think that the university does not do a good job really in sharing their vision". However, OUR-3 and OUR-4

think that SQU does well in sharing its vision with all staff and it has good system of exchanging vision and goals. I think these differences in respondents' views depend on their experience in dealing with the administration and on how close they are to the top management.

It is clear that there are different opinions on how well the university shares its vision and goals with its members, but all respondents agree that if a sharing process is well organized, it will impact highly on productivity, innovation and other important areas of competitiveness. Therefore, SQU should evaluate and review its sharing process to ensure the unity of direction. In the following section, there are many suggestions for improvement proposed by the respondents.

Sharing a university's vision, values and goals is also very beneficial when collaborating with outsiders, as stated by OUR-6, "If I tell the industry my vision and mission, they can also think how they can fit in that formula; how they can play a role in it ... we believe that the competitiveness definitely will be higher" (OUR-6). Also, OUR-3 point out that sharing the vision mission and objectives of the university with the others can strengthen the trust with them.

As we can notice from the above citations, OUR-3 links shared vision with trust (the third dimension of social capital with the second) and shows how important and complementary they are to each other. OUR-4 also supports this view by stating "I think this goes with trust; if the sharing is trustful then the process is better". This finding supports previous studies, for example, by authors (Al-Tabbaa & Ankrah, 2016b; Li et al., 2014; Tsai & Ghoshal, 1998; Villena et al., 2011) who found that the three dimensions of social capital are inter-related in important ways.

Thus, based on the above discussion, social capital through its three dimensions (structural, relational, and cognitive) is perceived to be very important to the inter- and intra-university relationships, and if used in an organized way it will impact positively the outcomes of both the internal and external collaborative networks. As stated by Steinfield et al. (2009), "within an organizational setting, social capital

facilitates knowledge management processes in that it enables individuals to locate useful information, draw on resources and make contributions to the network" (Steinfeld et al., 2009, p. 245).

Weaknesses in intra-university relationships

Based on the findings, there are different weaknesses which should be considered to develop intra-university relationships; such weaknesses include the following:

- Some universities tell external actors to be innovative and competitive, but do the opposite internally. They have poor coordination, little innovation capabilities, no incentive and support scheme, and complex procedures. Thus, some universities have to change internally.
- Even though SQU is seen to be a "Think Tank" for the whole country, the reality is different because SQU does not use its full potential to contribute to government and industry.
- SQU has different skills and capabilities; however, government approaches consultancy companies in regards to some specific issues and problems that SQU could deal with.
- Very few social interactions and not enough common places for all faculties to get together.
- The meetings inside or outside SQU take longer than necessary. As one respondent remarked, instead of half an hour, a meeting might take 2 to 3 hours and end without proper outcomes.
- There is little incentive or financial support for faculty to build connections and social networks.

8.5. The possible improvements in university relationships

This section holds the discussion of the second part of each research question dealing with both case study respondents' suggestions for improvements in university inter- and intra-relationships.

The answer to these research questions (third and fourth) includes general improvements for both SQU and UTN relationships and specific improvements for each.

8.5.1. General improvements for the university relationships

8.5.1.1. *How university-government relationships can be improved*

In reference to the third research question of this study which is focused on what can be done in regards to the improvements of the university-government relationship, so that its impacts on competitiveness through the three areas can be increased. Some of the respondents' suggestions will be given more attention because of their importance.

National policy

One of the main things to ensure the success of such relationships and improve its impacts on competitiveness is the national plan that supports collaboration between the different actors. Having such a national policy will increase the commitment, efficiency, productivity, and quality of outcomes. One respondent highlights the importance of having a national plan and policy for Oman, not only for university-government relationships but for collaboration and interaction with industry as well. He states:

We need a national policy that would harmonize the relationship between these three sectors: the private, the public and industry. And within this policy we would always have the necessary rules, regulation, incentives, funding, and governance (OGR-6).

As discussed in Chapters 2 and 3, the government with its national plans and policies can influence the strategy of the university and the way it interacts with other actors (Dodgson & Staggs, 2012; Gomez et al., 2014; Howells et al., 2012; Seppo & Roolah, 2012; Whitley, 2008). Such national policy can have a critical role in bringing government, university, and industry together to execute the cooperative relationships successfully.

The existence of a national plan can also ensure the existence of trust and shared vision between the actors, as pointed out by Yokakul et al. (2011); government intervention is very important to ensure the creation and effectiveness of social capital. Without national policy, each actor has its own policy and these different policies may not complement each. This definitely weakens competitiveness.

In a related, one respondent highlights the importance of sharing and linking the strategic objectives to impact national competitiveness. He states that:

By strongly highlighting the strategic objectives of both sides, this sharing and common understanding between both sides will strengthen the relationship, and as a result it will positively affect competitiveness because when there is shared vision, all resources will be aligned to achieve that, and with that, the achievement of objectives will be faster and cheaper, and more new ideas will be offered which will generate innovation (OGR-2).

Based on the previous studies and the results of this study, we think that such alignment cannot be ensured without a national plan with the right tools of implementation.

More dialogue and interactions

Social capital is a continuous process that must be activated in order to be built because it is not something guaranteed. Some respondents from the government indicate that there must be more dialogue, communication, collaboration, and

partnership not only between both sides but with other external actors from the private sector. They believe that the more they work together, the higher level of trust can be achieved and more work can be done. As argued by Coleman (1988), lack of connection makes some forms of social capital very difficult to attain; therefore, a close social structure is essential to maintain benefits of social capital where obligations can be forced and norms can be constructed.

Even though most respondents point out that their joint committees with the university are stable and meet 2 to 3 times a year, some of them still suggest that the member numbers should be increased and subcommittees should be formulated to look after specific areas like the three important areas of competitiveness in this study (innovation, higher education & training, and technological readiness). Through such subcommittees there will be more interactions, and more social capital will be earned. As stated by some respondents:

It can be developed by expanding the number of its members and developing a subcommittee that is dedicated only for certain tasks like innovation, training, and technology (OGR-4).

The members from SQU side are very busy and always over-loaded, which makes them not capable for handling our research-. They need to include more members on the committee (OGR-3).

AUR-3 suggests that the university must get more involved in dialogue and development by identifying demands and then proposing courses of action through research and technical assistance. Therefore, as pointed out by Gomez et al. (2014) and Seppo & Roolah (2012), government by its policies can have a critical role in improving the dialogue and interactions of a university with other actors, including the government and industry; therefore, governments should create the supportive means for building strong relationships between them and universities.

8.5.1.2. How university-industry relationships can be improved

According to the respondents, there are different measures that can improve the university-industry collaboration and its impact on competitiveness.

Support from the government

In a wider view, the process of ensuring shared vision and goals should start from the government's vision and is the clarity of that vision (OIR-3). Thus, as suggested in university-government relationships, national policy is required and without it, it would be very difficult to achieve the expected outcomes of such collaboration and expected impacts on national competitiveness. Other respondents highlight the importance of creating an adequate legal framework and joint technical framework to strengthen the collaboration. Such frameworks can be created with the national policy. In this regard, Edmondson et al. (2012) emphasizes the importance of the governmental support and encouragement for university and industry to form strategic and strong partnerships. Also, as discussed in Chapter 2, Gonzalez-Brambila (2014) highlights the significance of designing and formulating the right policies by the government and institutions for enhancing higher openness and mobility of knowledge creation in academia.

AIR-2 points out that when you have a clear strategic plan with clear shared objectives, and when the government shares that strategic plan with both the public and private actors, it will be easy to communicate and discuss things with them. Thus, commitments, agreements and solid base can be achieved and generated quickly.

Top management support

Collaborative relationships between university and other actors are strategic in nature and require top management involvement from both sides. According to the findings of this study, collaborative partners can develop more collaborative relationships when there is support from top management, as stated by some respondents:

The support and follow up of top management is very important in boosting the joint teamwork. The more care and emphasis is given by them, the more focused and productive teams will be. It really depends how the top management view such cooperation and place it in the organization's priorities (OIR-1).

The top management sponsorship/drive is very important to move things in the right direction and pace (OIR-5).

Organized interaction is required

Another suggestion is to meet and communicate more with a clear and better follow-up. According to AIR-1, university and industry should have an organized interaction with proper dialogue to avoid the offer problem as well as the demand problems which can take place between them. Such interaction should be scheduled with clear objectives and deadlines.

University support

Many respondents think that university should play more roles in improving and developing collaboration with industry. AIR-1 thinks that university should create spaces for dialogue with industry. University should help companies to innovate because they do not have all the necessary resources and knowledge (AIR-2). OIR-4 thinks that collaboration and the importance of such collaboration should be part of the education courses.

8.5.1.3. How intra-university relationship can be improved

University structure and system

Some respondents think that university should change its structure in order to build strong relationships with its members and with other outsider actors. According to AUR-1, some universities tell others what to do while not following their own advice. For example, some universities encourage outsiders (other actors) to innovate but they do not have a good supportive system that encourages their own members to innovate. So, any university wants to improve its inter- or intra-relationships should start from

its structure and system; it should improve itself first and such improvements should start from the top (OUR-1). As pointed out by Aranguren et al. (2016), such change requires an open and flexible organizational model that encourages and motivates researchers to interact with other actors in their environment, and to be agents that work and contribute with other actors strategically in the development process.

In regards to the first case study, there is no SQU structure that encourages its members to connect with outsiders (OUR-1), and there is a gap between the administration that follows a top-bottom approach, and academics who prefer a bottom-up approach. Such problems can be solved by having more dialogue between the university's top management and its members.

OUR-1 and AUR-2 claims that one of the problems that can hinder the continuity of university relationships by affecting trust is changes in personnel or their roles on either side.

More interactions internally and externally

The university should organize more social events and informal interactions internally and externally, and provide common places for all faculties to get together (AUR-1, OUR-1, OUR-3, OUR-6, and OUR-8). Such activities should help to break down barriers, bias and misunderstandings to improve inter- and intra-relationships.

Awareness about the university's vision and goals

Raising awareness among faculty and staff about the importance of maintaining relationships is required (OUR-2). The university should also base its vision, mission, and goals in every corner in its buildings and put a clear banner on its website (OUR-7 and OUR-8), because sharing vision and goals promotes integration and creates a sense of shared responsibility and collective action, and results in stronger high-quality relations (Coleman, 1990; Mohammed & Dumville, 2001).

8.5.2. Specific suggestions for improvements for SQU and UTN

This study provides the following possible suggestions for improvements for the two universities. These are possible ways of improvement proposed by the interviewees. They are considered as an input for reflection on the universities studied and not as a recipe for implementations.

8.5.2.1. Possible improvements in SQU's relationships

SQU-government relationship

- Regarding the current joint committees between SQU and governmental bodies
 - Increase the number of university members.
 - Include members from the private sector and other related institutions.
 - Form subcommittees to look after specific issues like innovation, training, and technology.
 - Create an evaluation system for the performance and outcomes determined by these committees because none exists.
- Create a 'Technology Transfer Agent' in SQU at the organizational level and not at a personal level, as in the present situation. As stated by one of the respondents from the first case study, "We are looking more for organizational level of collaboration so that things become easier and more facilitated and better governed to function and make success".
- More incentives are needed to increase the involvement of academics, as pointed out by the interviewed respondents.

