The Social Construction of Product Innovation:
The Role of Status and Social Capital

By

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I hereby declare that this thesis is my own work, and it has not been previously submitted to any other university for any type of academic degree or award. All other sources of knowledge, other than my own, are fully acknowledged.

Ebrahim Shariatzadeh

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Abstract

This Research investigates the origins of innovation from a social perspective. It identifies status and social capital as two constructs that could elucidate the social construction of innovation. Drawing on the expectation states theory, signalling mechanism of status, three-dimensional conceptualisation of social capital, and the network model of innovation, this thesis develops theoretical frameworks, in which the effect of status on innovation is theorised through the mediating role of social capital dimensions.

Following a social network analysis research design, the proposed models are tested in an empirical study. Relational data is collected from 121 individuals, and analysed through mediation analysis in PROCESS macro. The results show strong evidence that three dimensions of social capital both independently and collectively mediate the effect of status on innovation. The findings illustrate how and to what extent different perceptions regarding the social rankings of the actors could end up influencing their innovative contribution, through affecting their social network, and thereby regulating the access to the socially available resources.

The outcomes contribute to the literature by advancing the understanding regarding its social origins of innovation. The empirical evidence indicate that the social antecedents of innovation are not limited to the social interactions, but they have much deeper roots into individuals’ social attributes, namely perceived status. Moreover, the mediating role of social capital dimensions offers an explanation on how perceived status of individuals could influence their contribution to product innovation.
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1 Introduction and Theoretical Premises

1.1 Introduction

The origins of innovation in organisations have long been of focal concern to business scholars. Knowledge is widely recognised as the main cornerstone of innovation (Nonaka 1991, Leonard-Barton 1995, Tsai 2001). In addition to the formal sources of knowledge, social and informal interactions between actors foster exchange of knowledge across organisational settings. Unlike explicit forms of knowledge that could be documented and exchanged through formal channels of communications, tacit knowledge is embedded within the minds, behaviours and routines, and can be acquired through socialisation (Szulanski 1996, Nonaka and Takeuchi 1995). Actors tend to attain knowledge resources from their social interactions, and employ the acquired knowledge to create innovative products (Tsai and Ghoshal 1998). However, the amount of available resources varies according to the characteristics of their social network (Burt 1987, 2004). This study aims to theorise and examine the social construction of innovation, through investigating the role of social networks.

The recent wave of innovation studies highlights the importance of networks on the creation and development of innovative ideas (Tsai 2001, Phelps 2010, Dhanaraj and Parkhe 2006). Social interactions amongst actors lead to the exchange of knowledge and expertise, and thereby trigger the conception of new ideas (Nonaka 1994). Social networks exhibit the pattern of social ties amongst actors, and demonstrate the opportunities and constraints that are concomitant with any network position (Burt 1992, Scott and Carrington 2011). In particular, they can determine the pattern of resource flow and the accessibility of the said resources to each actor.

The aggregate of resources that are available through social networks is
characterised as *social capital* (Nahapiet and Ghoshal 1997, Putnam 1993, Nan Lin 2001, Adler and Kwon 2002). Social capital is often conceptualised as a three-dimensional construct, comprising of structural, relational and cognitive dimensions (Nahapiet and Ghoshal 1997, 1998). The dimensions of social capital independently and collectively are responsible for the accrual of socially accessible resources (i.e. knowledge). The position that actors occupy within the structure of social networks is associated with the exposure to other knowledge stocks (Tsai 2001, Burt 2005); the nature of relationship between structurally connected actors is theorised to affect the quality of exchanged knowledge (Levin and Cross 2004, Uzzi 1997), and finally shared cognitive values could ensure the usefulness of the exchanged knowledge and reduce knowledge ambiguity (Inkpen and Tsang 2005, Simonin 1999).

Social capital theory suggests that the sources of innovation must be sought in social networks, and particularly in their capacity for delivering the socially available knowledge (McFadyen and Cannella Jr. 2004, Tsai and Ghoshal 1998). By emphasising on the role of social interactions in the acquisition and creation of knowledge, social capital builds the first step towards understanding the social origins of innovation. While, introduction of social capital could certainly contribute to the continuous debate on the antecedents of innovation, it could raise equally important questions. Why do some actors have higher social capital than others? What are the origins of social capital?

The answers to these questions could be key in understanding the social origins of innovation. Nevertheless, little research has been carried out in this area. While the potential impact of social interactions as the conduits of knowledge exchange and innovation has been profusely studied (Gupta and Govindarajan 2000, Nonaka and Takeuchi 1995, Miller, Fern and Cardinal 2007), the deeper origins of innovation remain rather unknown. To find an answer to the alluded questions is the original motive for conducting this research.
Based on an extensive and thorough review of the sociology and social psychology literature, I identified status as the concept that could potentially provide an answer to the posed questions. Status is defined as an actor's “position in a stratified social hierarchy” (Smith, Menon, and Thompson 2012: 67). To be more accurate, “status creates a perception of actor's location in hierarchy which shapes others’ expectation and actions towards the actors” (Podolny 2005:11). Two key attributes are embedded within these statements. First, status is interpreted as the subjective ranking that actors hold within the social pecking order. Actors who are perceived to belong to the higher casts of the social hierarchy are tagged as high status (Gould 2002). Second, actors adjust their behaviours according to the perceived status of their interacting actor (Berger et al. 1977, 1985). Thus, actors tend to be treated differently, in accordance to their perceived status. This characterisation suggests status as a construct with the ability of affecting actors' behaviour in a social network. Status could not only become influential in the formation of social ties (Stuart 2000), but also it could possibly impact the dynamics of the social ties (Podolny and Page 1998), and thereby it could affect social capital.

This study traces back the social antecedents of innovation, first to social capital, and then to perceived status. It integrates these two relationships into an overarching pathway that epitomises the social construction of innovation. It theorises status as the distal antecedent of innovation. First, it hypothesises that a direct relationship between status and innovation is theoretically justified, and then attempts to explain their relationship by suggesting a mediating role for social capital dimensions. To summarise, this study aims to examine how and to what extent could the three dimensions of social capital explain the potential effect of status on innovation.
1.2 Theoretical Backgrounds

Innovation has always been an important area of academic research. A plethora of studies have been conducted to understand the antecedents of innovation from a psychological viewpoint (e.g. Damanpour 1991, West 1987, Amabile 1983, Cohen and Levinthal 1990, Scott and Bruce 1994). However, there have not been many studies that investigate the social origins of innovation within multinational organisations. While scholars have theorised the importance of social interactions on knowledge acquisition, knowledge creation and innovation diffusion (Nonaka and Takeuchi 1995), they have not taken a step deeper to explore the roots and enablers of social ties. The current innovation studies go often as far as theorising how specific aspects of social network affect the extent of knowledge exchange (Li 2005, Tsai and Ghoshal 1998, Reagans and McEvily 2003). Thus, they do not offer any explanation on the causes of social capital dissimilarities between actors.

The majority of these studies follow a structuralist viewpoint, and conceptualise position of actors in organisational social network as the direct determinant of their access to organisational knowledge repositories (Burt 2005, Tsai 2001, Lin 2001). In other words, they do not theorise social capital, but rather its structural dimension as the antecedent of innovation. This stream of studies builds on the premise that exposure to sources of knowledge is the vital precursor of innovation. Hence, they assign value to different network positions and argue that actors who occupy the most valuable positions are the most likely candidates to secure knowledge and be more innovative (Ahuja 2000, Coleman 1988, Burt 1992). Depending on the nature and objectives of the study, they employ different measures of network centrality to rank actors according to their position within the social network. These studies overlook the fact that although existence of social ties is the essential prerequisite for exchange of knowledge, being structurally connected to other actors does not necessarily
guarantee an access to their knowledge stock (Hansen 1999).

Not all social ties are the same in terms of ability to support knowledge exchange. The volume and quality of the knowledge that can be acquired through social ties depend on the nature and quality of the relationship between actors (Levin and Cross 2004). These considerations have provoked the interests of some academics to study the effect of relational dimension of social capital on innovation. Trust and tie strength have been largely suggested as the determinants of relational dimension of social capital (Nahapiet and Ghoshal 1997, Tsai and Ghoshal 1998, Tortoriello and Krackhardt 2010). While scholars advocate the positive effect of trust on the quality of social ties, they voice dichotomised opinions regarding the potential impact of tie strength. The mainstream body of literature associates strong ties with higher volume of knowledge exchange (Krackhardt 1992, Tortoriello, Reagans, and McEvily 2012, Tortoriello and Krackhardt 2010), however other studies have shown unequivocal evidence to support the role of weak ties as sources of unique and exclusive knowledge that can lead to innovations (Granovetter 1973, Levin and Cross 2004, Hansen 1999, Hauser, Tappeiner and Walde 2007).

The potential effect of the cognitive dimension of social capital on innovation has been largely left unnoticed in the literature. Although, there have been few studies that theorised the impact of shared goals, norms and culture on knowledge exchange (Inkpen and Tsang 2005, Bunderson and Reagans 2011, Li 2005), there are limited empirical evidence that supports those theories. One of the reasons for lack of empirical evidence may be the elusive nature of cognitive dimension, which makes it difficult to be measured objectively.

While business scholars are primarily interested in the influence of social capital on innovation, the impact of status on social capital and innovation remains within the territory of social sciences. Early status literature concentrates chiefly
on the effect of status on power and social stratifications of actors within societies (Weber 1948, Blau 1955, Bourdieu 1979). In this viewpoint, status disposition of an actor shapes the power structure of the network and determines the level of access to the resources.

Over the last two decades, another stream of status studies have gained momentum within social sciences. Organisational sociologists have expanded the status studies. Drawing upon expectation states theory (Berger et al. 1977), they theorised status as a signal of competence and quality (Podolny 1993, 2005, Correll et al. 2011), which could affect the expected performance of the actor. Although, scholars have not clearly linked this theory to social capital or innovation, it could offer solid theoretical background to explain the social antecedents of social capital and innovation.

In this view, actors who occupy advantageous social positions are expected to demonstrate stronger performance (Stuart 2000, Flynn and Amanatullah 2012). Such expectations make high status actors appealing candidates for partnership. As a result, they are more likely to be approached by other actors for establishing social ties (Cook et al. 2013, Podolny and Page 1998). Moreover, high status actors can exert their perceived popularity as a motivational tool to form their favourable social ties. Hence, the expectation of competence that emanates from perceived status could affect the structure of social network (Chung, Singh, and Lee 2000, Stuart 2000). Moreover, these expectations could potentially affect the relational dimension of social capital through precipitating the process of trust and respect. High status actors are expected to demonstrate high quality (Correll and Ridgeway 2006). Such expectations could create a feeling of assurance and reliability where there are no other signals of trustworthiness (Anderson et al. 2006, Podolny 2005). Finally, the linkage between status and cognitive dimension of social capital can be sought in the role of high status actors as the leaders or trendsetters. The expected performance of high status actors leads to
the dominance of their norms and values (Rao et al. 2003, Simmons and Elkins 2004). Isomorphism theory (DiMaggio and Powell 1983) and social identity theory (Tajfel 1978) are amongst the theories that explain how the values and behaviours of high status actors tend to spread across social networks and become popular.

These arguments inherently link status to all dimensions of social capital, and by extension innovation. Although, the initial high expectations are often based on unmerited judgements, they trigger a chain of actions that lead to a self-fulfilling prophecy (Merton 1968), which reinforces the dominance of high status actors and potentially rewards them with larger share of resources, more recognition and stronger performance. In essence, high expectation associated to the high status actors leads other actors to “change their behaviour toward the focal individual to fulfil their inflated expectation of her performance” (Flynn and Amanatullah 2012:401).

This introduction further accentuates that seeking the social origins of innovation in status and social capital can be theoretically justified. This short introduction provided sufficient theoretical accounts to support that the social construction of innovation based on status and social capital is feasible. However, the literature that addresses the social antecedents of innovation is highly fragmented. To my knowledge, there are not many studies that investigate the origins of innovation from the standpoint of social attributes. More specifically, a potential link between status, social capital and innovation has never been suggested within a single research framework. Social origins of innovation is partly studied under sociology and social psychology disciplines, and partly investigated within international business field. Lack of a holistic research, which links these two fragments together, is evident. There is a need for an all-embracing study that brings the theories of status and social capital from sociology literature into the business discipline, develops relevant
hypotheses, tests the implications of those theories in organisational settings, and finally integrates them into the body of innovation literature in order to offer a fresh perspective of innovation creation process within organisation.

1.3 Research Objectives and Questions

The main objective of this study is to explain the social origins of innovation. This research suggests status and social capital as two antecedents of innovation. It aspires to theorise and test the potential effects of status on innovation through introducing the concept of social capital as the mediator variable. This thesis attempts to advance our understanding on the social construction of innovation by uncovering how social capital can fill the conceptual gap between status and innovation, and thereby explain their relationship.

This study primarily contributes to innovation literature by furthering the network model of innovation and seeking the social roots of innovation in status disposition and social capital. It desires to offer an alternative perspective on the precursors of innovation by emphasising on the mediating role of social capital in the effect of status on innovation. Moreover, this research aims to contribute to the status literature by broadening its implications, and theorising status as the antecedent of social capital and more importantly innovation. In essence, the ultimate contribution of this research is to offer a picture that depicts how an innate human need to pass judgements on the social ranking of others (Gould 2002, Berger et al. 1977) can influence the dynamics of social interactions and ultimately innovative outcome.

The following questions summarise the goals and objectives of this thesis:

I. How do status and social capital affect innovation?

II. To what extent do status and social capital affect innovation?
   a. To what extent does status affect social capital?
b. To what extent does social capital affect innovation?

1.4 Empirical Study

This thesis follows a quantitative methodology to test proposed hypotheses and to measure the effect of status and social capital on innovation. In order to identify the fitting research design, it is essential to take some considerations into account. A social network view of the organisations is the central premise of this study. Investigating the social origins of innovation is only possible in the context of social networks. Status and social capital as two suggested antecedents of innovation are deeply rooted in the social networks, and would not exist otherwise (Gould 2002). Measuring three dimensions of social capital requires accurate mapping of the social network, and quantification of the ties between all actors, which entails collection of relational data (Tsai and Ghoshal 1998). Furthermore, status is constructed based on the judgment of actors regarding the position of a focal actor within social hierarchy (Podolny 1993, 2005). Therefore, status can be captured only through gathering those judgements and perceptions, making it a relational construct as well. Based on this discussion, this study opts for a social network analysis research design.

This empirical study focuses on the social network of individual actors within the boundary of one multinational enterprise (MNE). MNEs are the pioneers of innovation in the current business environment. They retain large volumes of knowledge and have the necessary capabilities to outperform any other type of organisations. Thus, they provide the most appropriate context for conducting an innovation study. Furthermore, selecting individuals as the units of analysis is pertinent to the objectives of this research. While the interactions between organisations in strategic alliances is often formal, and based on the exchange of
explicit knowledge (Chung, Singh and Lee 2000), examining the collaboration between colleagues in one organisation offers a more relevant pathway towards understanding the social roots of innovation. Status is a notion that resides within the minds of the people, therefore it is logical to avoid high-level analysis and focus on the network of individuals. This selection could be doubly beneficial, due to the fact that business literature is predominantly focused on measuring the innovative outcome in a business unit or organisational level, and shows less attention towards the contribution of individuals in innovations. Hence, an individual level of analysis could empirically contribute to the body of business literature as well.

To provide a robust analysis of the theoretical framework, this study primarily applies mediational analysis using PROCESS macro in SPSS (Hayes 2012). This method of data analysis is suitable to test the linkages between status, social capital and innovation. Both simple and multiple mediation tests are conducted in order to measure the mediating effect of three dimensions of social capital independently and collectively. This approach enables us to understand to what extent each dimension of social capital explains the potential effect of status on innovation. Furthermore, due to the relational nature of the collected data, and potential autocorrelations between the constructs, I conduct a supplementary data analysis using multiple regression quadratic assignment procedure (MRQAP) in UCINET VI (Krackhardt 1988). The results of this analysis could corroborate the robustness of the mediation analysis.

1.5 Thesis Structure

The thesis is structured as follows:

The first chapter of this research has presented an introduction to the thesis. It has offered a theoretical background on innovation and its social origins within current literature. Through identifying the theoretical and empirical gaps, it has
set certain goals and objectives that can contribute to both theory and practice. Relevant research questions have been posed accordingly, and suitable research design and methodology have been proposed. Finally, it presents an overall structure of the thesis, which delineates the direction of the research and shed light on the upcoming chapters.

The 2nd chapter is devoted to the literature review on the underlying constructs of this study. It begins with reviewing innovation literature. It discusses innovation typology and examines different models of innovation in organisations. It pinpoints the role of knowledge and network model as the key to understand the social roots of innovation. Chapter two follows by entering the sociology and social psychology realm in order to review the status literature. Different theories regarding status creation and propagation are discussed, and its implications on innovation are fully examined. Finally, chapter two presents an elaborate discussion regarding social networks and social capital. Three dimensions of social capital, their characteristics and implications are discussed in length. Moreover, chapter two scrutinises the noteworthy studies that have examined the interrelations between any pair of these three constructs, in order to build the underpinnings that determine the direction of the forthcoming hypotheses.

Chapter 3 aims to develop hypotheses that theorise the nature of relationship between status, social capital and innovation through an analytical discussion of the literature. Thus, three groups of hypotheses are proposed. The first group addresses the potential influence of status on social capital. The second set of hypotheses theorises how social capital can affect innovation. Finally, the third group of hypotheses focuses on the relationship between status and innovation by suggesting a mediating role for social capital dimensions.

Chapter 4 is dedicated to the research methodology. In accordance to the
research objectives and the proposed hypotheses, this chapter identifies the fitting methodology for conducting this research. First, the suitable research philosophy and approach are discussed. Then, it follows with the empirical research design including the data collection methods, sampling techniques, empirical study selection criteria and questionnaire design. In order to quantify the constructs, different measures are compared and the appropriate measures are suggested. This chapter continues with the introduction of the empirical study. All steps of research preparation and execution are discussed in details. Chapter four concludes with the introduction to mediational analysis, and social network analysis as the preferred data analysis methods, and PROCESS SPSS macro and UCINET VI as the selected data analysis software.

Chapter 5 is devoted to the data analysis and the presentation of the results. The collected data are screened, prepared and cleansed for the data analysis. Different measures are calculated and the results are presented in descriptive statistical analysis. The proposed hypotheses are tested according to the each research model. The results of the data analysis demonstrate whether the suggested hypotheses were valid.

Chapter 6 aims to offer convincing justifications of the results. The linkages between each pair of constructs are discussed one by one according to the outcomes of the empirical study and their implications are examined. This chapter lists the key findings and most salient outcomes of the research.

Finally, chapter 7 provides a conclusion to this research. It aims to summarise the results, discuss the theoretical contributions to the literature, as well as their empirical relevance in the business world. This thesis concludes with thoughts on the future areas of research.
### Table 1-1: Thesis Structure

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Sections</th>
</tr>
</thead>
</table>
| **Chapter 1** | • Introduction  
               • Objectives  
               • Research structure |
| **Chapter 2** | • Literature review  
               - Innovation  
               - Status  
               - Social Capital |
| **Chapter 3** | • Hypotheses  
               • Research models |
| **Chapter 4** | • Research methodology and design  
               - Research approach  
               - Data collection methods  
               - Questionnaire design  
               • Empirical Study  
               • Measures  
               • Data analysis methods |
| **Chapter 5** | • Data Analysis  
               • Results and testing hypotheses |
| **Chapter 6** | • Discussions |
| **Chapter 7** | • Conclusions |
2 Literature Review

The main purpose of this chapter is to offer a comprehensive review of the literature pertaining to the three underlying constructs of this study. First, it concentrates on innovation literature. It delves into its historical backgrounds, presents its main theories, and discusses the most noteworthy studies that have been conducted on the subject. Moreover, it elucidates how innovation studies have evolved from reliance on the theories of organisational psychologists to the structuralist viewpoint, and how over the last two decades social attributes have gained attention as the central precursors of innovation.

Then, it explores status as the potential distal antecedent of innovation. It sheds light on the theories regarding the formation of status values, their propagation and consensuality across organisational networks. Furthermore, the potential implications of status on the dynamics of social relationships will be discussed. This discussion brings about the pivotal role of social networks and, by extension social capital as the concept that can potentially link status and innovation. The three-dimensional conceptualisation of social capital will be discussed, and its attributes and implications will be scrutinised. Through discussing the theoretical linkages between these constructs, I pave the path to the third chapter, in which I elaborate on the research model and hypotheses.

2.1 Innovation

2.1.1 Introduction and Historical Background

Innovation has always been the driving force of humanity, transforming the primitive societies into great civilisations, and bringing us from the Stone Age into the post-modern era. Despite the unequivocal influence of innovation to the development of human society, it was not until the early twentieth century that it began to attract the attention of economy scholars (see, Mowery and Rosenberg...
Schumpeter (1934, 1939) was among the first group of economists, who has pinpointed the unique importance of innovation to the business evolution. He challenged the dominant economic paradigm of the time, by suggesting that the introduction of new products to the market could be far more effective than any other tactic of wealth generation. He suggested *creative destruction* theory and argued that innovative firms could change the economical equilibrium by making some older products and processes obsolete, and thereby create more value and ensure their success and survival in the long run (Schumpeter 1939). According to Schumpeter, innovation could involve one of the following scenarios: (1) the introduction of a new good or a new quality of the good, (2) the introduction of a new method of production, (3) the opening of a new market, (4) the conquest of a new source of supply and (5) the carrying out of the new organization of an industry (1934:66). Schumpeterian view of innovation, however, is primarily focused on manufacturing and development of tangible goods, disregarding innovation in services. Time could be a decisive factor to explain this approach. The service sector has developed rapidly over the last few decades, and it was marginal in the pre-WWII economy that was plagued with the great depression. The economy was greatly reliant on manufacturing and Schumpeter’s ideas were in full accord with the facts and actualities of the business milieu (McCraw 2009).