- More interactions and joint activities are required because, as pointed out by one respondent, the more they work together, the more they establish trust with other members and organizations.
- As discussed in the previous section, national policy is essential to ensure the commitment and trust between the actors in any committee. One respondent emphasizes the importance of having a national policy by stating “If we have a national policy, I think it would enhance the kind of collaboration and trust between industry, academia and the government... and it would improve competitiveness in a very significant way”. Such national policy, as well as specifying the strategic objectives, will also ensure the shared vision, values and goals between the collaborating partners.

SQU-industry relationship

About possible improvements, respondents raised the following comments and suggestions:

- There must be clear purposes of collaboration with an agreed stakeholder engagement plan and clear Terms of Reference (ToR) between SQU and industry. A systemic method with an adequate legal and joint technical framework is required to ensure the implementation of collaboration.
- SQU should include related concepts like partnership and collaboration in its educational courses and workshops.
- The trust in collaboration must represent the values of both sides, not only at an individual or personnel level but at the organizational level and both organizations must adhere to the agreed ground rules and the “Terms of Reference” of their collaboration.

- Having clarity of vision, goals, and responsibilities are very important in dealing between the two parties because this will increase the level of trust.

Intra-SQU relationships

Based on the findings of the first case study, there are different things that can be done by SQU in order to maintain close relationships between its employees and with other partners like government and industry. Some important suggestions are the following:

- SQU top management should take the following actions to develop its internal and external relationships:
 - SQU should work more in raising awareness among its employees, faculties, and research centers about the importance of maintaining relationships.
 - More encouragement and incentive for individuals, departments, and colleges to interact and participate, inside and outside SQU, are required.
 - SQU should create a strong intermediary unit for communicating and interacting with other actors, and to follow-up and maintain relationships.
- More social interactions and activities are required by SQU to maintain its internal and external relationships because such activities can increase the degree of trust and shared vision between SQU and its employees and with other organizations as well.
- More transparency between SQU and its employees is required, and more clarity in its vision, strategy, and goals is needed for increasing the level trust.

- Individual academics and researchers should promote SQU's vision and goals through their publications, journals, and conferences. At the university level, consistent communication is important to ensure shared vision.
- SQU should organize more social activities, base its vision on its website with a clear banner, and communicate more with its employees and outsiders to ensure a shared vision and goals.

8.5.2.2. Possible improvements in UTN's relationships

Based on the findings, there are some suggestions for improving UTN's relationships through the three dimensions of social capital.

Improvements in UTN-government relationship

- UTN should be more sensitive about changes in order to respond on time to government requirements, and this can be done through more interactions and dialogue between the university system and the political system.
- UTN should work hard to have more democratic dialogue, fulfill its promises and share the results of the collaborative activities with other partners. It should also respect agreements and have clear formal agreements with clear contributions with its partners.
- More commitment from UTN is required by having written formal agreements and by giving more attention to external problems in the surrounding environment.

Improvements in UTN-industry relationship

- UTN, in order to improve its relationships with firms in Rafaela, should have a systematic structure with clear objectives and deadlines. More spaces for dialogue are required as well as more alignment.
- All participants in Rafaela, either individuals or organizations, should understand their collaboration process and their roles in that process along with the need for continuous interaction and negotiation.
- There must be a common understanding about the strategic objectives and competitiveness areas between UTN and its partners to ensure shared vision, values and goals because such common understanding will result in easy communication and interaction between the actors.

Improvements in intra-UTN relationships

- UTN should continue to keep abreast of changes by developing important areas such as its innovation capability.
- UTN should give more attention to the demands of its environment and encourage its individuals and committees to form more collaborative networks.
- There must be more common areas and social activities organized by UTN, as well as more informal relationships in order to increase the level of commitment, trust and shared vision.
- UTN should focus on shared areas that benefit all participants. It should take every opportunity to present to and participate with other actors, on both individual and organizational levels, to increase awareness of its vision and goals.

Even though some of the above measures have already been adopted by the three actors, there is still much more that can be done, and more commitment is required from them. We would certainly recommend the formulation of a National Policy including its technical and implementation strategies to ensure the success of all promotional activities.

8.6. Learning from differences

The following section explores the differences found after analyzing the findings from both case studies. As mentioned in the Introduction and Methodology chapters, the “Learning from Differences” approach was used to identify the differences. For this purpose, the first case study (SQU) was the main case and second case study (UTN) was used to learn from.

- The universities council in Rafaela, Argentina and the Education Council in Oman

SQU is the only public university, and Nizwa is the main representative for private universities. Most of SQU’s Education Council’s members in Oman are from the government, and there are two University Vice Chancellors (and other members representing the society and the private sector. There is not much attention given to building strong partnership between universities and industry in Oman because most of the focus of this Council is on developing the education system and other related issues. As we noticed from the findings of the second case study (UTN), one of the main councils they have in Rafaela is The Universities Council which was created by the government and which includes all the universities’ presidents and vice chancellors in Rafaela. This council conducts meetings every month between representatives from the government and all universities. Through that council, universities in Rafaela interact and build partnerships with industry with support from the government.

This particular difference suggests there could be another council or supreme committee in Oman that includes all universities' presidents and vice chancellors as well as representatives from other higher education institutions and the government (e.g. Ministry of higher education and The Research Council). One of the main responsibilities of this council or supreme committee could be to look into partnerships between universities themselves and between them and industry in Oman.

- **The Chamber of Commerce's role**

The Small Business Chamber of the Commercial Centre of Rafaela (CAPIR) conducts meetings between universities and firms regularly to ensure proper interactions between both sides. The Oman Chamber of Commerce and Industry (OCCI) focuses more on the development of the private sector to make it a partner in sustainable economic development. OCCI has 15 specialized committees for discussing the different issues relating to the development of the different economic sectors as well as providing proposals and ideas that can result in a contribution to the growth of the Omani national economy. Such specialized committees include members who are considered among the best talents working in public and private sectors. Another lesson learned from differences is that OCCI could play a major role in creating a strong partnership between universities and the private sector in Oman through facilitating interaction and dialogue at individual and organizational levels; this could be done, for example, through the creation of a specialized committee. There must be strong collaboration between OCCI and the Industrial Innovation Centre to bring universities and firms closer together.

- **Strategic plan**

Based on the findings, more attention is given at the national level to the importance of university-industry collaboration in Rafaela than is the case in Oman. There is for example, The Strategic Plan of Rafaela which defines objectives for the next 5 and 10

years and clearly mentions the expected contributions from participants like university and industry.

- **Dialogue culture**

The results show that there is a greater culture of dialogue between government, university, and industry in Rafaela than in Oman. All respondents from government, university and industry in Rafaela agree that they have a good level of dialogue and they want to maintain and improve this culture. The opposite is the case in Oman; respondents gave different answers and many of them asked for more dialogue between government, university and industry. This is another lesson that is useful for further reflection and exploitation.

- **University's vision, values, and goals**

UTN includes in its vision the importance of approaching community and industry and building strong relationships with them. UTN adapts some mechanisms to reach its vision and to achieve its objectives which focus on collaborating with industry. However, there is no direct statement in SQU's vision, mission, and objectives that indicates the need for collaboration with industry. There are some initiatives by some colleges in SQU (e.g. Engineering and Economics & Political Science) to build connections with industry. For example, some colleges invite representatives from the private sector to be members of some of their councils and committees, and to provide consultancies, and be involved in joint organization of some events. Therefore, SQU could capitalize on these initiatives and increase such engagement.

- **Participation of professionals from government and industry**

One of the important points raised from respondents of the second case study was that there are many professionals from local government and industries in Rafaela who teach different subjects in UTN. No doubt that such participation in university activities will benefit all partners and increase trust, confidence, commitment and

shared vision between them, as already discussed in Chapters 2 and 3. Therefore, one important lesson from differences for SQU could be inviting more professionals from both government and industry to teach some subjects and to participate in other activities in both the science and humanities colleges. Even though, as mentioned in Chapter 6, some interactions exist between SQU and other actors, most of them concern simple and short activities at personal and department levels, and not at the organizational level.

Even though such initiatives exist, much more can be done to build coherent partnerships with the private sector in Oman. Some public institutions (e.g. The Research Council through the Industrial Innovation Centre) are working to link SQU and other universities with the private sector to increase the level of interaction, trust and shared understanding about common issues that can improve the national competitiveness, especially in forms of innovation, higher education and training, and technological readiness.

8.7. Synthesis of the discussion

In this chapter, the empirical results reported in Chapters 6 and 7 have been reviewed and discussed based on the literature review and research questions of this study. The following table (Table 8.1) summarizes what has been discussed in this chapter, especially in regards to the main theoretical concepts that helped and were used to explain the participants' perceptions of the role of social capital in university relationships, the main areas for improvements, and the main lessons learned from differences.

Table 8-1 : Summary of the main elements discussed in Chapter 8

Main theoretical concepts that help explain the perceptions of participants	University-Government relationship (U-G)	<ul style="list-style-type: none"> - Strategic plan (national, regional, and local) - Government support (e.g. regulations, policies, incentives) - Government intervention - The university knowledge and its role - Innovation system - Mutual trust and shared vision - bureaucratic system
	University-Industry relationship (U-I)	<ul style="list-style-type: none"> - Importance of U-I collaboration - Role of social capital (social interaction, trust, and shared vision and goals) - Innovative knowledge and innovation system - Competitiveness (university, industry, national) - Social structure and networks (U & I) - Government intervention
	Intra-university relations (Intra-U)	<ul style="list-style-type: none"> - Internal social capital (social interaction, trust, and shared vision and goals) - Internal organizational performance - Internal and external relationships - Competitiveness - Personal trust and organizational trust - Complementary of social capital dimensions - Incentives and financial support
Main Areas for Improvements	U-G	<ul style="list-style-type: none"> - National Plan - More dialogue and interactions - Practical subcommittees
	U-I	<ul style="list-style-type: none"> - Support from government - Top management support - Organized interaction - University as proactive - Trust and commitment
	Intra-U	<ul style="list-style-type: none"> - University structure and system - Interaction internally and externally - Awareness of university's vision and goal - Trust and transparency
Main learnings from differences		<ul style="list-style-type: none"> - Universities or Education Council - Chamber of Commerce's Role - Strategic plan - Dialogue Culture - University's vision - Participation of professional from government and industry

Source: Researcher's own elaboration

Chapter 9: Conclusions, Implications, and Recommendations

9.1. Conclusions

Whilst collaboration with key actors and partners is an attractive concept for government, university and industry, many actors that have attempted to develop such relationships have found it difficult to achieve this at a practical level. This study, as mentioned in the introductory chapter, focused on the social aspects that have the potential to facilitate effective collaboration between university and other actors. These aspects include the different dimensions of social capital (structural, relational, and cognitive dimensions). Therefore, the main focus of this study was the following theme:

Social capital through its structural, relational and cognitive dimensions plays a vital role in enhancing interactions and collaboration between university and government, university and industry, as well as within a university in a way that affects competitiveness positively.

Based on the above theme, the following research questions were examined in this study:

The theoretical question:

What are the university's main relationships studied by the literature on innovation?

This theoretical question helps construct the relational framework for the next empirical questions.

The empirical questions:

How can the previously detected relationships be analyzed in terms of social capital?

What is the perception of participants concerning social capital in Sultan Qaboos University's relationships, and how can the relationships be improved?