Schumpeter’s theories remained as the dominant discourse of innovation studies for few decades, influencing the works of researchers such as Drucker, Freeman or Perez (e.g. see, Drucker 1985, Freeman 1979, Perez 1983). However, the emergence of the service sector coupled with the widespread application of IT tools have urged innovation scholars to broaden those ideas to reflect the requirements of the new business settings. West and Farr (1990:9) elaborately defined innovation as “the intentional introduction and application within a role, group or organization of ideas, processes, products or procedures, new to the
relevant unit of adoption, designed to significantly benefit the individual, the
group, the organization or wider society”. The inclusion of processes, and
recognising individuals as the active sources of innovation are the main features
of the Neo-Schumpeterian narrative of innovation. There are however some
similarities between the two streams of innovation definitions. It is generally
accepted amongst scholars to characterise innovation with the application and
realisation of the final products or services. This attribute differentiates
innovation from creativity. While creativity is focused on ideation and
conception of novel ideas (Amabile 1983), innovation takes a more practical
approach and includes implementation and commercialisation of those ideas

Today, the study of innovation is one of the most established areas of research in
business discipline. The merits of innovation are so obvious that theorising their
positive effects are no longer of concern to the academics. The interest of the
researchers, however, has shifted towards investigating the precursors of
innovation. They aim to understand how innovative ideas are initially generated,
and what are the factors that facilitate the development of those ideas into
becoming marketable products or services.

2.1.2 Innovation Typology

Scholars seek innovation in virtually all dimensions of the organisations, and
argue that an innovation can occur in many shapes and forms (Trott 2008).
Accordingly, they have suggested several typologies in order to capture multiple
modes of innovation. One prevalent typology is to categorise innovations based
on the business areas that they affect (Table 2.1).

This typology highlights the wide range of innovations in organisations. It
emphasises that not only final products and services, but also the supporting
processes and managerial approaches could improve through innovative
contributions. Innovative managerial solutions, modern tools of process optimisation and internet-based services have reduced the costs of operations and have offered businesses the ability to create more innovative products (Damanpour 1991, Sawhney, Verona and Prandelli 2005, Tuomi 2002). Hence, developing innovative products is concomitant with innovation in manufacturing processes, managerial methods, sales and marketing strategies, etc.

<table>
<thead>
<tr>
<th>Type of Innovation</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>Development of new (radical) or improved (incremental) products</td>
</tr>
<tr>
<td>Process</td>
<td>Optimizing a process that improves productivity or reduces operational costs</td>
</tr>
<tr>
<td>Organisational</td>
<td>New internal collaboration tools, e.g. Tibbr, Jive or Yammer</td>
</tr>
<tr>
<td>Management</td>
<td>Introduction of ERP solutions (SAP, Oracle, etc.)</td>
</tr>
<tr>
<td>Production</td>
<td>New production software, e.g. MRP, Lean manufacturing</td>
</tr>
<tr>
<td>Commercial / Marketing</td>
<td>New marketing procedures (e.g. social media marketing), or new sales approach (e.g. mobile sales and direct store delivery)</td>
</tr>
<tr>
<td>Service</td>
<td>Cloud-based software, Software as a Service (SaaS) solutions</td>
</tr>
</tbody>
</table>

Table 2-1- Innovation Typology- Based on Trott (2008), customised with own examples

Other scholars have suggested an alternative typology of innovations based on the degree of novelty that is involved in an innovation. They argue that all innovations, whether in products, services or processes, can be dichotomised into two major types, which are incremental and radical (Dewar and Dutton 1986, Subramaniam and Youndt 2005).

Incremental innovations consist of continuous minimal changes in products, services or processes (Dewar and Dutton 1986). They apply organisational
knowledge and expertise to modify existing products or optimise processes in order to develop new products or services. This type of innovation is also characterised as exploitative innovation. It denotes that organisations tend to monitor their current products, identify new profitable niches, and exploit them through minor innovations (Jansen, Van den Bosch, and Volberda 2006).

Radical innovations, on the other hand, involve major (and often sudden) changes in the existing products, services or processes (Dewar and Dutton 1986). They can make the existing products obsolete, and lead to drastic changes both inside and outside their organisation. Radical innovation is commonly described as exploratory innovation, which signifies creating something completely new based on the exploration and research (March 1991, Gupta, Smith, and Shalley 2006).

Despite theoretical differences between these two types of innovation, scholars emphasise on the importance of ambidexterity in organisational innovative activities (Gibson and Birkinshaw 2004, He and Wong 2004). Ambidexterity signifies the simultaneous coexistence of both exploitative and exploratory innovations in an organisation. A myriad of studies has been conducted to investigate the merits and challenges of ambidextrous organisations (see, Gibson and Birkinshaw 2004, Raisch et al. 2009). Tushman and O’Reilly (1996) argue that the ability to exploit the existing products, while exploring the opportunities to make radical innovations positively affects organisational performance. This argument was empirically tested and confirmed by Gibson and Birkinshaw (2004) and Lubatkin et al. (2006). However, another stream of ambidexterity studies focuses on the potential conflicts that may rise between the two types of innovation, and highlights the crucial role of managing tensions and keeping balance in order to assure the sustainability of the innovation processes (Andriopoulos and Lewis 2009, Raisch et al. 2009).
The following example sheds more light on the difference of exploratory and exploitative innovations, and demonstrates how they could coexist in an organisation. The introduction of SAP ERP has empowered organisations through integration of their key business functions and thereby it has changed the IT-landscape of multinational businesses greatly, thus it is considered as a radical (exploratory) innovation. However, SAP enhancement packages could be considered as incremental (exploitative) innovations, due to the fact that they include optimisations, updates, and minor new features.

Although, enlisting all innovations under either radical or incremental may seem simplistic, and one may rightly argue that the majority of innovations may locate somewhere between these two extremes (Abernathy and Utterback 1978), they certainly offer useful benchmarks to assess innovations in terms of the degree of their novelty.

2.1.3 Innovation Models

Once the integral role of innovation to the survival of organisations became clear, due to the efforts of Schumpeter and others, scholars alongside practitioners have developed several models in order to explain the process of innovation in business environments. These models aim to conceptualise the most effective methods of innovation, from idea generation to the implementation of those ideas. Reviewing the most prominent models of innovation represents their evolution from initial simplicity to their current intricacy.

2.1.3.1 Linear Models:

The linear models of innovation have been developed collaboratively by both academics and practitioner in the mid-twentieth century (Nelson 1959). The linear models suggest R&D, manufacturing and marketing as three components of innovation process. The first wave of the linear models conceptualised
innovation as a linear sequence. First, the innovative ideas are developed within science and technology bases (i.e. universities or research centres), then those ideas come to realisation through manufacturing, and finally the products are pushed to the market through the marketing and sales activities. Hence, it has been also named as the technology push. This model portrays innovation process as a proverbial relay race, in which runners pass the relay baton to the next one once they have completed their duties. Technology push model assumes a passive role for the customers, and expects science and technology centres to predict the needs of the market (Rothwell 1992, 1994). This approach to innovation was dominant for over two decades until a new wave of linear model was suggested.

The second stream of linear models was developed during the 1970s upon the premise that customers’ needs must be taken into account prior to the development of innovative products (von Hippel 1978). As a result, market pull model of innovation was proposed. Its main and only difference from technology push is the shift of focus from science centres to the markets as the initiators of ideas. Basically, market pull model constitutes of the same three components of the technology push, however, the order of the sequence is reshuffled. First, the marketing department captures the needs of the market. R&D centres receive the collected market data, analyse them, and develop new products that are relevant to the needs of the market. The industry, as always, is responsible for manufacturing those products (Hayes and Abernathy 1980). This model enabled businesses to be more responsive to the needs and interests of the market and reduce the risks of trial and error that was innate to the technology-push model (Rothwell 1994).

2.1.3.2 Coupling Model:

The coupling or interactive model of innovation is built organically from the
development of the linear model. It is based on integration of marketing and R&D departments, and focuses on the collaborative approach and feedback loops between the functions (Rothwell 1992, 1994). While the linear models were mainly attentive to the birthplace of the innovative ideas, coupling model suggested that, “it is the simultaneous coupling of the knowledge within all three functions that will foster innovation” (Trott 2008:24). In the coupling model, every function could contribute to the generation of innovative idea, and ideation was not exclusive to either of the R&D or marketing departments. Although, many aspects of organisational innovation remained similar to the linear models, positive changes were introduced with the rise of coupling model. Rothwell (1992) categorises the positive contributions of coupling model to project execution factors (viz. communication and access to knowhow, improved planning, handling innovation as an organisation-wide task, etc.), and corporate level factors (viz. top management commitment to long-term and strategic projects, corporate flexibility, etc.).

2.1.3.3 Network Model:

In 1990s, a new perspective of innovation has developed that regarded innovation from cognitive and learning viewpoints. Focusing on the role of knowledge, this strand of innovation literature is mainly concerned about how organisations learn, develop new ideas and create new knowledge. This perspective stems from the organisational learning literature (Nonaka 1991, Nonaka and Takeuchi 1995), and it underlines the role of knowledge acquisition and assimilation as the key determinants of innovation.

Drawing upon Polanyi (1966), organisational learning scholars highlight tacit knowledge as the building blocks of innovation. Reed and DeFillippi (1990:89) define tacit knowledge as the implicit and non-codifiable accumulation of skills. Nonaka advances this definition and argues that “tacit knowledge cannot be
easily shared and communicated in written or symbolic form, is deeply rooted in action and in an individual’s involvement within a specific context” (Nonaka 1994:169). He suggests that tacit knowledge, in contrast to explicit knowledge, can solely be exchanged through socialisation (Szulanski 1996, Nonaka 1991, Eraut 2000), and new knowledge is created collaboratively between actors rather than within them. In this view, actors can be defined as each active entity of the network (i.e. individuals, work groups, business units, etc.). Network model views innovation as a result of cross-fertilisation of ideas and the synergy between collaborative actors (Leonard and Sensiper 1998, Von Krogh, Ichijo, and Nonaka 2000). In sum, network model furthers the concept of feedback loops, and suggests a more cohesive collaboration network between all functions and individuals as the effective method of innovation.

Although, scholars suggest other models of innovations, this study reviews the most notable models that are relevant to the purpose of this research. For instance the fourth generation of innovation models, suggested by Rothwell (1992) is deliberately left out due to its concentration on the new manufacturing and production methods. Table 2.2 summarises the major models of innovation.

The network model of innovation is the most recent theory that has been suggested to explain the complex nature of innovation in firms. As opposed to previous models, the network model characterises innovation as a continuous process that involves all individuals and functions of the organisation. This model has strong emphasis on the structure of organisational network as the backbone of knowledge exchange and innovation (Kay 1993, Burt 1987). Structuralist scholars study innovation from a structural viewpoint and explore the optimum configuration that could maximise the innovation outputs (Mintzberg 1978, Teece 1998).
Table 2-2: Innovation Models – Own Table, adapted from Rothwell (1992)

<table>
<thead>
<tr>
<th>Innovation Model</th>
<th>Characteristics</th>
</tr>
</thead>
</table>
| Linear Models    | - Technology push: Innovations occur in science and technology bases. After manufacturing, the innovative products are pushed to the customers.  
- Market pull: Needs of the market is captured by marketing department. Science and technology bases develop innovations according to the needs of the customers. |
| Coupling Model   | - A feedback loop between all functions, especially between R&D and marketing  
- Combination of technology push and market pull models pull models |
| Network Model    | - Importance of knowledge acquisition for knowledge creation  
- Extensive interactions between actors leads to knowledge exchange and innovation |

The importance of structure becomes even more salient in MNEs, due to the complexity of their network. MNEs tend to adopt different structures and follow different policies regarding the exchange of knowledge. The configuration that an MNE opts for, not only regulates the interactions between its business units, but also determines the possibility of collaborations between individuals. A review on the MNE structures sheds more light on how structural differences could affect expected innovative outcomes.