What is the perception of participants concerning social capital in the relationships of The National Technological University in Rafaela, Argentina, and how can the relationships be improved?

In regards to the theoretical question of this study, and as discussed in Chapter 3, universities are considered to be critical components of national policies, and their contribution to successful economies is evident. Such important contributions in the development of national policies and in economic development cannot be achieved without strong collaboration with government and industry. The whole discussion about the university's role and relationship in the literature of innovation approaches (NIS, RIS, SIS) was summarized in table (3.3) in Chapter 3 (page 66).

To answer the above empirical questions, and based on the work of Nahapiet and Ghoshal (1998) and Tsai and Ghoshal (1998), this study argued that social capital, through its three dimensions (structural, relational, and cognitive), can enhance to a great extent the collaboration between university and government and industry, and enhance the collaboration between employees, departments, and faculties within the university. Thus, both inter and intra-university relationships are covered in this study.

An analytical framework and guideline table were constructed (Chapter 4) based on the theoretical discussion in Chapters 2 and 3. Both were used for the empirical work in two case studies: Sultan Qaboos University (SQU) from Oman, and The National Technological University of Rafaela, Argentina (UTN), and data were collected through conducting interviews with targeted participants from Oman and Argentina.

The results show that structural dimension manifested in social interaction, relational dimension manifested in trust, and cognitive dimension manifested in shared vision,

values and goals were highly perceived to be important to the extent of collaboration between the different actors and to the impacts of such collaboration on national competitiveness in forms of innovation, higher education and training, and technological readiness. They show that social capital is perceived to play crucial role in enhancing and ensuring the collaboration outcomes at both levels of performance (strategic and operational) directly and indirectly, through facilitating interactions and the process of exchanging knowledge and other resources.

Therefore, one of the main contributions of this study is the strong support the results show for the argument that social capital facilitates collaborative relationships and enhances their success. Furthermore, in line with previous research in other fields, this study showed that social capital is perceived to have economic outcomes.

The findings show that when university and other actors are bonded in social interaction ties, trust each other, and share the same vision, they tend to interact and collaborate more frequently and in an effective way, which leads to better outcomes and strong collaborative relationships between all partners. In addition, social capital dimensions are perceived to affect the strategic outcomes of university relationships with government and industry, which are very important for improving national competitiveness. Thus, among the contributions of this study is the greater understanding of the role of social factors in enhancing the level of collaboration between the partners.

The results show that the university-government relationship is perceived to be very important in improving national competitiveness, but such impact depends greatly on the social capital that exists between the university and government. For example, if the levels of trust and of shared vision and goals is high between the two sides, the impact of their collaborative relationship on competitiveness will be stronger and more focused. Furthermore, based on the findings, social capital is perceived to ensure that the interest of the country (e.g. Oman and Argentina) is at the top priority for both sides.

The outcomes of this study support previous studies in the importance of the interaction and collaboration between university and industry, not only for themselves but also for the country at a national level. Based on the findings presented in chapters 6 & 7 and the discussion in Chapter 8, the success and effectiveness of such collaboration cannot be ensured without the existence of social capital because social capital through its three dimensions (structural “social interaction”, relational “trust”, and cognitive “shared vision & goals”) is perceived in cases studied to improve communication, facilitate mutual understanding and shared goals, lessen the possibilities of conflicts and disagreements, and increase resource exchange between the different partners.

Furthermore, in line with previous studies, this study shows that social capital is important not only for inter-university relationships but also for intra-university relationships. The three dimensions of social capital facilitate knowledge management inside the university by enabling individuals to share and locate useful information and by establishing a healthy environment for interaction, with mutual trust and shared vision between individuals. Based on the findings of this study, a high level of social capital within the university is perceived to lead to higher productivity as well as to a higher level of quality and quantity of work, especially in academic activities.

9.2. Implications and recommendations for policy and practice

Based on the findings from the two case studies, and on the discussion conducted in this study (Chapters 6, 7 & 8), outlined below are implications and recommendations (e.g. for the policy makers) aimed to improve university interactions and relationships with government and industry as well as its internal relationships. The most immediate target of these recommendations is Sultan Qaboos University (SQU) and other concerned actors in Oman, but they can be used by any university wanting to improve its relationships with government, industry, and internally. If interaction and collaborative relationships between government-university-industry are improved, their own competitiveness as well as national competitiveness will be improved

directly or indirectly, in forms such as innovation, higher education and training, and technological readiness.

9.2.1. For the government

At the national level, it is very important for the government to consider partnership and collaboration with university and industry as a tool for national development. The government should give more attention and importance to the relationship and collaboration between the three actors (government, university, & industry) not only by publicity but by applying the supportive strategies that encourage universities and firms to collaborate with each other.

One of the most important implications for government that seeks to establish strong linking and research alliances between government-university-industry is that a strategic national plan is very important for applying such strategies and ensuring the three dimensions of social capital.

We therefore suggest that plans and policies could be formulated at a strategic level along with a supportive regulatory environment to encourage governmental bodies, universities, and firms to collaborate with each other. No doubt these strategic plans can ensure the common understandings and shared goals between government, university, and firms, which are critical to the success and effectiveness of government-university-industry partnerships. When government shares such a strategic plan and objectives with other actors from public and private sectors, more commitment will be there to implement the plans and achieve the objectives.

Policy-makers in the government could create an incentive system for universities, firms, and individuals to encourage them to collaborate with each other because, based on the findings, such an incentive system will improve interaction and collaboration, and academics as well as researchers will be more inclined to support the industry. For example, government can encourage movement of experts between

university and industry by establishing and funding chairs which can be jointly funded.

In addition, government could encourage universities to be proactive in approaching firms because such contact will simplify the process of building strong and effective collaboration between partners. That is because in some countries (e.g. Oman), firms are reluctant and not interested in building collaboration with universities. This may be because there is not enough social interaction and trust between firms and universities, or because firms do not realize the importance of interacting with university.

Furthermore, the government could organize workshops and awareness programs about the importance of interaction and collaboration between government, university and industry, and about the expected benefits for each actor as well as for the national development and competitiveness. Such workshops and programs can host and present successful stories of collaboration, especially between university and firms. These activities can bring the actors (individuals and organizations) closer together and create more chances for dialogue and interaction, which can result in increasing the level of trust and common understanding between individuals and organizations, in turn leading to more collaboration.

Finally, the findings of this study imply that the government could clarify the important areas of competitiveness that all partners should focus on, which will help in improving competitiveness. Government can also increase the collaboration by giving opportunities to all actors to participate in the development plans and activities, as well as by generating a democratic dialogue between the university and industry.

9.2.2. For the university

The findings of this study provide universities with many insights for management about the importance of social capital in improving their relationships, especially when collaborating with government and industry.

The results of this study show that social capital plays an important role in the formation and development of successful collaborative relationships among the universities themselves and between the universities and other actors like government and industry. They suggest that giving more importance to social activities can facilitate the development of closer relationships among actors. This study offers several insights that can be useful to not only universities the ones in this study (SQU and UTN), but to other partners like government and industry.

First, this study provides empirical evidence that the dimensions of social capital (structural, relational, and cognitive) are perceived to matter in the cases studied in improving university's collaborative relationship and networks. Such findings can direct an organization (e.g. university) to give importance to the social aspects of the relationship with other actors as they are likely to have many benefits for that organization in both short and long-terms.

Second, the results of this study show that social capital dimensions are perceived in the cases to significantly enhance the outcomes of university's collaboration with other actors as specified by many scholars and already mentioned in Chapters 2 and 3. If collaborative organizations build strong social capital, they can advance their knowledge and ability to innovate, conduct more joint projects and research, achieve higher quality, and overall improve their competitiveness. In this sense, this study provides further evidence that an organization like a university could focus on developing social capital with their employees and partners to improve not only the outcomes of their collaboration but the impacts of such outcomes on competitiveness, in the forms of innovation, higher education and training, and technological readiness.

Third, the findings of this study suggest that universities should work toward developing the three dimensions of social capital as all of them are perceived to have an effect on the relationship inside and outside the university because they are complementary. According to the respondents' suggestions, the three dimensions can be developed and ensured by using different methods, such as having more dialogue

with individuals, sharing vision and goals, creating more common spaces inside the university, and organizing social gatherings.

Similarly, all individuals, actors and partners could also focus on finding ways to build and develop social capital among them. They could be made aware that the resources and time allocated to develop their social capital is not without valuable returns both in the short and long terms. Hence, universities could invest in social interactions by using different mechanisms and channels such as social events and common spaces, and create more dialogue with their members and with other actors like government and industry to socially interact with each other, establish integrity and trust, and be able to reach a shared vision that benefits all actors. Such activities would result in improving the competitiveness of each partner, which in turn would improve national competitiveness.

Finally, this study provided further evidence that social capital dimensions are perceived to facilitate the exchange process inside the university and between the universities themselves, as well as with other actors. Universities that are rich in social capital have the willingness to interact and build collaborative relationships to exchange information, personnel and technology among themselves and with others. Therefore, through the dimensions of social capital, the university and its collaborative partners could use their resources in a complementary way.

In regards to some of the recommendations and actions that can be taken by the university's top management to ensure the above implications, the following are among them:

The findings suggest that when a university (e.g. SQU and UTN) aims to build strong collaborative relationships with other actors like government and industry, it can be beneficial to make that objective part of the strategic objectives. Interacting and collaborating with government and industry is very beneficial to the university, as already discussed in previous chapters, to strengthen both education and research activities of the university. In reference to the first case study (SQU), respondents

from the university highlighted the importance of including such issues in their university's structure.

Also, SQU and UTN or other universities could strengthen their efforts by creating a strong specialized unit of personnel in its system to maintain close relationships and be responsible for knowledge and technology transfer and for the interaction and collaboration with government and industry. This has been identified as a key success factor in the previous studies. Such a unit could work closely with other departments in the university, such as Engineering, and Economics & Political Science.

Through some activities that have been described in the cases, universities like SQU and UTN can further facilitate interactions by encouraging more participation of representatives from the government and the private sector (firms) to be members of councils and committees, to teach some courses for the students, and to sponsor and organize some activities inside the university. Furthermore, the university should encourage its academics and researchers to interact and collaborate with individuals from the government and private sector.

In addition, university should provide more financial incentives for academics and researchers who are involved in its collaboration with government and industry.

Furthermore, SQU and UTN should be aware of the complexity of interacting with government and industry and gain further understanding. For example, conflict may arise in regards to timelines and deadlines because academics and researchers have other commitments like teaching, and need more time to accomplish some tasks which government and industry may expect to finish in a shorter time. Therefore, the university must be able to manage such conflicts and expectations by having more communication and dialogue between the participants in order to ensure mutual understanding and trust between them.

Based on the findings from both case studies and as discussed in Chapter 8, SQU and UTN could communicate its vision, values and goals externally as well as internally

with its employees, and be sure that such vision and goals are clear and understandable. Organizing social gatherings and open days, providing common spaces, and having more dialogue with employees are important to ensure trust and commitment from the employees and their departments and colleges.

9.2.3. For the industry

It is important for the whole system that firms interact with government and university to improve operations and productivity and thus competitiveness. As highlighted in Chapter 3, and according to the findings from the two case studies presented in Chapters 6 and 7, there are many benefits that firms can gain from their collaboration with university, such as obtaining access to facilities, getting training for their workforce, enhancing the possibility of producing new products, and employing qualified and skilled graduates. No doubt that these benefits will enhance the firm's competitiveness. Thus, firms that are interested in building relationships with university should create specialized capabilities to look after their collaboration with university and other higher education institutions.

Firms' top management could encourage the development of initiatives with the university that address their specific knowledge needs. More social interaction is essential to ensure trust and shared vision between firms and universities, and a national strategic plan can help a lot in ensuring the commitment of all actors.

Furthermore, according to findings from both case studies, and as discussed in Chapter 8, firms could innovate to cope with changes and to be more competitive, but this is difficult to do by themselves. Therefore, firms can be more successful in improving their innovative activities and competitiveness if they have strong interaction and collaboration with universities. As emphasized by one of the respondents from the industry sector, such collaborative activities in innovation are strategic for the firms. The university-industry collaboration should be clear in its objectives, responsibilities and deadlines, and it should be implemented in a

systematic way with more dialogue and negotiation to minimize misunderstanding and reduce disagreements.

9.3. Opportunities for future research

There are several avenues through which this research could be extended in future studies. The first possibility is to examine other factors that can moderate and facilitate the interaction between university and other actors. Literature shows that the success of collaborative relationships between university and other actors like government and industry could be affected by many factors, including, for example, the type of collaborative arrangements, duration and strength of the relationship, strategic criticalness, and proximity. Future studies could examine the effects of such moderators in the university's relationships.

Second, this study examined the university's relationships across government, industry, and its internal levels and provided some evidence that highlighted the importance of the three dimensions of social capital in enhancing collaboration between university, government, and industry as well as among the university's employees themselves. Studies suggest that government's strategies and policies, organization's culture and nature (e.g. university), and the nature of industry play an important role in defining the relationship between social capital and the improvements in the university's collaborative relationships. Future studies could focus more in other factors such as government support, university size and scope, and the nature of industry.

Another avenue for future research is related to the nature of the university, whether public or private. The two case studies in this study were public universities; the first one from Oman (SQU) and the second from Rafaela, Argentina (UTN). Future research could examine and compare the collaborative relationships of private and public universities. In addition, social capital dimensions (structural, relational, and cognitive) were used by focusing on specific aspects of each dimension; for example, the structural dimension was manifested by social interaction ties, and the relational

dimension by trust. So, other aspects of the three dimensions can be used to examine the university's relationships.

Finally, the data for this study were collected through participants from Oman and Argentina. Similar research based in other geographic areas would assist in improving the generalizability of this study.

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Appendixes

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Appendix A: Interview Guide

Model One: University-Government level

Guideline for the interview

	Other actors beside university	Role of university	Impacts of university on other actors	Impact of the other actors on university	How (mechanism for interactions)
U - G Relations	National Government	<ul style="list-style-type: none"> - Critical institutional actor and component of national policy - Delivering advice to politicians and policy makers - Provide a learning environment and supply learned people 	<ul style="list-style-type: none"> - Change in political structure - Increase of citizen participation 	<ul style="list-style-type: none"> - preparedness of universities to make bold decision - Universities' strategy, rules and regulation - Can hinder or support U-I collaboration 	<ul style="list-style-type: none"> - Institutional and academic leadership - National regulation, higher education, science and innovation policy instruments and funds.

Structural Dimension

- How does the joint committee work? What is its structure (Place of meeting, how many times, stable or not)?
- What is expected from the university in such collaboration? Why?
- How can university benefit from such joint interactions? Why?
- How such social interaction impact competitiveness in forms of innovation, higher education and training, and technological readiness?
- What is your evaluation of this committee (strengths and weaknesses)? How it could be improved in regards to its impact on competitiveness?

Relational Dimension

- How important is trust when interacting with a university? Why?
- Is it easy for actors within this joint committee to trust each other? Why?
- To what extent trust can impact innovation, higher education and training, and technological readiness? So that competitiveness can be improved.
- How can the degree of trustworthiness be increased between government and university? How do you think this would affect competitiveness? Why?

Cognitive Dimension

- To what extent do joint committee members collaborate with each other to solve shared problems? How can this impact innovation, higher education and training, and technological readiness?
- Based on your experience, how far vision, values and goals are shared between you as a government policy makers and university? Is this desirable?
- What both university and government should do to ensure the shared vision between the main actors in such joint committees? How you think this will affect competitiveness?

Model Two: University-Industry Level

Guideline for the interview

	Other actors beside university	Role of university	Impacts of university on other actors	Impact of the other actors on university	How (mechanism for interactions)
U - I relations	<ul style="list-style-type: none"> - Specialized agencies - Funding - Technology transfer - Business promotion - Industry (firms) - Other public and research organizations 	<ul style="list-style-type: none"> - As generators and originator of new knowledge, ideas and products - Entrepreneurial role - Developmental role - Intermediary or Facilitator role 	<ul style="list-style-type: none"> - Bringing global state-of-the-art science. - Facilitating the industrial development. - Help industries to respond the rapid change in the knowledge development. - Enhance the industries competitiveness through technology supply and training specialized personnel. - Contribute in developing the capability of knowledge-based economy and assist in the growth, development, and meeting the society demands. 	<ul style="list-style-type: none"> - Access to additional financing and find sponsors for research which are tied to fewer restrictions (administrative) than research programs that funded by the government. - Test the practical application of the research theory and get feedback and experience of businesses. - Understand what really the university's needs which will result in more economic viability to academic projects. - Find and define new research questions. 	<ul style="list-style-type: none"> - Cooperation of education (influencing university program curricula, providing scholarship, and sponsoring education). - Participation in professional networks (conferences and fairs and industry participation in university boards). - Entrepreneurship related activities (start-ups, incubators, science parks). - Collaboration in consultancy, joint research, staff mobility. - Informal interaction channels

Structural Dimension

- How does the team (joint project) work? What is its structure (Place of meeting, how many times, stable or not)?
- What is expected from the university in such collaboration?
- How can university benefit from such joint interactions?
- How such social interaction impact competitiveness in forms of innovation, higher education and training, and technological readiness?
- What is your evaluation of this team (joint project) (strengths and weaknesses)? How it could be improved in regards to its impact on competitiveness?

Relational Dimension

- How important is trust when interacting with a university/industry (firm)?
- Is it easy for actors within this team or joint project to trust each other?
- To what extent trust can impact innovation, higher education and training, and technological readiness? So that competitiveness can be improved.
- How can the degree of trustworthiness be increased between both sides? How do you think this would affect competitiveness?

Cognitive Dimension

- To what extent do team (joint project) members collaborate with each other to solve shared problems? How can this impact innovation, higher education and training, and technological readiness?

- Based on your experience, how far vision, values and goals are shared between the both sides? Is this desirable?
- What both university and industry (firm) should do to ensure the shared vision between the main actors in such teams or joint projects? How you think this will affect competitiveness?

Model Three: Intra-University Level

Guideline for the interview

	Other actors beside university	Role of university	Impacts of university on other actors	Impact of the other actors on university	How (mechanism for interactions)
Intra-organizational	- Individuals from universities	- Teaching their students to increase their motivation and ability to innovate and to become an entrepreneur. - Disseminate their knowledge internally and externally. - Students and staff can participate in important social projects.	- Increasing the learning opportunities for students, academics, & researchers. - Equipping students with the knowledge and skills required for the development. - Preparing students to be as potential employees (e.g. for government and industry) - Building research and innovation capabilities to serve the university as well as outsiders actors	-Academics and researchers can contribute in increasing the ranking of their university. - Students and staff may participate in improving the university's image. - Universities may create consultancy organizations, centers or departments . - University can be a source of start-ups and innovation.	- Co-publication and joint research projects within the university. - Mobility of people within university: mobility of academic, mobility of researchers, double appointments, temporary exchange of personnel. - Cooperation in supervision of trainee and PhD students.

Structural Dimension

- How much it is important to know people at a personal level from inside and outside the university? How can this impact innovation, higher education and training, and technological readiness? Why?
- What benefits you and your university will get by interacting and collaborating with other actors like government and industry?
- How far you think your university maintaining close relationships with other partners like government and industry to improve competitiveness? In your opinion, what can be done more in this regards? Why?

Relational Dimension

- How important is the trust between you, your colleagues and organization?
- How trust helps you in collaborating in joint committees or joint projects? How can this impact competitiveness? Why?
- How can you increase the degree of trustworthiness between you and other partners? Why?
- "Trust facilitates the process of knowledge transfer between two parties", what is your comments in this statement? How can it affect the process of innovation, higher education and training, and technological readiness?

Cognitive Dimension

- How far your organization is sharing its vision, values and goals with you? Why?
- How sharing the vision, values and goals between the actors impact innovation, higher education and training, and technological readiness? Why?

- Based on your experience, how far vision, values and goals are shared between the both sides? Is this desirable? Why?
- What both you and your university should do to ensure the shared vision? How you think this will affect competitiveness?

Appendix B: SQU – Government Relationship (Oman)

Social Capital Dimensiones			
	Structural – (Social Interaction)	Relational – (Trust)	Cognitive – (Shared visión)
OGR1	<ul style="list-style-type: none"> - Stable committee, meet twice a year, can communicate without meeting by letters. - University is expected to study the ideas, suggestions, and proposals presented by the Ministry (as expert). - University can benefit by being aware of the reforms in the education system, training program for students, develop programs. - The respondent suggested that such committee should include members from private sector and other higher education institutions. 	<ul style="list-style-type: none"> - Trust is very important for their work, the actors understand that the failure to one side effects the other side. - Trust can have an impact on innovation, higher education and training, and technological readiness. - The government gives much support to the university to improve itself and get well qualified people and this effect competitiveness. 	<ul style="list-style-type: none"> - The members are sharing vision and work to solve national problems and this improve competitiveness. - Both sides need to have more communication, collaboration and partnership between them and other stakeholders like the private sector.
OGR2	<ul style="list-style-type: none"> - Stable committee; meet 2-3 times a year. - Identify common subjects at the high level and then meet together for discussion. - University is expected to provide researchers, new ideas and solutions, and provide skilled graduates. University can benefit by getting more funds and extra cash, training for students. 	<ul style="list-style-type: none"> - Trust is important and it is a cumulative factor. - Social and personnel communication will help trusting the committee’s members. - Trust can be increased by working together more. 	<ul style="list-style-type: none"> - Shared vision is shared to the highest level, if one side be selfish the other side will stop collaborating. - It is very desirable to share vision, values and goals between the collaborated organization and they should help each other for this. - If they have shared vision, the relationship will be strong and this will positively impact competitiveness.
OGR3	<ul style="list-style-type: none"> - Top level joint committee; meet 2-3 times a year but unstable, meeting take place in both sides. 	<ul style="list-style-type: none"> - Trust is shacked in the meantime. It was better but now decreased after seeing the 	<ul style="list-style-type: none"> - The shared vision depends on the subjects raised by both sides but they