2.1.4 MNE Structures

International business scholars have documented different types for organisational configurations and accordingly have developed different structures for MNEs (Bartlett and Ghoshal 1989, Enright and Subramanian 2007). According to the structuralist perspective of innovation, organisational structure affects the likelihood of knowledge sharing across organisational network. The structure of ties between actors represents the extent of exposure to the sources of knowledge, while headquarters’ approach in promoting/
preventing internal knowledge sharing affects the possibility of knowledge exchange between actors. Espousing a certain organisational type often depends on the requirements of the industry in terms of decision-making autonomy and market responsiveness.

Bartlett and Ghoshal (1989) suggest the most elaborate models of MNE structures in their largely cited book *Managing Across Borders*. They categorised MNEs based on the strategies that are mobilised by their headquarters towards the subsidiaries. They argue that MNEs employ different corporate strategies in order to respond to the requirements of their business, and maximise the advantage of corporate core competencies and capabilities. More recently, Kawai and Strange (2014:513) found evidence that “subsidiary autonomy is more favourable in a business environment where the technology is changing rapidly and unpredictably” and suggested a balance between the level of autonomy and headquarter controlling mechanism, in order to maximise subsidiaries’ performance. Based on these premises, MNEs can be categorised into multidomestic\(^1\), global, international, and transnational organisational outlines. Bartlett and Ghoshal (1989) differentiate these four types of organisations by three variables, which are (1) level of local responsiveness, (2) interdependence between subsidiaries and headquarter, and (3) diffusion of organisational knowledge. These factors suggest an on-going battle between subsidiaries’ role versus headquarter mandated strategies (Birkinshaw and Pedersen 2008). The first two variables indicate the extent to which subsidiaries follow the orders of the Headquarter, which could represent the degree of their autonomous decision-making power. However, the third variable is in direct relationship to innovative capacity of the subsidiaries, and by extension their members. Although, the MNE types are primarily suggested to explain the position and role of the subsidiaries, they can also demonstrate how the high-

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\(^1\) Bartlett and Ghoshal name this type as ‘multinational’, however the majority of scholars have called it as ‘multidomestic’.
level organisational structure can catalyse/restrict the potential interaction and knowledge exchange between the individuals across the organisation.

2.1.4.1 Multidomestic Organisation Model

In multidomestic MNEs, subsidiaries tend to act more independently from their headquarter and other subsidiaries (Harzing 2000). In such configuration, subsidiaries do not directly replicate headquarters’ strategies, because they have high level of responsiveness to their local markets. The major concern of the subsidiaries in multidomestic MNEs is to maintain and serve the local environment. Multidomestic type of organisational design helps MNEs to be more sensitive to the needs and interests of the local markets and provide a faster and more efficient response, especially when national regulations are involved. Autonomous subsidiaries have the flexibility to customise their products/services to meet the needs and requirements of their local market without going through corporate hierarchical layers, resulting in a faster and more accurate response (Luo 2003, Ambos and Birkinshaw 2010). High level of autonomy in decision-making naturally reduces the level of interactions and communications between subsidiaries in multidomestic organisations. In multidomestic organisations, knowledge creation and innovation process usually occurs within subsidiaries, relying either on the internal knowledge stock or external knowledge resources that are potentially available from local partnerships and alliances (Wu and Wu 20014). Hence, the individuals usually collaborate within the confined boundary of their own subsidiary and have very limited interactions with knowledgeable people of the other subsidiaries.

McDonald’s could be an example of multidomestic MNE. Subsidiaries of McDonald’s act rather independently in terms of product innovation as well as marketing strategies. They are well integrated to the local culture and norms, and develop strategies that are compliant to the requirements of the local
market. For example, replacing their signature product of Big Mac with Maharaja Mac in India was a response to the needs of the local market to substitute beef with lamb or chicken.

![Diagram of Multidomestic Organisation Model](image)

**Figure 1- Multidomestic Organisation Model (Adapted from Bartlett & Ghoshal 1989)**

### 2.1.4.2 Global Organisation Model

Global MNEs are characterized by centralisation of resources and responsibilities in the Headquarter. The main role of the subsidiaries in global organisations is to deliver the products or services from headquarter to their local markets (Bartlett and Ghoshal 1989, Harzing 2000). Subsidiaries in global MNEs tend to follow the strategies that are defined and mandated by the Headquarter. Level of responsiveness to the local market is very limited and subsidiaries are usually not involved in innovating new products or even modifying the existing ones. Global configuration suits best to businesses that provide products or services with minimum local customisation requirements. Innovation process takes place in headquarters, and knowledge is retained there as well. The majority of interactions occur in one direction from the Headquarter towards subsidiaries, and the exchange of knowledge between the members of
the subsidiaries is virtually non-existent.

Chemical and pharmaceutical multinationals such as BASF or Bayer tend to follow the global configuration, while the headquarters closely monitors the innovation process; their worldwide presence is mainly for sales purposes. Apparel or sporting goods retailers, such as Nike or Adidas are other examples of global MNEs. The subsidiaries act mainly as the sales departments and are not involved in the process of innovation.

![Diagram of Global Organisation Model](image)

**Figure 2- Global Organisation Model (Adapted from Bartlett & Ghoshal 1989)**

2.1.4.3 International Organisation Model

International configuration represents the third type of organisation that has been suggested by Bartlett and Ghoshal (1989). Essentially, international MNEs are very similar to the global MNEs; however in international MNEs, headquarters transfer the necessary knowledge and expertise to their subsidiaries so that they can handle some requirements of their local markets. On the other hand, the level of autonomy for the subsidiaries is much less than multidomestic MNEs. Innovation process therefore occurs in the Headquarter but in contrast to global MNEs, knowledge is not fully retained there and
headquarters share some knowledge with the subsidiaries. However, knowledge transfer is unidirectional, and the level of knowledge sharing between subsidiaries is still very low.

Coca-Cola can be considered as an international MNE. Although, subsidiaries are not involved in formulation and development of new products, they have limited autonomy to collaborate with local partners regarding the sales and distribution strategies, including the packaging design and sales campaigns.

2.1.4.4 Transnational Organisation Model

The last type of MNEs, proposed by Bartlett and Ghoshal (1989) is the transnational configuration. It is characterised as a mixture between global and multidomestic types and as a solution to corporate problems pertaining to organisational structure. In transnational MNEs, subsidiaries can act as specialised centres of excellence for a specific product or process. This environment creates higher level of interdependence between subsidiaries, due to the fact that each subsidiary may require the knowledge and expertise of
other subsidiaries (Bartlett and Ghoshal 1989). Furthermore, at the same time, subsidiaries have strong relationship with their local markets and they need to respond to the needs of their local customers. Even though, some subsidiaries may still be dependent on the Headquarter, most interactions occur between the subsidiaries. Transnational MNEs provide a complex configuration to achieve a balance that optimises subsidiaries' local responsiveness and the level of interdependence, but nonetheless reserves the strategic role of the headquarters (Nohria and Ghoshal 1997). Resources are partly centralised at the Headquarter, and partly at the subsidiaries as centres of excellence. “The result is a complex configuration of assets and capabilities that are distributed, yet specialised” (Bartlett and Ghoshal 1989: 69). In contrast to international MNEs - that knowledge transfer is unidirectional and from the Headquarter to the subsidiaries - in transnational MNEs, knowledge is created more or less in all units of the organisation and flows throughout the organisational network and in all directions. The headquarter is much less involved in innovation process as well as knowledge diffusion, and its role is limited to controlling the processes and defining macro-level strategies. Transnational structure supports the exchange of knowledge resources across organisational network and promotes cross-fertilisation of the ideas and collaborative innovation. Hence, it provides the suitable setting for the individuals to interact regardless of their formal association to a certain subsidiary. The availability of interaction channels between subsidiaries enables individuals to seek knowledge not only from their local colleagues but also from other individuals who work elsewhere.

A few software and technology development multinationals have taken long strides towards adopting the transnational configuration. For example, IBM is an MNE, in which individuals and teams from different subsidiaries collaborate, regardless of their location, on specific software projects. Although individuals are officially associated to certain teams and units, due to the reporting and
controlling purposes, they tend to work concurrently on different projects alongside different teams. In consumer product industry, Nestle and Unilever attempt to adopt the transnational configuration by supporting the share of best practices and open exchange of knowledge between collaborative R&D teams.

The transnational type of organisation is the structural representation of the network model of innovation. It highlights the importance of collaboration and socially constructed knowledge, making it the most suitable type of organisation for network-based innovation studies. However, it should be borne in mind that although this configuration offers a helpful guideline for understanding different organisational structures, and their standpoint towards knowledge exchange and innovation, it would be too simplistic to assume that an MNE fully complies with a specific type. MNEs have faced a sea change over the last two decades, and the traditional rigid structures are replacing with flexible arrangement. New managerial methods are fading the classic unidirectional reporting lines and the ever-increasing focus on the talented individuals regardless of their location is diminishing the geographical demarcations.

Figure 4- Transnational Organisation Model (Adapted from Bartlett & Ghoshal 1989)
2.1.5 Innovation Antecedents

Throughout the development of the innovation models, the emphasis on knowledge and its central role in innovation has constantly improved (Leonard-Barton 1995). At first, the linear models limited the task of knowledge creation to the science and technology bases (technology push) and marketing departments (market pull). Along the same vein, the coupling model optimised the knowledge creation process through suggesting feedback loops between R&D and marketing functions and collaboration between the main organisational functions. Finally, knowledge was placed at the centre-piece of the network model, and knowledge exchange was advocated as the primary antecedent of innovation (Nonaka and Takeuchi 1995). The progression of innovation models reflects the constant pursuit of organisations to enhance knowledge creation and diffusion as the key facilitator of innovation (Kogut and Zander 1992). This progression is fully mirrored in the efforts of innovation scholars in the academia. Reviewing the notable studies on the antecedents of innovation shows how those studies have evolved from heavy reliance on internal capabilities (Amabile 1983, West 1987, Damanpour 1991), of the actors to the recognition of knowledge acquisition and the role of social interactions as the context of fostering innovation (Tsai and Ghoshal 1998, Gupta and Govindarajan 2000, Miller, Fern and Cardinal 2007).

The essence of network model of innovation is to consider organisation as a social network and seek the origins of innovation in the social interactions between actors rather than within each isolated actor (Cohen and Levinthal 1990, Nonaka 1994). This model recognises the social ties between actors as the pipelines that foster the flow of knowledge across organisations (Ibarra 1993, Podolny and Page 1998, Bathelt, Malmberg and Maskell 2004, Rothaermel and Hess 2007). If access to knowledge is the prime prerequisite of innovation, the structure of social ties (Coleman 1988, Burt 2005, Brass 2009), strength and
quality of those ties (Tortoriello and Krackhardt 2010, Levin and Cross 2004), and level of cognitive understanding between actors (Nonaka 1994, Bunderson and Reagans 2011), must be the required infrastructure for regulating the diffusion of knowledge throughout the organisational network (Inkpen and Tsang 2005, Rothaermel and Hess 2007).

The network model of innovation particularly raised the potential innovative role of the individuals. This change has been parallel to the shift in the organisational culture, which has started to recognise the value of people as the true sources of knowledge creation (Nonaka 1991, 1994). Prior to the introduction of network model and before the popularity of knowledge as the main determinant of innovation, the studies on the antecedents of innovation were predominantly focused on the psychological capabilities of the actors. One of the main reasons could be that the most remarkable studies on this subject were conducted by organisational psychologists (West 1987, Damanpour 1991).