	<ul style="list-style-type: none"> - University is expected to give solutions and recommendations, produce a qualified HR in transportation, logistics and railway fields. - University can benefit by linking their curriculum with the field (practical). - According to the respondent members from the university are very busy and always over loaded, thus not capable to handle the ministry's researches. Also, university should include more members in the committee. 	<p>results.</p> <ul style="list-style-type: none"> - Due to the full scheduled timetable, the university's members were not achieving the committee goals, so became harder to trust. - Trust and its impacts on competitiveness can be improved by separating the academic staff from researchers staff and include more researchers in the committee. 	<p>collaborate to share their subjects.</p>
OGR4	<ul style="list-style-type: none"> - Top level committee, 4-5 members from each side, meeting twice a year in SQU and in the Ministry. - University is asked to keep the ministry updated to the new cases, diseases, and the lacking in health care services. University is expected to provide professional training to the ministry staff. - University benefit by getting funds for its research projects and other collaborating aspects. - By such collaboration, innovation can be improved and new ideas can be adapted and implemented in Oman. - The respondent suggested that the number of committee's members should be increased and subcommittee should be formulated to look after certain tasks like innovation, training, and technology. Also, provide separate budget for this committee. 	<ul style="list-style-type: none"> - Trust is very important, without it, there will be delay and thus productivity will decrease. - No problems, things are open and clear between the members. - Trust is important for the factors; innovation, training, and technology. "if I do not trust an organization, I won't send my people to that organization as simple as that". 	<ul style="list-style-type: none"> - Both sides are thinking about the interest of Oman and how to improve the health services and to serve Oman better. - "It's not us and you, it's WE". - The committee's goals are clear from the first meeting.
OGR5	<ul style="list-style-type: none"> - Meeting in neutral place, either in SQU or the Council. 	<p>-</p>	<ul style="list-style-type: none"> - Such shared vision and goals depends on the committee's

	<p>- SQU is announced in 2008 as a “house of excellence”. It can provide knowledge and experience. It has academics and researchers which make it more practical than just theory.</p> <ul style="list-style-type: none"> - SQU can get fund for its projects. - Such joint committee can affect the development of Oman according to the vision of Oman and the 5 years development plans. - The committee has subcommittee which called technical committee which meets more often and they move things faster. 		<p>members, if they are willing to collaborate, then they will be able to solve shared problems.</p>
<p>OGR6</p>	<ul style="list-style-type: none"> - Did a couple of projects to solve some industrial problems. - Their role is to facilitate the interaction between university - industry, and to benefits both parties. - Case-to-case basis and no problem with communication. - Dealing with a focal point (personal level only) called “technology transfer agent”. Looking for organizational level of collaboration for things to be easier and more facilitated, and better governed. - There is a case-to-case collaboration between industry and academia, there is no NATIONAL POLICY. Things dome meanly driven by personal relationships. - University can develop its knowledge and know-how. - The relationship of Government-Private sector-academic sector is very important for the knowledge base, and they are trying to capitalize 	<ul style="list-style-type: none"> - There is usually no argument. - If there are any differences in opinion, both parties will be called for round table discussion. - The trust should be between organization to organization but now operating on a personal basis. - “We need to capitalize on the personal relationships but at the same time having a National Policy would facilitate that and make it more aligned vision ad complimentary roles will be clear “. - And “the university can play a more important role I supporting economic sector, especially industry”. - Defiantly trust will improve competitiveness through the three areas (example). -In order to increase the degree of trustworthiness, the country needs a national mandate to support that kind of collaboration 	<ul style="list-style-type: none"> - The sharing of vision or goal will come with a national mandate and without that it would be difficult to share because for example universities have their own priorities. - If two parallel policies, there is no necessarily complementary role-taking place. This definitely weakens the competitiveness. - Need to introduce some incentives to improve innovative collaboration. - Incentivize academic lead to be more entrusted to support industry, thus better outcomes and better competitiveness. - There is an improvement taking place.

	<p>on that in Oman.</p> <ul style="list-style-type: none">- Government is usually funding some projects.- It is a platform to connect between industries, industrial problems and academics.- Difficult to assess the interactions between U-I but it is going in a very slow motion.	<p>and commitment, so national policy is essential. This will improve comp. in a very significant way.</p> <ul style="list-style-type: none">- If both industry and academic appreciate the value of collaboration that will improve the trust.- The optimized relationship and the optimized results.- The national policy will be more comprehensive in terms of what needed on a national level.	
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Appendix C: SQU – Industry Relationship (Oman)

		Social Capital Dimensiones		
	Structural – (Social Interaction)	Relational – (Trust)	Cognitive – (Shared vision)	
OIR-1	<ul style="list-style-type: none"> - Liaison committee at senior level meets three times a year, very strong and decisions can be taken very fast. - SQU is expected to accept the feedback on its programs and graduates, to be willing to cope with the company’s requirements and needs, to be proactive in sharing the latest advancements in education and science with the company. - SQU can improve its programs to meet the industry’s needs, improve the employability of its graduates, access to practical projects. - The respondent pointed out that such interaction and collaboration helps them to improve their production through the implementation of new technologies and such improvement will impact the competitiveness. 	<ul style="list-style-type: none"> - Trust is essential in their joint collaboration with SQU. - Confidentiality agreement has to be signed between both organizations to ensure the protection of data. They focus on the main principles of international business ethics and copy right laws. - Trust must represent the values of both sides not only at an individual or personnel level but at the corporate level. - Without trust and the business ethics are the core of any collaboration agreement, and without it, it will be impossible for any company to accept the exposure of its capabilities to others. 	<ul style="list-style-type: none"> - They have many successful examples of collaboration in research and implementation. - Joint projects like MSc scholarship program and final year projects. - HR development is the core of the vision between both sides. The compliance of vision, value, and goals helps enriching the cooperation between the two organizations. - The support and follow-up of top management is very important in boosting the joint teamwork. - It depends on how the top management views such cooperation and how it placed in the organization priorities. 	
OIR-2	<ul style="list-style-type: none"> - Approximately 8-10 meetings a year. - University is expected to be ready for resolving the company’s challenges, helps by labs and qualified places. - By such joint interaction, the university’s competitiveness can be increased; it can gain a competitive advantage over other universities. - Such interaction leads to highly increase the level of innovation, higher education and training. - Very good interaction, let people from university to stay in the company environment for at least 2 	<ul style="list-style-type: none"> - Trust is extremely important. - If no trust, collaboration will end with poor outcomes. - Trust need time to build. - Trust is very essential, higher trust leads to higher chance for innovation, higher education, and technological readiness. - Evidence and time are required for maintaining trustworthiness. 	<ul style="list-style-type: none"> - Both collaborated sides have a clear vision and goals that benefit both of them. - It is very desirable to satisfy all members in order to achieve the goals. - Some of the industry’s challenges need academic thinking and universities like SQU come to overcome such challenges. 	

OIR-3	<p>weeks to feel the struggles and challenges in such environment.</p> <ul style="list-style-type: none"> - Collaboration with universities is very limited and it only focuses on creating training opportunities in the different factories and companies. - There is no stability in relationships and collaboration. The picture is not clear. - University has well qualified researches and research centers and it should lead the process of modernization and development. - University can benefit by the practical application and experimentation, find cases and problems to be solved, training opportunities for its students. - Undoubtedly such interaction affect competitiveness, linking educational institutions and development plans, work on complementary trajectory would enhance the community on competition and innovation and continue to do so. - Now universities are issuing graduation certificates only and not qualified, efficient, and researchers with critical minds graduates. Such image maybe will be clearer after cooperation with the community. 	<ul style="list-style-type: none"> - Trust and collaboration are very important for all participants. - Trust opens up prospects for cooperation with common ground. - working together with trust lead to growth of society as a whole and not just for one party at the expense of other. - Trust can be increased by a clarity of vision, unity of purpose, and transparency when collaborate with each other. 	<ul style="list-style-type: none"> - Sharing vision, values and goals are very desirable but according to the respondents they are not exist and if exist, it is not clear. - All should have different strategy frameworks with complementary goals to build a society which believe that competitiveness is the way of success and growth. - Start with a governmental clear vision, an active educational institutional and capable private sector.
OIR-4	<ul style="list-style-type: none"> - There is no coordinated and framed collaboration with universities. - The existing interaction is focus on receiving students for training and as visitors, and sponsoring some activities for students, the 	<ul style="list-style-type: none"> - Trust is very important and it can be built through multiple partnerships and by the mutual awareness of the importance of U-I collaboration. Such awareness should cover all Oman. 	<ul style="list-style-type: none"> - The respondent doesn't see the Industrial Zone that he/she belong to is reaching the stage of sharing vision, values, and goals. - The question should be asked The

	<p>respondent participated in project evaluation process.</p> <ul style="list-style-type: none"> - University should evaluate companies and factories to determine how student and researchers can benefit from them, and coordinate with a clear plan for both parties and who will follow-up. - Now companies are reached by the university in randomly way, student sent without clear plan and no follow-up, thus no enough attention is given to students from company. Companies' financial support should be addressed to support innovate ideas and creativities and not for less important projects. Also, companies should benefit from such support through the media and market related to such collaboration. - University can benefit by supporting their research centers, access to practical application of innovation, market their innovation, and provide solution to industry problems. Overall, such collaboration will enhance its role in society and thus will get more support. - No doubt that there is a direct impact on competitiveness of the country. - The respondents provide different strengths, weaknesses, recommendations for improvement. - Once every quarter to start with and once things are stable it might go down to bi-annual. - An agreed stakeholder engagement plan needs to be in place. - A clear Terms of Reference (ToR) would have to 	<ul style="list-style-type: none"> - Not easy to build trust due to the great diversity in corporate structure. - Trust is the source of cooperation and it can be increased by clear goals, responsibilities, and expected benefits. 	<p>Research Council and Innovation Centre.</p> <ul style="list-style-type: none"> - The common ground need to be strengthened by adequate legal framework as well as the joint technical framework. - The respondent gives different recommendations to government, university, and private sector to ensure common vision and goals.
OIR-5		<ul style="list-style-type: none"> - Each set of teams have confidential aspect of their business to protect in order to stay competitive. - Guarantees from both ends that integrity is at the heart of their dealings will help 	<ul style="list-style-type: none"> - Widely shared. - Each party has set of values that they operate under which, the other party needs to be aware of and agree to. - Collaboration is pivotal to identifying,

	<p>be in place.</p> <ul style="list-style-type: none"> - University is expected to keep abreast with the work place requirements. Unfortunately, the university teaches syllabus which either obsolete or no longer what the job market requires and research programs are another area where the two parties need to join forces and collaborate for it. - University ought to be proactive in approaching industry because industry can have their own initiatives, labs and institutes to cater for their needs if the academia can't do it. - University can have internship programs for their students; have some of the industry practitioners deliver lectures to students. - Collaboration with industry is paramount to keep up with current and future needs in order to remain competitive and it is in the interest of universities. - Industry applies and implements technology and the academia can only learn from industry what the issues are facing them to find improvements and solutions. - Being isolated from industry will mean the results could be misleading and can't be implemented. - The top management sponsorship/drive is very important to move things in the right direction and pace. - Time is of essence; so if dedicated teams with clear mandate and empowerment are put in place 	<p>improve trust between the team members.</p> <ul style="list-style-type: none"> - Trust in each other intention and capabilities is key to the success. - Trust can make or break any relationship or initiative. - Once trust is established, anything is possible; sharing knowhow, experience, information, ideas and solutions to achieve competitiveness. Absence of trust will definitely hinder such openness, transparency and collaboration - Agreed ground rules of do's and don'ts, the ToR of the collaboration, transparency and credibility can definitely increase the level of trust. 	<p>diagnosing and solving problems.</p> <ul style="list-style-type: none"> - The industry is an implementer/user of technology and innovation while the university is the developer of the solution and if the implementer does not help communicate problems and anticipated technology needs to the university, how can the university in turn be able to innovate.
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OIR-6	<p>for such collaboration it will definitely improve efficiency and speed.</p> <ul style="list-style-type: none"> - Members are divided equally between both sides, Meet once a year, Stable for the past 3 years. - University benefits by having access to high level feedback and get actions done quicker with business. - need to meet more with better follow-up and focus to get a wider representation from industry with fewer but focused members of the university. 	<ul style="list-style-type: none"> - Trust is important but “I don’t see this as an issue in such forum” . - As far as trust does not promote complacency, it should be positive. - Trust is affecting competitiveness positively. 	<ul style="list-style-type: none"> - There is a good amount of coherence between the members. - It is important and positive to share but it should not impact diversity.
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Appendix D: Intra-SQU Relationship (Oman)

Social Capital Dimensiones			
	Structural – (Social Interaction)	Relational – (Trust)	Cognitive – (Shared visión)
OUR1	<ul style="list-style-type: none"> - knowing people at a personal level is very essential, work out faster, smoothly not even require a letter – if not knowing them, official communication exists, longer time, a bit of bureaucracy, time consuming. - It can increase competitiveness, for example, the companies will do business more if they have personal contacts. Same for the university, they will work better together and things will go smoother for the overall performance of the whole university. - University has always views as “Think Tank” for the whole country but this far from the real because so far SQU is not getting its full potential to contribute with government and industry. - Government is approaching a certain consultancy company while all skills required are at SQU. - The respondent thinks that SQU does not involved per se as a structure or governance. There is a bit of encouragement but not in every unit. It is at personal level, if that person leaves SQU, the connection dead. There is no in SQU structure which indicates it’s good to contact and go out. (Rafaela case) - Improvement must come from the top and there must be something within the SQU’s culture which emphasizes on personal relations with other 	<ul style="list-style-type: none"> - If trust exists, things will flow and happen. “How likely am I going to work with a colleague if I don’t trust him/her”. - Trust encourages a person to work in committees where he/she knows other people in those committees. Without trust, takes time to build, difficult to reach a consensus and maybe clashes will be there. - More social interaction is required and providing a common place for all faculties to get together, more social involvement with activities in the universities would be better. - His/her college already trying to establish trustworthiness with outside parties by inviting members from private and public sector to be on the College Advisory Board, such thing will produce kind of an ownership and more commitment will be there from private and public sectors. (As a first link). 	<ul style="list-style-type: none"> - There is more room to improve the issue of sharing vision, value and goals. Unfortunately the SQU vision and mission are only communicated to people who are working in strategic plans. If you ask many people at the college for example, many of them will don’t know what is the SQU’s vision and mission. It should be in every corner. - Such shared vision cans unifying the projects and activities to achieve that vision. - It’s very essential to share the vision for example with the advisory board which include members from government and industry. It is routine but not in practice, many committees start their first meeting by stating specific goals but the final reached goals going somewhere else. - In regards to the committee, the leader should control the committee in terms of setting and vision, mission, and goals. It is continuously informing process to share with other members the vision and goals. - It’s two ways communication; they provide feedback and SQU provide feedback, so it’s give and take.

	places.		<ul style="list-style-type: none"> - Long meetings instead of half an hour, it will take 2-3 hours without outcomes. - SQU is sharing values, vision, and goals. - There is strong communication between staff and administration. - sharing vision impacts innovation and higher education and so on. Everyone knows their roles and understands their individual responsibilities. Good for promotion and improvement. - it is desirable, department's vision needs to be aligned with the college's vision, which needs to be aligned with the university's vision, which need to be aligned with higher education and government's vision. - To ensure shared vision, more planning and implementation, this will improve competitiveness. - The obstacle is finance.
OUR2	<p>Personal interaction is very important because it allow you to understand other people's personalities, know how to deal with them, helps in decision making. Ensuring a good connection and relationship which will result in collaborative networks.</p> <ul style="list-style-type: none"> - SQU can benefits in terms of financial support, sharing knowledge and ideas, exposure to up-to-date technology, increasing awareness, exposing the college to outside industries. - SQU considers maintaining close relationship with government and industry is essential and significant. Sometime no support and not always have all needed means. - Raising awareness among faculty and staff of the importance and requirements of maintaining relationships. This will also improve competitiveness. Financial difficulties exist. 	<ul style="list-style-type: none"> - Trust is KEY. - Without trust, relationship would be extremely fragile. It leads to healthy and supportive environment. It strengthens collaboration and result in better outcomes. - It affects competitiveness positively. - Transparency and recognition are important for increasing the level trust. - It will improve communication and strengthen ties, better support, and more motivation. 	<ul style="list-style-type: none"> - SQU is sharing the vision, mission, and goals with all staff members. - When formulating future plans, vision and mission are there in minds. - Sharing the vision, mission and objectives can strengthen the trust with others. - It also provides information to others about what university can do and how it can helps them.
OUR3	<ul style="list-style-type: none"> - The relation in general should be professional relation, the personal aspect shouldn't matter. If exist, it should be used in a positive way. Personal disagreement shouldn't negatively affect the institute. - Many benefits like better communication, better sustainable and cooperative way of communication between SQU and other actors (public or private). - SQU is keen to maintain good relationship. - SQU should organize more frequent and unofficial 	<ul style="list-style-type: none"> - Trust is CRUCIAL, confidence to give, to provide information, to work. - Without trust, very difficult to collaborate within the department, college, university, and outside the university. - "without material there is no engineering", so without trust there is no collaboration. - "OK I will do my best because I trust that others also will do their best". 	

	<p>meetings with different parties to maintain its relationships.</p>	<ul style="list-style-type: none"> - The relationship should be strengthening not only through professional but also by personal level. - “Trust something that needs to be earned; it is not something that is guaranteed”. - The moderator or the chair of the committee has an important role in ensuring the trust between the members. 	
<p>OUR4</p>	<ul style="list-style-type: none"> - It is important to know people at personal level because they will cooperate really well (if trusted). Such thing impact competitiveness through the improvement of innovation and higher education and training. - Up grading the education system, giving more opportunities, access to industry, thus technology can be further developed. - Benefits can be by building an ecosystem, which mean relationships need to be really strong. - Government as the demand side in the ecosystem and as a regulator, industry as the supplier and provider of solutions, and the university is the tangle of knowledge and information, and plays a huge role with interacting between the government and industry. - Once a good strong and coherent ecosystem is established then good interaction between two parties will benefit SQU. More knowledgeable economy, higher regional competitiveness, and stronger role for SQU which can be very competitive in the region. 	<ul style="list-style-type: none"> - Trust is very important. In academia, ethics are very important because knowledge is based on ethics (the universal ethics). So, both trust and ethics are very important. They give the individual a sense of empowerment, motivation, work harder and better. - Trust must exist for greater productivity and motivation. - Be realistic, do not over-present your abilities, meet your promises. - Trust facilitates the exchange of knowledge and views. Knowledge has subjective components which require trust. Good and two way communication lead to agreement on views. - For trust to work, objectives must be clear and agreed upon between parties. “Personally knowing the person also helps in trusting them, since trust on the personal level and trust in the knowledge 	<ul style="list-style-type: none"> - SQU has very good links for sharing with transparent system of exchanging objectives, vision. - Welcoming criticize and comments. - The impacts of shared vision depend on the shared trust. “I think this goes with trust. If the sharing is trustful then the process is better”. - Shared vision, values and goals are prerequisite for any development. Sharing must be there in SQU. - Setting up an efficient communication channel is needed. Such channel must have the right tools inside and outside SQU in order to improve competitiveness. - Building a great communication channel that allows for coherent objectives and trustworthy criticism is essential for SQU.

	<p>- What can be done more? "To be honest, this topic keeps me awake at night" ... SQU is in a very good and mature position in terms of research but we need stronger link.</p> <p>- SQU need a big strong unit which hard to achieve that since SQU should have high innovation, patenting, easy process of links to reduce bureaucracy and make a great authoritative figures.</p>	<p>system complements each other".</p>	
<p>OURS</p>	<ul style="list-style-type: none"> - knowing people will create networking, networking will accelerate the productivity, networking will enhance collaboration between individuals which, if developed, will be between institutions. - Networking impacts innovation, higher education and training by new ideas and knowledge also will facilitate sharing technology. - Promote SQU, people will be more familiar with SQU's activities, more credit to SQU from inside and outside the country, more exchange of ideas and technology, even between Omani institutions. - Two components; administration and academics (researches and scientists). SQU administration is following top-bottom approach which (according to UR5 is not appropriate for academics) who think it should be a bottom-up approach. - Academics like SOLDIERS. If not do, they are failure! - The whole communication should start from bottom. - "I think they (administration) are doing well 	<ul style="list-style-type: none"> - Trust is very important, without trust no productivity, low quality, no publication, more conflicts, and no continuity in the research. Thus, It is one of the research' pillars. It is like research ethics. - Selecting the research team's member is very important to build trust. - Trust helps in moving things in a nice flow and productivity will be to the top. - Adding some sort of social events might improve trust (e.g. tea hour). Such events should be inside and outside SQU. UR5 gives good example with one of government bodies!!!. Such activities and events will help to bread down the walls and reduce gaps. - If I trust them, I will transfer my knowledge to them, and productivity will be more which will improve innovation and other areas of competitiveness for sure.(Examp. available) - "funds must be from institutions and not 	<ul style="list-style-type: none"> - UR5 thinks SQU is doing good work in sharing its vision, values, and goals but it is not important for him/her whether SQU is publicized its vision or not, because he/she know what are expected from him/her as an academic staff. - Sharing vision with outsider also important and SQU is well organized with that. - Clear vision, mission, and objectives; know what you want; facilities; funds all are important for collaboration. - Sharing vision can be ensured through collaboration publications, journals affiliated with SQU, conferences, doing well job and quality research. SQU should be consistence in dealing with people, proper communication. - Debate about whether SQU is a teaching university or a research university!! Whether faculty is promoted based on their teaching or research or community