The majority of studies on individual innovation were basically focused on theorising and measuring actors’ innovative behaviour in terms of idea generation based on the premise that innovative ideas are generated in the minds of the individuals and in accordance to their personal capabilities (West 1987). In that sense, there was a huge overlap between innovation and creativity studies. Organisational psychology scholars showed great interest in the first step of innovation, which is generating innovative ideas, ignoring the socially built knowledge and importance of social interactions to propagate and realise the innovative ideas. Anderson et al. (2004) identified four major categories of individual innovation studies, namely personality, cognitive ability, motivation and job characteristics. This generation of innovation studies was mainly interested to investigate how and to what extent do different traits of personality, intellectual capital, motivational stimuli and vocational contexts can influence the innovative behaviour of an individual in the workplace.
However, there was also a fifth type of innovation studies that though was reliant on the internal capabilities of the actors, it has recognised the integral role of knowledge as the crux of innovation. Cohen and Levinthal (1990) has first suggested *absorptive capacity* and characterised it as “a new perspective on learning and innovation” (1990:128). Absorptive capacity entails the extent to which an actor is capable of receiving and assimilating new knowledge. Zahra and George (2002) expanded this definition and characterised absorptive capacity as the ability to acquire, assimilate, transform, and exploit knowledge. Although absorptive capacity was first suggested in the context of R&D units, scholars have broadened its application to the individual level and developed their own versions of this concept. Minbaeva et al. (2003) argued that the absorptive capacity stands on two pillars of motivation and capability, while Gupta and Govindarajan (2000) separate these two notions and interpret absorptive capacity as the ability of actors to learn new knowledge. (The most notable studies are summarised in the table 2.3.)

The introduction of absorptive capacity has built on the classic psychological standpoint of innovation, and offered it an interface with the emerging knowledge-based perspective of innovation. Although, the introduction of absorptive capacity was a major stepping-stone towards understanding the origins of innovation, it still viewed actors as passive members of the organisations and overlooked their potentials as active social entities. Popularity and prevalence of absorptive capacity combined with the ever-increasing attention of scholars towards the role of knowledge in innovation has opened a gate towards a new wave of innovation studies, which were mainly focused on the patterns of knowledge diffusion and methods of knowledge acquisition as the prime antecedents of innovation.
### Key Contributions

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#### Level of Analysis
- Individual
- Organisation
- Organisation & Individual

#### Main Focus
- Personality
- Cognitive ability & personality
- Role characteristics (e.g., discretion and satisfaction)
- Absorptive capacity
- Development of a new instrument to assess perceived similarities and obstacles
- Acquisition and evaluation of the predictions of role innovation, adaptation to new role characteristics (e.g., discretion and satisfaction)

#### Structure Properties
- Personality
- Cognitive ability & personality
- Role characteristics (e.g., discretion and satisfaction)

#### Main Focus of Innovation Antecedents

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#### Structure Properties
- Personality
- Cognitive ability & personality
- Role characteristics (e.g., discretion and satisfaction)
Hence, it is essential that the notion of knowledge is fully understood and the theories of knowledge transfer are discussed. Reviewing those theories can elucidate the dynamics of knowledge exchange and take us one step closer to the social origins of innovation.

2.2 Knowledge

2.2.1 Introduction

Knowledge is one of the most valuable assets of the organisations. Scholars suggest a broad continuum of definitions for knowledge. Nonaka and Takeuchi (1995:58) adopt Plato’s “justified true belief” definition of knowledge, and accordingly describe knowledge as “dynamic human process of justifying personal belief towards the truth”. This characterisation suggests that not only knowledge must be correct and truthful, but also the knowledge holders must believe in its truthfulness. Despite the popularity of epistemological discourse amongst social scientists, it was only in 1990s that economists and business scholars realised the true value of knowledge in organisations. Peter Drucker’s quote in the Post Capitalist Society is considered as a defining moment in the organisational knowledge theory. He noted, “The basic economic resource [...] is no longer capital, nor natural resources, nor labour. It is and will be knowledge” (1993:8).

The notion of organisational knowledge has first developed in the works of Nelson and Winter (1982), and Pavitt (1990). They argue that the organisations as a whole retain knowledge within their routines, culture and social interactions. Organisational knowledge is defined as “the accumulation of the knowledge bases of all the individuals within an organisation and the social knowledge embedded in relationships between those individuals” (Trott 2008:191). Kay (1993) furthered this notion and highlighted that a right
architecture can enhance the embedded knowledge of the organisations. He argued that in different organisational architectures, the same set of individuals create different amount of knowledge. Accordingly, scholars single out knowledge as the main building block of innovation. Innovation is the prime feature of knowledge creation, which occurs through synthesising acquired external knowledge and available internal knowledge in order to create new products or services (Miller, Fern, and Cardinal 2007, Scott and Bruce 1994). Hamel and Prahalad (1994) emphasised that organisational knowledge plays a vital role in the ability of firms to innovate and be competitive in the future. Organisations constantly attempt to maximise the acquisition of knowledge and facilitate its dissemination across their networks. All recent technological advancements from Internet to social networking tools follow the same cause, which is to increase the mobilisation of knowledge resources and enhance the collaboration within organisations. Despite the great contribution of technological tools, blindly embracing the technology as the only solution can be a naïve and simplistic approach. Effective diffusion of knowledge requires a supporting organisational structure, integration of collaboration culture to organisational philosophy, and supporting decisions by the policy makers.

### 2.2.2 Knowledge Transfer Models

Knowledge transfer has been one of the focal areas of attention over the last three decades (Simonin 1999, Argote and Ingram 2000, Tsai 2001). It has been widely characterised as the source of organisational learning (Kogut and Zander 1992, Huber 1991) as well as knowledge creation (Conner and Prahalad 1991, Nonaka 1994).

The following discussion describes the models of knowledge transfer within the boundaries of an organisation. The first model is derived from communication theory and it usually involves two parties as sender and recipient of knowledge
(Gupta and Govindarajan 2000), whereas the second model concentrates on social networks and the importance of socialising in creation and diffusion of knowledge (Reagans and McEvily 2003). The strengths and weaknesses of each model, as well as their implications for innovation study will be discussed in more detail.

2.2.2.1 Sender/Recipient Model

A classic structure of sender/recipient model of knowledge transfer has been developed based on communication theory (Krone, Jablin and Putnam 1987, Charlie 2004). This model consists of five major steps, which are sender's knowledge stock, ability and willingness of sender to share, knowledge transmission channels, willingness and ability of recipient to learn, and finally absorptive capacity of the recipient (Gupta and Govindarajan 1991, 2000, Charlie 2004). Sender/recipient model concentrates on the “flow” of knowledge between different actors of an organisation and usually from a knowledge-rich actor to a knowledge-poor one. In figure 5, the arrows show the direction of knowledge transfer from the sender to the recipients.

![Figure 5 - Sender/Recipient Model of Knowledge Transfer. (Own Figure)](image)

One of the main strengths of sender/recipient model is to study the transfer of explicit knowledge (e.g. training courses, work instructions), in circumstances that the senders and recipients are clearly defined. For example, sender/recipient model is very applicable for studying the knowledge transfer between headquarter and subsidiaries. The receptive role of the subsidiaries and the
dominance of headquarter provides a suitable context for the unidirectional flow of knowledge and expertise. Furthermore, this model provides a fitting framework to study the characteristics of sender or recipient actors, in creating or learning new knowledge. The studies that examine the role of psychological factors (e.g. personality, cognitive ability, etc.) on innovation could fall under this perspective of knowledge transfer.

While sender/recipient provides some advantages, it is also bound to have some serious drawbacks (Becker-Ritterspach 2006). First, this model considers a passive role for the recipient actors, and the availability of knowledge depends on the willingness of the sender. Second, this model assigns the ownership of the knowledge to one of the two involved parties. Therefore, it cannot explain the exchange of knowledge that has been created collaboratively. Third, sender/recipient model has a dual view of the process of knowledge transfer, focusing on the process of knowledge exchange between two entities, thus it does not explain the knowledge that is available through the overall position of actors within social networks.

Such deficiencies in sender/recipient model have urged scholars to study transfer of knowledge from another perspective. Recent knowledge management literature has highlighted that knowledge is created primarily through social interactions between actors of a network (Nonaka 1994, Reagans and McEvily 2003). The idea of knowledge flow from a sending actor to a receiving one does not fully explain the social backgrounds of innovation. Social network model of knowledge transfer has been suggested to address these issues

2.2.2.2 Social Network Model

Social network model of knowledge transfer is built upon the premise that exchange of knowledge is often bidirectional and it occurs in social interactions between actors within a network of relationships rather than a unidirectional
flow from a sender actor to a recipient one (Plaskoff 2003). As opposed to sender/recipient model that considers knowledge as an object or commodity, social network model argues that knowledge is created interdependently in social relationships and diffused by social interactions and through active engagement of the involved actors of the network (McFadyen and Cannella Jr. 2004, Fox 2000). Therefore, this model distances itself from the traditional view of knowledge transfer and could be best characterised with knowledge exchange. Informal discussions between actors in social events or collaborations between them in business meetings expedite creation and exchange of knowledge, and serve to eradicate demarcation lines between sender and recipient of tacit knowledge (Szulanski 1996). Thus, this model could offer a more realistic view of knowledge transfer, especially in individual level of analysis. While, the transfer of knowledge between units or firms is predominantly explicit and documented, individuals thrive on the social collaborations to develop new ideas.

Social Network model of knowledge transfer suggest that actors could actively modify their social ties, and adjust the nature of their relationships in order to access useful knowledge resources, and avoid undesirable knowledge. Thereby, it addresses one of the main pitfalls of sender/recipient model. This model combines the social aspects of knowledge creation into the classic communication theory, and offers a more accurate image of how knowledge flows within organisations (Inkpen and Tsang 2005, Reagans and McEvily 2003, Gulati, Nohria, and Zaheer 2000). The ability of actors to orchestrate the available knowledge, through building or aborting social ties, is the essence of social network model (Nambisan and Sawhney 2011, Dhanaraj and Parkhe 2006).

Figure 6 visualises the previous example, however there are no clear directions of knowledge flow, and no senders or recipients. Knowledge is created mutually
and exchanged between actors. The knowledge is exchanged at different rates based on to the quality of ties between actors.

![Figure 6- Social Network Model of Knowledge Transfer (Own figure)](image)

The social network model describes each member of the network as a social actor. Accordingly, it suggests that besides structural properties, each social actor possesses certain social traits and attributes that could affect the nature of their social ties and influence the volume and quality of knowledge that they can acquire. This model opens new horizons towards understanding the social construction of innovation by allowing us to study the potential influence of the said attributes. The next section introduces the concept of status, and discusses its merits as potential social antecedent of innovation.

2.3 Status

2.3.1 Introduction

Introduction of status can be traced back to decades ago, and in the works of sociologists such as Weber (1948, 1978), Blau (1955) and Merton (1968), and Bourdieu (1979, 1984). Weber (1948) viewed status as an element of social structure that ranks actors according to their social position or prestige. This viewpoint is reflected on Gould’s (2002:1147) definition of status, in which he defined it as “the prestige accorded to individuals because of the abstract
positions they occupy rather than because of immediately observable behaviour”. Similarly Magee and Galinsky (2008: 354) associated status to the social hierarchy, which in their view is “an implicit or explicit rank order of individuals or groups with respect to a valued social dimension”.