	<p>although it might be in a wrong way, it shouldn't be that way".</p> <ul style="list-style-type: none"> - Relationship will open the doors with the government but you should know someone inside! - More incentives and financial support are required (e.g. attending more conferences, host conferences). 	<p>from individuals", "we are talking about something shouldn't happen in science".</p> <ul style="list-style-type: none"> - "Knowing people can accelerate the process but it shouldn't affect having the fund, especially in science". 	<p>services.</p> <ul style="list-style-type: none"> - Academic recruitment is very important for the department, college, university, and for the whole country.
<p>OUR6</p>	<ul style="list-style-type: none"> - knowing people at a personal level is very important because systematic thing don't work always. - Good tasks and job can be produced by it, building a network (agree with UR5), enhance trust, share resources and information, more innovative. - Many benefits of such network for both; bridging the gap with industry, more skilled students, collaborative research, consultancy. "we utilize a lot of our social network and our connections to set up meeting with external entities". - Before SQU did a very initiative called "open days" with industry. Also, it had some "open days" with the main actors including even the army. Trying to bridge the gap between SQU and other actors. - Definitely it would improve the competitiveness by improving social interaction and bridging the gap between SQU and other actors (e.g. education). 	<ul style="list-style-type: none"> - It is extremely important, without it there would be no sharing information and no collaborative work and research. - It is extremely important to break down the silos and to work collaboratively inside and outside SQU. Always had a problem with industry "ahh I want a westerner to do this study for me rather than an Omani" but now this changed a lot. - Other actors give SQU preference because there is a lot of social interaction which built trust .. "Alright, we can produce". - The philosophy of trust is important not only for inside SQU but also when collaborating with the outsiders. - Within SQU, social interaction is very important to increase the degree of trust. - Definitely can improve the competitiveness of Oman 	<ul style="list-style-type: none"> - SQU doesn't do a good job really in sharing its vision. "if you go outside and ask me secretary : What is the vision or the mission of the university?, I don't think she knows". - "It is extremely crucial to share the vision with all employees" for the unity of direction (e.g. Boat Sailing). - Telling other actors like industry about SQU vision will help to work together more efficiently (e.g. of breaking sticks). - By sharing the same vision competitiveness will be higher. The ranking of SQU will be higher (more research funding, more projects, and skilled student). - "open days", more interactions, social gathering, and involving every single employee all these can help in ensuring shared vision inside and outside SQU
<p>OUR7</p>	<ul style="list-style-type: none"> - Professionally, it shouldn't matter but actually it does. Makes things easier, strengthen the 	<ul style="list-style-type: none"> - Trust is very important; everyone can do their job without surveillance, having 	<ul style="list-style-type: none"> - SQU is not doing a good job in sharing its vision, values and goals ... "that is a bad

	<p>relationships, and facilitates the work, and impacts innovation and technological readiness.</p> <ul style="list-style-type: none"> - Good connections with outsiders can help SQU in getting approvals and implement projects but it doesn't doing a good job in this field. 	<p>spaces for innovation, getting new ideas, more productivity.</p> <ul style="list-style-type: none"> - Trust is a platform where collaboration is based. - having a clear vision and objectives, a clear strategy, good election of employees ... a continue ability system .. more interaction between employees ... result in TRUST. 	<p>thing".</p> <ul style="list-style-type: none"> - sharing the same vision ensures that all employees are looking toward a specific point, improve the productivity of the organization as well as innovation, higher education and training. - Between the both sides, vision is well shared because they know what they want from the other and what they will give. - Successful organizations usually base their vision in each corner of the organization so the employee remembers it, SQU has to sit together with employees, communicate, discuss and agree on their shared goals.
<p>OUR8</p>	<ul style="list-style-type: none"> - knowing people can facilitate the work done, breaks barriers, reduce hesitation, impacts (innovation, higher educations and other areas), promote education and learning of a country. - SQU is an important part of the society, such interaction helps it to know the society's needs, and in shaping its education and directs its staff to serve the society. - SQU is doing well, it is forming committees with government and private sector, interaction is at personal and university level. - Need more meetings, joint workshops, and organizing open days between SQU and actors. 	<ul style="list-style-type: none"> - Trust among people is very important aspect, put value to your work, improve productivity, and helps to accomplish tasks. - Trust among organization is also important, if no trust on SQU, other organizations will seek help from outside the country. - By showing and telling others about SQU knowledge and products, historical and past joint projects SQU can obtain more trustworthiness. 	<ul style="list-style-type: none"> - Shared vision means that all employees are focusing on the real goal of the organization, fasten the productivity and accomplishment, this will strongly impact innovation in Oman. - "It happens rarely and mostly at the first meeting only and that what makes parties lost sometimes". - Putting a clear banner in SQU website, giving presentations, putting it in social media's accounts.

Appendix E: UTN – Government Relationship (Rafaela, Argentina)

		Social Capital Dimensiones	
	Structural – (Social Interaction)	Relational – (Trust)	Cognitive – (Shared visión)
AGR1	<p>- The government creates the Universities Council. All universities and government meet there every month to discuss different issues. So, communication between the universities themselves and between them and the government.</p> <p>- There are formal relationship “e.g. with the minister” and non-structured relationships with other universities and departments.</p> <p>- University contributes by new ideas and act as a big consultancy firm.</p> <p>- University benefit by getting resources and ideas about reality things.</p> <p>- Impacts cannot be measured but university must be very sensitive about the new changes in order to respond to the government needs.</p> <p>- One of the main weaknesses is the slow response of the university to the government requirements because faculty is busy with other responsibilities as well as because of the university bureaucratic system and culture different “time”. This can be improved by having a better dialogue between the university system and the political system.</p> <p>- More time is needed to have the relationship more mature and to configure this relationship better.</p> <p>- They have the Committee of Universities of</p>	<p>- Trust is very critical when interacting with the university.</p> <p>- “Trust is one of the main and critical elements to make relationships more efficient” because it brings down the transaction cost, reduce doubts, lower disagreements, more capability to accept mistake and more abilities to solve problems.</p> <p>- The level of Transparency is important to ensure the trust.</p> <p>- Fulfilling promises and be consistent in what you are saying in public and private, and sharing the results.</p> <p>- “Above all, trust can be build when building a shared vision”.</p>	<p>- Not yet building a shared vision, it needs higher level to build the shared vision at the strategic level.</p>
AGR2	<p>- They have the Committee of Universities of</p>	<p>- The grade of trust is very high in their</p>	<p>- Based on the experience, there are</p>

<p>AGR3</p>	<p>- There is no a pre-established schedule for meetings and no formal committee but having</p>	<p>- “Trust is crucial because an articulation and dialogue process demands high levels of</p>	<p>share vision and common objectives. - We have a permanent relation with the university which related to many problems of the city like the water supply and the design of the sewage system. - University should help companies to solve problems. - Even though the decision of what to research is private for the researchers, we need their help to solve different problems, so that innovation and competitiveness of the city can be improved and promoted. - We trust each other, we share history, but we just need resources. “It is important to constantly build this culture of interacting” . - One issue is the time of university which is different to those of private companies, so more dialogue and interaction is required because we need to maintain this culture. - University should give more attentions to the external problems in its environment and not only to its internal problems, degrees and educational levels. - It is necessary to be clear in the areas of actions of each participant</p>
<p>Rafaela; they meet once a month formally. All universities and HEIs meet with a representative from the City Hall to discuss different shared issues. CUR also a place for universities to meet together as well as with other institutions. - Two big contributions are expected from the university, Knowledge and training e.g. for technical assistance. University can benefit when their students participating in daily projects and have relations with the practice and everyday work, generating new knowledge by interacting. - Such relationships definitely impact competitiveness positively. Providing highly/trained employees locally for the industry, producing local professionals and knowledge of the city, and contribute and support with the City Hall’s programs.</p>	<p>relationships and social capital is important for all actors. - The importance of the graduates’ feedback of those who are working in the city is recognized by the government official. This is a capital for the university. - There is a natural relation because of talking to former partner of study or because you know them before. - Trust is at all level, we trust the local university e.g to solve problems, we trust the high performance of their companies, and we trust the young people who work in the local companies and look for innovations. - The university has worked a lot and has done a lot for the competitiveness and innovation. “Examples” . - The young professionals have been working in an open and natural relation between their universities, the government, companies, and other actors. “They were born in this culture; it is part of their DNA” .</p>	<p>relationships and social capital is important for all actors. - The importance of the graduates’ feedback of those who are working in the city is recognized by the government official. This is a capital for the university. - There is a natural relation because of talking to former partner of study or because you know them before. - Trust is at all level, we trust the local university e.g to solve problems, we trust the high performance of their companies, and we trust the young people who work in the local companies and look for innovations. - The university has worked a lot and has done a lot for the competitiveness and innovation. “Examples” . - The young professionals have been working in an open and natural relation between their universities, the government, companies, and other actors. “They were born in this culture; it is part of their DNA” .</p>	<p>share vision and common objectives. - We have a permanent relation with the university which related to many problems of the city like the water supply and the design of the sewage system. - University should help companies to solve problems. - Even though the decision of what to research is private for the researchers, we need their help to solve different problems, so that innovation and competitiveness of the city can be improved and promoted. - We trust each other, we share history, but we just need resources. “It is important to constantly build this culture of interacting” . - One issue is the time of university which is different to those of private companies, so more dialogue and interaction is required because we need to maintain this culture. - University should give more attentions to the external problems in its environment and not only to its internal problems, degrees and educational levels. - It is necessary to be clear in the areas of actions of each participant</p>

	<p>different and specific projects for the productive area; entrepreneurship and higher employability.</p> <ul style="list-style-type: none"> - The City Hall works as a facilitator to link the universities and companies, and it's the one who leads and promotes these meetings through specific policies for specific projects. - Development Agency includes the universities, companies, and the City Hall. - Much is expected from the university. "Rafaela is becoming a university city". Working with teachers and students to make their professional practice in real cases, the themes of students' thesis should be related to the city necessities and requirements. - Organize meetings between students and other actors to explain some real problems which need to be investigated by the university researchers, so all participants will get more knowledge. - University can benefit by having practical experience for its academics and students, adaptations to its curriculums, research about real situations, and more participation in the development. - University can positively impact the competitiveness. through the collaboration with companies in innovation, technological demand and design require. - Even though we have a dialogue culture, more things can be done. University must get more involved with the dialogue and development by identifying the demands and propose courses of actions through research and technical assistance. 	<p>trust".</p> <ul style="list-style-type: none"> - It is an intangible characteristic that is fundamental. It can help in gathering information, respecting agreements, and attending to an idea of integral development. - It is fundamental to continue the relationships between the different actors. - It takes more time and it can be built over and over again, but having some agreements and trusting each other will surely result in more solid in the development policies. - It is not simple because each actor has own positions and interest but having culture and spaces for dialogue can simplify building it. <p>"Our local policy is based on a constant possibility for dialogue. All the actors know it clearly ... we always reach an agreement because the needs of the territory are more important than our personal interests".</p> <ul style="list-style-type: none"> - Trust is a key factor to participate in a collective strategy. Someone who does not trust these institutions cannot be part of this project. If we do not trust each other, conflict appears and delays the whole process. - Trust can be generated by bringing participation to all the actors, generating a democratic dialogue, respecting the agreements, getting formal agreements with clear contributions from each institution. 	<p>because such thing will result in an agreement between the participants and more commitment will be there.</p> <ul style="list-style-type: none"> - Having relationships in several projects promotes trust and thus ready for new challenges. - More commitment is required to deal and develop complex projects. - "I am not sure if you can always rely on the commitment of the different institution, but you can formalize the agreements, put them on papers". <p>Such action can generate more commitment.</p> <ul style="list-style-type: none"> - "IN Rafaela we have a dialogue culture and respect for the agreements, but it is convenient to draft a nice proposal to formalize them".
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	<p>- Some universities are open and always looking for building relationships with other actors but there are other universities with which building such relationships are more difficult.</p>		
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Appendix F: UTN – Industry Relationship (Rafaela, Argentina)

Social Capital Dimensiones			
	Structural – (Social Interaction)	Relational – (Trust)	Cognitive – (Shared vision)
AIR-1	<ul style="list-style-type: none"> - There is a difference between dealing with public and private sectors. In the public sector, most of the time dealing with one department but in the private sector very diverse, some firms have little contacts, other no contacts, and some with many contacts with the university. - Some time the university approaches the firm and in some cases the firm approaches the university for collaboration. - Firms are interpreting the role of university as a consultancy (e.g. measurements projects). - University can benefit by learning about the reality, access to student training, and access to more fund. - Long-term and short-term collaboration are both important to build coherent and strong collaboration. - University must create spaces for dialogue; marketing should be part of a bigger. - There is an offer problem in what the university is offering and in how it offering that things. <p>Demand problem, industry is focusing on their daily work and on short term objectives. NEED DIALOGUE to change the two problems.</p>	<ul style="list-style-type: none"> - Doing and evaluating, doing and evaluating process is very important but is must be facilitated. - All actors should understand the process and market will not do it, instead individuals and organizations should do that. 	<ul style="list-style-type: none"> - A very big sick shared vision. - University can help firms to be more competitive but the interpretations are different. - To know what competitiveness area, we need contact. - Facilitators are important and this all can impact the competitiveness.
AIR-2	<ul style="list-style-type: none"> - There is no a stable committee but only specific projects, e.g. with City Hall in waste management or with the university in training and employment 	<ul style="list-style-type: none"> - Trust is a fundamental concept and all actors need to trust each other. - Trust is having honest human relations 	<ul style="list-style-type: none"> - It is very important to share objectives and to make them clear to enable all participants to work in achieving them. In

	<p>courses.</p> <ul style="list-style-type: none"> - Relationships include the study of some companies' necessities, training programs, organizing student visits to some local companies, and having specific programs like in information systems. - The university produces knowledge and a lot is expected from it. - University benefits by the possibility to apply in practical the theoretical knowledge which the students learn in the classroom. It helps to mix theory and practice. - Companies must innovate to cope with the changes but they do not have all resources and knowledge. So, university can help them. It is strategic. - One of the weaknesses is the shortage of institutionalization of these spaces; we should work on calendar with clear objectives and deadlines. - Lack of a systematic structure of this relation between the city hall (government), companies, and the university. 	<p>and being able to see-through them and it is an important part in a professional, academic or business context. It is mandatory as well.</p> <ul style="list-style-type: none"> - "without trust there is no relationship, but you need both aspects; human and professional trust. Having only one of them is not enough". - Based on the respondent's feedback, there is a good level of trust in Rafaela. All participants know each other and they have long lasting reliable relationship between them. So, things are clearer and faster. - Trust is fundamental to start a relationship but it is not enough, there must be common objectives, all should work together, participate in joint researches, share knowledge, and generate new things. - Trust can be built by reaching objectives and every participant has to do their best to be able to do this. All should use the available necessary resources and share the achievements. - Based on the respondent's experience, trust is exist on university but for others (business owners) who were not a student or member at that university have a question; What can a young professional know about the reality of our business?. It 	<p>that way, it is easy to soften disagreements, ideological, practical and operative differences. Obstacles should not appear.</p> <ul style="list-style-type: none"> - The more common and shared objectives are, the easier it becomes to work towards them. (EXAMPLE of the Strategic Plan of Rafaela). - When you have clear strategic plan with clear shared objectives and when the government shares such strategic plan with both public and private actors, it will be easy to communicate and discuss things with them (Dr. Abdullah Al Mahruqi_ Oman case study). Thus, commitments, agreements and solid base can be achieved and generated in very fast.
AIR-3	<ul style="list-style-type: none"> - Meeting once a month in the Commercial Centre and work in specific objectives. - Companies expect to have answers and exchange knowledge with other actors. - The students can see the reality and assimilate the theory. 		<ul style="list-style-type: none"> - According to the respondents, 50% are shared and this is good because five years back, it was 20% only. We are in the path of more interaction. Nowadays it is much better compared with five years ago. - It is very positive, more joined and

	<p>- It impacts on the productive development of a company and it is always positive. Not only external or local competitiveness but internal, in the improvement of production.</p> <p>- We are in the right path, the interaction between universities and companies are for the economic development.</p> <p>- Weakness: Almost 80% are small companies in Rafaela and some ideas are good for big companies and not for small companies. Sometimes, it is very difficult to apply some theories to small businesses.</p> <p>- We are just starting in interacting with universities and other companies through the City Hall, and this, years ago, was completely unimaginable.</p>	<p>is necessary to change such way of thinking.</p> <p>- It is not so easy to trust. Sometimes, you need to see results to trust.</p> <p>- Increasing the level of trust helps a lot to improve competitiveness and innovation. Commitment and trust are important for continuing joint projects and to improve the relationship between students and businessmen.</p> <p>- More trust is required between the different participants. That is what we are lacking: this committee would be great with convinced people in business and university. Talking and negotiating between the actors or participants are required to increase the level of trust.</p>	<p>developing projects are required from a common committee, it would make it easier to share that vision. It is a suggestion not critic because we are somehow doing that now.</p> <p>- Interacting with other actors is better. Businessmen have some good ideas but they need support because it is much more difficult to do it alone. Interactions and discussion must take place with other actors like the university to have common things.</p> <p>- Sometime, the proposed projects are good for companies but not for other actors like the university, and also some proposed projects are good for university and not for companies, so such projects must be built in a way which benefit all participants including university and companies to ensure the shared and common vision and objectives.</p> <p>- A commission or committee with other business owners should be established to work on the above idea. This will help us to improve the competitiveness of our companies.</p>
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Appendix G: Intra-UTN Relationship - Rafaela, Argentina

Social Capital Dimensiones			
	Structural – (Social Interaction)	Relational – (Trust)	Cognitive – (Shared visión)
AUR-1	<ul style="list-style-type: none"> - It is very important to know people at a personal level from inside and outside the university. Easier to contact and talk, and faster access to information. - Personal interactions strengthen the university relationships (same as Oman). - “The university sometimes tells others what to do but it does the same thin inside quite badly, it is not coordinated, very little innovation capability, many daily issues. University has to change”. - The university should improve itself and correct the above areas. The university cannot be part of the new model if people not change inside the university. - “The university should put a pump inside and start from scratch again”. It must change!!! 	<ul style="list-style-type: none"> - Trust is very important - Both individuals and organizations should work for that. - Common spaces are important to build shared trust and vision. - Other social activities can be done by individuals, department, and university’s top management. - “In my university, we go out to Drink MATEH or Eat outside as part of social activities. - More informal interactions are required, the university should do more social activities to build trust and people can come closer. 	<ul style="list-style-type: none"> - There is no shared vision and if there is, it will be very basic. - Different interpretations about the vision. -- There are spaces for people to feel comfortable and very strong ..., - They have a shared vision to be close to the productive sector but each department has different interpretations about what does this mean!!!! - The respondent thinks that many employees do not know what the university’s vision is. - By facilitating the processes and by giving more attention to the informal relationships.
AUR-2	<ul style="list-style-type: none"> - There are different relationships between the university and government, companies, and City Hall. There are degrees that started because of the requirements of the industries and the government ... it is clear relationship. - A lot of benefits; from companies: to do practices, to visit them, to do exercises there, and to investigate. From government: help teaching in programs. 	<ul style="list-style-type: none"> - Trust is very important because all the relational aspects are based on trust, on knowing each other, in the recognition, in the value of what people do, and based on that, we are building our projects. - One of the problems that could happen is the change of authorities; change of people could make us lose some of the relationships (EXAMPLE). - The relation of trust lets you know your 	<ul style="list-style-type: none"> - Very good. It is difficult in a big organization, with so many areas, to share points of views. - “It is important to pay attention to the political change in the university, because it could affect the trust, which took so many years to be built. All these efforts could be lost from one day to the other”. - Sharing values and goals are important to improve the relationships and to reach

	<p>- The creation of knowledge is important because we train engineers. We have a permanent demand of graduates.</p> <p>- We should work more on the shaping aspects that the environment is demanding, offering postgraduate courses, training, for example, computing engineering with a postgraduate course in robotics or mechatronic, which is a new contribution to what the university already offers. We should work in that direction.</p>	<p>partner inside the project. The problem could appear if the person changes, if there is another person, this could change the model of the university.</p> <p>- Working more means generating more projects to work together and with more interrelationships. EXAMPLE, RAFAELA PLAN 2020.</p> <p>- It impacts directly, if you need to think in innovation with people that you do not know, first you have to build the whole relation, a high level of trust, and then start to work in projects.</p>	<p>the objectives of improvement, of a high-quality education and the improvement of the innovation system. "I believe that to work together in different projects that have a similar point of view of the development is fundamental".</p> <p>- "Yes of course, it is good to share! It is an added of value to the things we are doing in each institution. And a plus for the actions we do together with the common objective of innovation, excellence, growth, quality generates development". EXAMPLE.</p> <p>- Sometimes in the institutions there are internal problems that make things difficult. The Universities, being public organizations with a political character, with elective direction and political management sometimes make things difficult to solve.</p> <p>- EXAMPLE, We have elections and change of authorities every four years. We need a political construction with the new management, the working idea, and the goals for the university. Without that political building we cannot have the university we want. Sometimes appear opposite groups that have a different look and that is an obstacle for the things that we are doing.</p> <p>- "We are sharing the things that we want</p>
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<p>AUR-3</p>	<p>- "It is very important". "It creates a richer dialogue". If you go to one place where do not know the people, first you need some time to get to know them, to interpret them and then you feel more comfortable to work with them. EXAMPLE. - The benefits come from interacting, taking up a space - a simple actor, an important actor, a leader of the project - you are part of this space where you can have different roles and this constant change is important. - "A lot. It can give a lot" e.g. as a source of human resources. So it is very important what the university can give, not only for the city hall but for the companies as well. - "We need to oil the mechanics of this committee. We need to meet more often to discuss the different issues more frequently".</p>	<p>- "Trust is important in all aspects". Technical things can be solved. It depends on the people involved and there comes the issue of trust. Sometimes projects cannot be continued because of the low level of trust between the participants. It is not easy to develop the trust. - Trust is the first thing which must be built when building a team and to share activities with other institutions in any field of work. Thereafter, you can define what each participant should do in that project. - "The trustworthiness increases with the continuity and with the exercise". "I am not sure if there is a tool for building trust, it is something that takes time and continuity". Sometimes when the conversation or the institutions change, that goes against continuity. EXAMPLE. - There are personal trust and institutional trust which represent the total trust. The institutions have their own trustworthiness and the people who are representing them have their own way of</p>	<p>to improve. The competitiveness, the innovations that we want to achieve by working together are for the city, the university and the companies, for the city hall, and for people in general that live in Rafaela".</p> <p>- It gives you a space and a common thinking that let you avoid some discussions (EXAm). - If you sit to discuss some theme and you already have the agreement in the goals, the objectives, the vision of that space, it let you save a lot of time. - It's very involved with the time, the presence, and the participation. (GOOD EXAMPLE) (I always tried...). - It's easier to share visions, goals and objectives in an only organization, you have your own plans, people who work with you. Now we're talking about a through inter institutional workshops. - "The Plan Rafaela 2020 is a tool for this, it gives you not all the vision but sure objectives and it makes it easier things because it's a collective construction". - More complex in public institution which is democratic and participative. "I can take up a space, to give my opinion, but in some decisions I need support. So it could be slower to share the vision and the goals".</p>
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