The following notes can be construed from these definitions. First, the status values are subjective by nature (Ridgeway 1997). They do not emanate from observable and measurable behaviours; instead they are the products of social judgements (Bitektine 2011, Gould 2002). Status is built based on the judgment of other actors regarding a specific social trait or characteristic that is considered as high status value (Bianchi, Kang, and Stewart 2012). Second, status judgements are represented in ranking orders. They create a social hierarchy, in which the high positions are more valuable than the low positions (Weber 1978, Bourdieu 1979, Gould 2002), insinuating that the actor A is somehow “better” than actor B (Sewell 1992). The duality of high status versus low status stems from the ranking nature of status. The next section explains how status values are created and propagated across social networks.

2.3.2 Status Construction and Diffusion

This study is chiefly interested in the potential implications of status on product innovation in organisations. Nevertheless, understanding how status values are generated, diffused, and retained in social networks could offer valuable insights regarding their characteristics, and thereby it could lead to a more realistic interpretation of their implications.

Over the last two decades many studies have been conducted regarding the construction of status values in social networks (Ridgeway 1991, 1997, Ridgeway and Ericksen 2000, Gould 2002, Bianchi, Kang, and Stewart 2012). Ridgeway (1997) has developed a theory of status construction by characterising it as “widely held beliefs that attach differential social worthiness and
competence to states of characteristics on which people are perceived to differ” (Ridgeway 1997: 138). She argues that an initial distinction in a random social characteristic could lead to the creation of status difference between actors. The origins of theory could be found in the social psychology literature, particularly in the works of Bales (1950). He conducted an experiment on the interactions amongst small groups of Harvard sophomore students. He observed that despite the initial homogeneity, social similarity, and lack of group structure, the group developed inequality and social structure very quickly and stabilised those beliefs in the first session, and in the next sessions the social interactions were guided according to the perceived social ranking of the members. This observation was amongst the first studies that demonstrated the construction of social structure within initially unordered groups (Correll and Ridgeway 2006).

Bianchi, Kang, and Stewart (2012) build upon this theory and suggest that the status-making social characteristics are selected arbitrarily (e.g. education, gender, geographical location, age, language, etc.). They argue that the social characteristics that create status ranking differ in different social networks, because actors tend to select social characteristic “that are potentially only meaningful for the given social situation and selectively nullifying others” (Bianchi, Kang, and Stewart 2012:352). Actors judge each other based on specific social attributes and create a pecking order accordingly. This ranking derives from the initial dissimilarity in subjective social attributes, and therefore is reliant on actors’ perceptions rather than actual verity (Ridgeway 1991, Wagner and Berger 1993, Webster and Foschi 1988). Such judgements lead to different levels of deference towards actors according to their perceived social position. Sauder et al. (2012) summed up these theories and suggested status as the “position in a social hierarchy that results from accumulated acts of

This concept is similar to the correspondence bias, which suggests that actors tend to often wrongly associated high status to a random trait, and propagate the idea that the possession of that given trait is the yardstick of status (see, Gilbert and Malone 1995).
deference” (2012:268).

The initial ranking of the actors is the first step towards the creation of status hierarchy in social networks. Ridgeway (1997) pinpoints “consensuality” as one of the principal traits of status. Status beliefs are roughly consensual across all involved actors and consensuality creates a social reality that objectifies the status beliefs and protects them against unfavourable opinions (Ridgeway 1997, Ridgeway and Correll 2006, Berger et al. 1980). In this view, the initial subjective judgments and the widely accepted social ranking is not assessed objectively by each actor of the social network, instead each actor fosters the propagation of those status beliefs “simply by allowing the judgments of others to influence his or her own” (Gould 2002:1146).

Moreover, high status actors apply various techniques to stabilise their superior status. Martin (2009) suggests that high status actors have the ability to convey a positive image of themselves, control the perception of other actors, and thereby assure the stability of their status ranking. As a result, status tends to become a sticky and long-term attribute that is widely preserved not only by the high status actors themselves, but also by the active participation of the low status actors (Magee and Galinsky 2008). Washington and Zajac (2005) found evidence that the organisations with legacy of high status enjoy the privileges of high status position regardless of their performance during a period of time. This argument highlights the integral role of networks in the creation, diffusion, and preservation of status hierarchy. Status values cannot be created in isolation, and networks provide the necessary platform to construct and maintain the status values (Gould 2002).

2.3.3 Status Mechanisms

Research on the characteristics of status has led to the discovery of a number of mechanisms, which could explain the nature of association between status and
social networks. The following discussion introduces the most prominent mechanisms of status, and clarifies their conceptual terrains.

2.3.3.1 Expectation States Theory

Expectation theory is one of the most dominant and widely accepted theories of status studies. Built upon Bales (1950, 1970), and Sherif, White and Harvey (1955), Berger and colleagues developed a theory that suggests status hierarchies are associated with expectations and actors are expected to behave in accordance to their perceived status (Berger et al. 1977, 1985). Status states theorists argue that expectations can create a version of truth and affect actors' behaviours towards its realisation. This theory was originally developed to explain how social structures and status rankings are created within different types of networks, however its potentials to explain the implications of status has been recognised by sociologists and business scholars (Correll and Ridgeway 2006).

2.3.3.2 Matthew Effect

The Matthew effect theory, suggested by Merton (1968) could be categorised as one of the most influential mechanisms of status. Merton has found the inspiration from the following verse of the New Testament (25:29), "for unto everyone that hath shall be given, and he shall have abundance; but from him that hath not shall be taken away even what he hath". This theory suggests that "high status actors obtain greater recognition and rewards for performing a given task at a given level of quality and lower status actors receive correspondingly less" (Podolny 2005:22). The expectation-evaluation cycle acts as a mechanism that assures the long-term maintenance of status order within a social network.
2.3.3.3 Status Signals

The signalling mechanism of status could be considered as one of the most colossal contributions to the status literature. Drawing upon Spence’s (1974) signal theory, Podolny (1993, 2005) argued that status could act as the signal of quality, competence and performance in network settings. The major focus of this theory was on uncertain circumstances, where actors do not have extensive knowledge about the quality of the others. Podolny (1993) argues that actors use status as a sign of quality and act accordingly. Based on this theorisation, he argues that high status actors tend to send stronger signals of quality and competence, and consequently they are more likely to acquire tangible or intangible rewards.

2.3.4 Status Implications

The concept of status and its implications have been traditionally studied under sociology and social psychology disciplines, however its implications for international business setting have recently raised the interest of business scholars. MNEs are generally dispersed geographical and cultural entities with complex structures, such diversity further accentuates the integral role of status in the MNEs (Metiu 2006). The majority of status studies focus on the positive consequences of high status for individuals or organisations (Berger et al. 1985, Stuart et al. 1999, Burt and Merluzzi 2014), while others conducted research on the potential negative aspects of high status (Graffin et al. 2013, Bothner, Kim, and Smith 2012, Marr and Thau 2014). This section reviews the status literature, and by discussing the most notable areas of status research, it paves the path for theorising the relationship between status and innovation.
2.3.4.1 Performance

The potential impact of status on performance is one of the most recognised and at the same time most challenging implications of status (Marr and Thau 2014). Generally, there are three different views regarding the potential impact of status on performance. The first group of scholars do not acknowledge any association between the two constructs (Meindl et al. 1985), and some even address the potential disadvantages of status on performance (Bothner, Kim, and Smith 2012) (see, 2.4.3.5). The other two groups of researchers concede that high status could improve actors’ performance, but their opinions regarding the extent of the effect is divided.

The first group of scholars suggest that the effect of status on performance remains at perception level and does not objectively influence the performance. Building on Matthew effect theory, they argue that the high expectations associated to the high status actors makes other believe that they actually have achieved higher standards of performance. Simply put, they suggest that “regardless of their actual performance, higher-status individuals tend to be seen as better performers than their lower-status colleagues” (Flynn and Amanatullah 2012). For example, Benjamin and Podolny (1999) examined the Californian wine industry, and found that the high status wine producers received more recognition and achieved higher financial returns for the same quality of product as the low status producers.

The second group of researchers also recognise the impact of Matthew effect, however they mainly build on the decisive role of expectation states theory to explain the alluded relationship (Berger et al. 1977, Wagner and Berger 1993). They argue that high status creates the high expectation of performance. The consensuality of such expectations can condition actors’ minds to behave
according to those expectations\(^3\), creating a self-fulfilling prophecy that shapes the behaviour of all actors towards realisation of the expected outcomes. “The higher expectations held for a given actor, the more likely he is to be given and to accept chances to perform” (Webster and Entwisle 1976: 493). Thus, high expectations enable high status actors to perform better and even receive support from other actors to achieve that goal (Correll and Ridgeway 2006).

### 2.3.4.2 Power

The mainstream research in accommodating status into business study is interested in investigating the effect of status in determining the structure of power within organisations. Sociology literature suggests power as the immediate outcome of status, advocating status and power as two closely-knitted concepts, associating high status to more power and low status to powerlessness (Emerson 1962, Kraus et al. 2009, Thye, Willer, and Markovsky 2006). Blau (1955) and Emerson (1962) argued that high status actors could gain more power in societies and utilise their power to maintain the current status beliefs. These arguments suggest “although the concepts of status and power are distinct, they tend to be tightly coupled” (Bunderson and Reagans 2011:1183). Magee and Galinsky (2008) distinguished these two concepts by characterising status as the perception of respect and deference, and defining power as perception of control over valuable resources. However, even in their theorisation, these two concepts are closely associated.

Lovaglia (1997) characterised power as the ability of depriving others from desired goals. High status actors have the potentials to monopolise resources, stabilise their status position and marginalise low status actors within their network by depriving them from access to the available resources. Parkin (1974) labelled this concept as “closure”. He maintained that since resources are limited,

\(^{3}\) This concept is very similar to the “labelling theory”, which suggests actors’ behaviours could be affected according to the terms, groups or categories that they are associated to. (See, Becker 1963)
access to larger portion of resources is a zero-sum game, in which one’s success can be interpreted as other’s failure. Drawing upon Parkin (1974, 1979) and Murphy (1988), Metiu (2006) investigated the closure techniques within a multinational software development firm. She argued that high status subsidiaries use similar techniques to gain larger share of organisational resources, and thereby stabilise their status dominance over low status actors. In essence, high status actors apply closure techniques as a mechanism to reinforce their status advantage (Metiu 2006, Vallas 2001, Weeden 2002, Tilly 1998).

The second application of status on power regards the superior bargaining power of the high status actors (Inkpen and Beamish 1997, Phillips 2001). In this view, high status actors tend to use their perceived social position and power to affect the decision-making processes so that they are more favourable to them (Willer 1981). Moreover, high status actors tend to use their power to achieve political advantages within their social network (Wittenbaum et al. 2004).4

Finally, high status actors tend to be recognised as the role models and good examples due to their association with high quality and performance (Rao et al. 2003, Simmons and Elkins 2004). Such perceptions enable high status actors to attain power over low status actors and enforce their norms and culture across the social network (Tajfel 1978). The low status actors also imitate the behaviours of the high status actors as the symbols of high quality, and thereby accelerate the propagation of those values throughout the network. This behaviour resounds the coercive, mimetic and normative isomorphism theory (DiMaggio and Powell 1983, Mizruchi and Fein 1999). While coercive and mimetic isomorphism are primarily associated to the organisational level of analysis, the normative isomorphism can explain the behaviour of the low status individuals to follow the pattern of behaviour that is similar to those of the

4 This application of power is similar to the rent-seeking theory in the economics and political science disciplines (See, Tullock 2001)
seemingly successful high status actors, as a means of replicating their strong performance and quality.

2.3.4.3 Network Ties

There is a stream of status studies that investigates the potential role of status in the selection of social ties. Reagans (2011) theorises the role of status similarity on the strength of social bonds between actors. Chung, Singh, and Lee (2000) suggest that in strategic alliances, actors tend to establish ties with similar or higher status actors. Podolny (1994), and Rindova, Pollock and Hayward (2006) corroborate this notion by highlighting that the high status actors tend to become attractive exchange partners in social settings. Actors can only develop finite social ties in their organisational network. Thus, they ought to select the social ties that could be most advantageous to them. It is widely believed that they would be inclined towards high status actors for establishing new ties.

The benefits of social connection to high status actors is theorised from different viewpoints (Cook et al. 2013). First, establishing social ties with high status actors is suggested as an act of attaining legitimacy. Podolny and Page (1998) suggest high status actors as the legitimate and respected members of the social network, and theorise that low status actors view association to high status actors as a method of raising their profile and gaining legitimacy and reputation. Gould (2002) also characterises affiliation with high status actors as a “gesture of approval”. Stuart (2000) found evidence that association to the high status actors could be especially influential for the new and low status actors, because it would be seen as a sign of endorsement, and could positively affect their innovation rate. By the same token, Rindova et al. (2005) suggest that organisations gain prominence through association with high status actors. Second, since high status actors are expected to demonstrate high quality, low status actors regard association to them as a method of improving their own
quality. There is a vast body of literature that characterises high status actors as referents and benchmarks (Berger et al. 1985, Foschi 1996, Feldman and Ruble 1981). In a more recent study, Flynn and Amanatullah (2012) found evidence that collaboration with high status coactors improves the performance of the low status actors, however they also found that a negative effect when the collaboration has a competitive nature. Overall, these arguments denote that status plays a vital role in the selection of the social ties, as well as determining the nature of the ties.

2.3.4.4 Other Positive Implications

Besides the abovementioned streams of status studies in the business literature, other implications have been sporadically suggested as the possible outcomes of status in organisations. High status has been linked to higher respect and admiration (Anderson et al. 2006), access to financial resources (Stuart et al. 1999, Stuart and Dong 2006), confidence and self-efficacy (Shea and Howell 2000, Frank 1985), compensation for CEOs (Malmendier and Tate 2009, Graffin et al. 2008), competitiveness (Washington and Zajac 2005), and intangible privileges (Van der Vegt et al. 2006, Homans 1958).

2.3.4.5 Negative Implications

Although the vast majority of status studies advocate the positive effects of high status, there is a growing body of literature that attempts to investigate the potential drawbacks that could be attached to the high status label. Graffin et al. (2013) investigate the reasons behind potential loss of status in a scandal involving the MPs. They have found evidence that although high status and low status actors showed similar abusive behaviour, the high status actors received more attention by the press and the auditors, and subsequently they received bigger punishments vis-à-vis low status actors. Their results hint at the Matthew Effect in a negative context. For the equally negative actions, high status actors
have received higher recognition in comparison to their low status colleagues as well as harsher evaluation (Fine 2001, Adut 2005).

Marr and Thau (2014) have followed this line of work by focusing on the implications of status loss on performance. Having studied different scenarios, they argue that the performance of high status actors have declined sharply once they had lost their status, recording worse performance than both high status actors and low status actors. Other studies on the negative effects of status suggest complacency (Burt 2010, Walker and Smith 2002) distraction (Malmendier and Tate 2009, Collins 2001), and decline of performance (Bothner, Kim, and Smith 2012).

The number of studies regarding the effect of status on business functions is increasing. However, this field of research is still in its infancy and there are several issues that are yet to be addressed. Exploring the potential effect of status on knowledge creation and innovation is one of the issues that have gone unnoticed thus far. Despite the plausibility of a positive correlation between status and innovation, and importance of such discovery, to my knowledge, there has not been any effort to theorise and explain the nature of the relationship between them. Innovation is one of the most critical performance indicators in modern businesses, rooting deep into the social structure of the organisational networks. The social nature of status values and their attested effect on shaping the behaviour of the actors in a social network can offer an explanation on how innovative ideas are socially generated and diffused across social networks. These arguments further accentuate the unique role of social networks and pave the path to the introduction of social capital as the potential missing link that could fill the conceptual distance between status and innovation.
2.4 Social Capital

2.4.1 Introduction

Social capital is defined as the "aggregate of resources embedded within, available through and derived from the network of relationships possessed by an individual or organisation" (Nahapiet and Ghoshal 1998:243). Accordingly, Knoke (1999:18) defined social capital as "the process by which social actors create and mobilise their network connections within and between organisations to gain access to other social actors' resources". Bourdieu and Wacquant (1992:119) also characterised social capital as "the sum of the resources, actual or virtual, that accrue to an individual or group by virtue of possessing a durable network of more or less institutionalised relationships of mutual acquaintance and recognition". The primary conceptual difference between social capital and other sources of capital (e.g. financial capital, human capital, etc.) can be found in their origins. While, common types of capital are based on internal capabilities, “to posses social capital, a person must be related to others, and it is those others, not himself, who are actual sources of his or her advantage” (Portes 2000:43). These definitions reflect the idea that social networks could be considered as the cradles of invaluable resources, and actors could benefit from these sources of capital according to the pattern and quality of their social ties.

Popularity of social capital concept has increased recently through the works of Putnam (1993, 2001), Burt (1992, 1995), and Nan Lin (2001), and its potential implications for organisational networks in terms of securing tangible or intangible resources have raised the interest of business scholars. One of the most valuable of those resources is knowledge. The ability of social networks to explain the extent to which actors can access knowledge is one of the key foundations of this study.
Nahapiet and Ghoshal (1997) conceptualised a three-dimensional model for social capital, which has found widespread recognition amongst social network scholars. This model categorises social capital into three structural, relational and cognitive dimensions. They argued that the aggregate resources accrued through these three dimensions forms actors’ social capital. Figure 7 takes a closer look into the three dimensions of social capital.

![Social Capital Dimensions based on Nahapiet & Ghoshal (1997)](image)

**2.4.2 Structural Dimension**

Structural Dimension of social capital is defined as the advantage created by actor’s position in a network of relationships (Nahapiet and Ghoshal 1998, Nan Lin 2001). The structuralist social network analysts, such as Coleman (1990) or Gulati (1999) focus specifically on structural dimension as the most important aspect of social capital, and in some instances even use it interchangeably with social capital. For example, Adler and Kwon (2002:18) defined social capital as “resource available to actors as a function of their [location] in the structure of their social relations”.

The classic view of the structural dimension is heavily focused on the multitude of social ties as the representative of network structure. Direct ties are considered as the obvious channels of resource exchange in a social context, and actors who engage in social interactions are more likely to be exposed to other sources of knowledge and expertise (Gupta and Govindarajan 2000). While one must acknowledge the importance of direct ties, it would be naïve to constraint the potentials of network structure to them.

The more recent wave of studies on the structural dimension of social capital are built on the premise that different network positions possess different values, therefore they can offer distinct advantages to their occupiers. This point of view has given rise to two major avenues of study. Structural holes and brokerage studies apply an egocentric approach, and focus on the position of each focal actor in contrast to their adjacent actors (Burt 1992, 1994, 2005, Mehra et al. 2001, Ahuja 2000). Conversely, centrality studies view social networks as a whole, and evaluate the position of actors in a wider structure (Freeman 1979, Tsai and Ghoshal 1998).

2.4.2.1 Structural Holes and Brokerage

Ron Burt (1992) defined the term “structural hole” as a relationship of non-redundancy between two – otherwise disconnected – actors. When actors identify a structural hole and establish bridging ties between two disjointed actors, they attain the broker role (Burt 2005). Brokerage has been associated to multiple advantages such as better performance (Mehra et al. 2001), power (Brass 1984) or most importantly creativity and innovation (Burt 1987, 2004, McEvily and Zaheer 1999, Hargadon and Sutton 1997, Ahuja 2000). Structural holes are the most strategic positions of the network, providing the only link between two detached sub-networks. Thus, brokers have the opportunity to monitor the exchange of knowledge as well as any other sort of communications.
between those sub-networks. Occupying the informational bottleneck provides brokers with diverse sources of knowledge, as well as power of controlling them (Burt 2005). Unique bridging ties across structural holes can create value with minimum costs of maintenance and commitments. This virtue of unique ties becomes clearer, when they are compared with the notion of redundancy. Figure 8 depicts X as the broker, located in the structural hole between two clusters of A and B. It is clear how X can control any flow of knowledge between A and B.

![Figure 8](image)

**Figure 8- Structural Hole and Broker Position – (Own Figure)**

Scholars suggest two common types of redundancy in social networks. *Cohesion* represents a robust relationship amongst a group of actors. Since they provide the same network benefits, establishing social ties with all of them creates redundancy (Burt 1995, Scott 2000). In figure 9, Actors A, B and C are tightly connected, thus a social tie with any of them leads to similar advantages for actor X.

![Figure 9](image)

**Figure 9- Redundancy Caused by Structural Cohesion (Own Figure)**
Structural equivalence describes a situation, in which two or more actors have the same pattern of relationships with other actors within a network (Burt 1992). It means that they can lead to the same sources of knowledge; therefore they are also considered as redundant. In Figure 10, A, B and C are structurally equivalent, because they all occupy exactly similar position.

![Figure 10- Redundancy Caused by Structural Equivalence (Own Figure)](image)

The concepts of brokerage and redundancy can be used as strong arguments to challenge the idea that regards number of direct ties as the undisputed positive structural attribute. These theories confirm that few non-redundant ties could be even more advantageous than abundance of redundant ties that do not diversify the available knowledge stock (Burt 2005). Moreover, building unique ties can distinguish actors from their structural equivalents; make them more valuable and their position indispensible. This discussion paves the path for a more holistic view of network structure, epitomised in the notion of centrality.

### 2.4.2.2 Centrality

The concept of centrality is a loose term to describe the importance that is assigned to each network position (Freeman 1979). Centrality views actors’ position within the context of the whole network. Despite the pervasiveness of centrality in the body of research, there is no consensus amongst scholars on
what it exactly entails. As a result several interpretations of centrality have been offered within network literature. The following discussion introduces the most common notions of centrality, and explains their conceptual differences.

**Degree Centrality.** Degree centrality is the most basic and intuitive view of centrality. Degree centrality is basically characterises the sum of direct contacts that actors possess in a network; hence actors with higher number of ties are considered more central.\(^5\) An advanced version of degree centrality can be applied to networks with directional ties. In-degree centrality comprises of the number of ties that an actor receives, while out-degree centrality contains the number of ties an actor sends. Degree centrality offers an index regarding actors’ exposure to their local network. Furthermore, it is useful for studies that focus on direct influence between actors such as advice or trust networks (Borgatti 2005). Although, degree centrality can demonstrates actors’ popularity in rather small networks, it fails to explain centrality in a larger scale. Degree centrality does not consider the importance of diversity and structural holes either. The larger the size of the network is, the more obvious these weaknesses become. A high degree centrality could be limited to a confined sub-network, overlooking actors’ position in the whole network.

**Eigenvector Centrality.** In order to mitigate the downsides of degree centrality, Bonacich (1987) proposed eigenvector centrality, which integrates degree centrality of all adjacent actors to measure focal actors’ centrality. Eigenvector centrality is the product of actors’ degree centrality weighted by degree centrality of their immediate contacts (Bonacich 1987, 2007, Bonacich and Lloyd 2001). Thus, it is an extended version of the degree centrality (Borgatti 2005). Even though eigenvector centrality is more advanced than degree centrality,

\(^5\) \( C_D(i) = \sum_{j=1}^{n} x_{ij} = \sum_{i=1}^{n} x_{ji} \), Where,

\( x_{ji} \) = The value of the tie from actor \( i \) to \( j \) (0 or 1), \( n= \) number of actors
they both fail to encompass the whole network and they are rather concentrated on local centrality, especially in large networks they both remain within a local cluster of network ties.

**Closeness Centrality.** Network scholars suggest closeness centrality to incorporate overall position of actors into centrality measure. Closeness centrality is built on the assumption that resources move along the shortest paths, and it represents the extent to which each actor is close to the other actors. It is measured by summing the shortest path between each actor and all other actors of the network (Freeman 1979). The actor with the smallest aggregate is the most central member of the network.\(^6\) In order to avoid any confusion, social network analysts tend to use the reverse measure of farness centrality in order to facilitate the usage of the calculated centrality.

Closeness offers an index representing the expected time until arrival of resources that flows across the network. Thus, it could be applied for the networks that operate on the speed of information or resources flow. Similar to the degree centrality, closeness centrality can be divided into two directional networks. In-closeness variable indicates the extent to which an actor is easily accessed by others, while out-closeness represents the extent to which an actor can reach other actors. The main weakness of closeness centrality is its inability to work in disconnected networks, because the closeness with the disjointed actors will be infinite. Betweenness centrality is suggested to address this issue.

**Betweenness Centrality.** Betweenness centrality is a more intricate view of centrality that takes the whole network into account. Betweenness centrality focuses on overall position of actors in the network rather than the number of their direct ties. Betweenness index, which has been introduced in graph theory,

\[^6\] \( C_C(i) = \sum_{j=1}^{n} d_{ij}, \) Where,

\( d_{ij} = \) The distance connecting actor \( i \) to actor \( j \).
is mainly suggested for the studies that investigate the networks of resource exchange (Freeman 1977, 1979, Burt 1992). It basically signifies how many times an actor locates on the shortest path linking any two other actors together (Sabidussi 1966, Freeman 1977). The more number of times an actor appears on the geodesic of other actors, the more central it becomes.

Similar to closeness, betweenness centrality is based on the assumption that knowledge flows through the shortest path between actors. Thus, it inherently favours broker actors due to their gatekeeper position, while it also takes the direct ties into account. Betweenness centrality integrates the actual position of the actors and associates centrality to the aggregate exposure of actors to the resources that flow across network ties.

Figure 11 compares these notions of centrality in an example in order to further demonstrate their differences.

![Figure 11 - Example of four centrality measures – Own Figure and Table](image)

<table>
<thead>
<tr>
<th></th>
<th>Degree</th>
<th>Eigenvector</th>
<th>Closeness (Farness)</th>
<th>Betweenness</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>0.079</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>0.210</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>0.478</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>0.53</td>
<td>8</td>
<td>1.5</td>
</tr>
<tr>
<td>E</td>
<td>2</td>
<td>0.399</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>F</td>
<td>3</td>
<td>0.53</td>
<td>8</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Figure 11- Example of four centrality measures – Own Figure and Table

\[ C_b(k) = \frac{\sum_{i\neq j} a_{ikj}}{\delta_{ij}}, i \neq j \neq k \]

Where:

\( \delta_{ikj} \) = The number of geodesics connecting actors \( i \) and \( j \) that pass through actor \( k \).
Although, actors C, D, and F have similar degree and eigenvector centrality, C is slightly more central in terms of closeness, and considerably more central according to betweenness centrality. D and F are structurally equivalent and they share the value of their network position, making them expendable. C on the other hand occupies the structural hole between D/F and B. Removing C will turn the network into two disconnected sub-networks, thus C is valuable, integral and most central actor of the network.

Overall, the structural dimension of social capital represents the advantages that actors receive from their network position. Direct social ties, closeness to the origins of resources, frequent presence in the paths of resource exchange, or unique ties across structural holes could all become valuable means of resource acquisition.

Moreover, network structure determines the pattern of collaboration between actors and represents the level of cohesiveness and togetherness of the network. Well-connected networks create higher network stability (Inkpen and Tsang 2005). Stable networks foster mutual trust and intensify cooperation between actors, and long-lasting relationships between actors can build strong bonds between them (Gabarro 1978, Biggart and Delbridge 2004). Strength of social ties and level of trustworthiness are the key concepts that influence the nature of social ties and quality of exchanged knowledge between structurally connected actors. These concepts will be discussed under relational dimension of social capital.

2.4.3 Relational Dimension

Relational Dimension of social capital is characterised by the quality and dynamics of relationships between the actors within a network (Nahapiet and Ghoshal 1997). Scholars strongly suggest that trust is one of the most salient determinants of relational dimension of social capital (Nahapiet and Ghoshal
1997, Tsai and Ghoshal 1998, Reagans and McElivy 2003, Inkpen and Tsang 2005, Uzzi 1997, Van Wijk et al. 2008). “Trust is a type of expectation that alleviates the fear that one’s exchange partner will act opportunistically” (Bradach and Eccles 1989:104). In other words, trust gives actors the confidence that their knowledge will not be appropriated or misused (Krackhardt 1990, Uzzi 1997). Granovetter (1995:118) compares trusting networks to “moral communities, in which, trustworthy behaviour can be expected, normative standards understood and opportunism foregone.” Thus, a trustworthy actor naturally has a better chance of receiving high quality knowledge resources and stronger support from its social connections (Szulanski, Cappetta and Jensen 2004, Levin and Cross 2004).

There are two major viewpoints theorising the process of trust creation between actors. The first theory considers strong trust between actors as a long-term process. In this view, process of strong trust starts with less risky exchanges that need little trust and it gradually develops to exchanges that require more trust, in which partners can build trusting partnerships (Blau 1964, Gabarro 1978, Mayer, Davis and Schoorman 1995). Initial tentative exchanges lead to more familiarity and it eventually results in more significant exchanges (Cross and Parker 2004). During a long-term collaboration actors can prove their benevolence, reliability and commitment and consequently develop trusting bonds. "As trusting relationships develop inside a network, actors build up reputations of trustworthiness that may become important information for other actors in the network" (Tsai and Ghoshal 1998:467).

The second perspective of trust creation focuses mainly on the development of trustworthiness. According to this view, the characteristics of the trustee play the main role in the formation of trustworthiness. Mayer, Davis and Schoorman (1995:717) defined ability as a “group of skills, competencies, and characteristics that enable a party to have influence within specific domain”, and suggested it as
one of the key factors of trustworthiness. Similarly, Butler and Cantrell (1984) characterised competence-based trustworthiness as the perception that the trustees have the necessary skills and abilities to undertake their job. Thus, this viewpoint argues that the actors who are perceived as competent tend to become the trustworthy members of their network (Levin and Cross 2004). These definitions expose the conceptual differences between the two viewpoints. While the first view focuses on the creation of mutual trust between long-term partners, the second view highlights the pivotal role of perceptions in the formation of the often unidirectional trustworthiness.

Tie strength has also been suggested by some scholars as a determinant of relational dimension of social capital. Strength of ties has been associated with frequency of interactions and level of obligations, commitments and responsibilities (Mitchell 1969, Granovetter 1973, Levin and Cross 2004). Close and intense interaction between actors bolsters their relationship and strengthens their social tie. Some scholars argue that although maintaining intense ties could be very costly and time-consuming (Zaheer, McEvily and Perrone 1998, Perry-Smith 2006), they can provide the strongest conduits of knowledge in social networks (Tortoriello and Krackhardt 2010, Tortoriello, Reagans, and McEvily 2012, Krackhardt 1992). On the other hand, there has been another stream of studies that challenges this theory, emphasising on the importance of weak ties as sources of non-redundant and unique knowledge (Levin and Cross 2004, Hansen 1999, Granovetter 1973). This branch of studies builds on Granovetter (1973), who raised the question regarding the importance of weak connections. Levin and Cross (2004) highlight the importance of trusting weak ties as the efficient type of knowledge acquisition. They contended that weak but trustworthy ties provide actors with reliable knowledge, and they are not costly to maintain. Overall, actors access knowledge resources through both strong and weak ties at different costs, and they need to decide whether the
accessible knowledge justifies the costs or not.

Although structural and relational dimensions of social capital can nearly explain the dynamics of knowledge exchange, the level of cognitive understanding and shared goals and values between actors can also influence the outcome of knowledge acquisition and social capital.

2.4.4 Cognitive Dimension

Cognitive Dimension of social capital is characterised as actors' shared goals, visions, beliefs and culture that facilitate a common understanding of collective goals and proper acting in a social system (Nahapiet and Ghoshal 1997, Gulati 1995). Cognitive values provide shared representation, interpretation, and systems of meaning among actors (Nahapiet and Ghoshal 1997). Merton (1968) argues that shared values are the most important indicators in explaining the behaviour of societies and institutions. These values and beliefs can be merged into the concept of culture. The crucial role of culture in cognitive dimension of social capital links it directly to a wider range of studies in international business literature, that attempt to investigate and theorise the dimensions of national or organisational culture (Hofstede 1980, 1989, Kogut and Singh 1988, Shenkar 2001, House et al. 2004).

Friedkin (1998) argues that actors with similar attitudes and values are more likely to be socially tied to one another. Collaboration process can be more successful between two actors with more similarity in their cognitive values (Reagans 2011). However, actors often come from distinct cultural backgrounds and follow dissimilar personal goals in an MNE. A wide cognitive gap between actors could be a massive deterrent of collaboration and knowledge exchange. Thus, it is crucial to define collective cognitive values of the network as the mutual (or possibly consensual) cognitive platform, and encourage all actors to follow those values. Shared goals and culture are the two major components of
the collective cognitive values. Common goals and cultures act as bonding mechanisms, create mutual understandings and homophily, and promote exchange of ideas and resources between collaborating actors (Inkpen and Tsang 2005, Nahapiet and Ghoshal 1998). Moreover, they can direct the efforts of all actors towards predefined collective objectives. Since actors are asked to follow the shared goals and act under the shared culture and norms, those whose initial cognitive values are close to the collective cognitive platform, tend to have stronger cognitive capital in comparison to those who need to go through drastic changes in order to accommodate the mutual cognitive values (Li 2005). In other words, the actors who have it easier to comply with the collective goals and culture are more likely to achieve those cognitive values. These propositions are in line with the institutional duality theory, which highlights the conflict between subsidiaries’ goals versus headquarter mandated goals and practices. Building on Scott (1995), Kostova (1999) characterised institutional environment into regulatory, cognitive, and normative components. She suggested that the success of knowledge acquisition is negatively associated with the institutional distance.

However, some scholars propose a contradictive argument. They claim that cognitive similarity can reduce the variety of ideas and in a bigger picture deprive the whole network from diversity of viewpoints (Nootenboom et al. 2007, Cox 1994). From this point of view, complete cognitive similarity leads to uniformity and reduces innovative and novel ideas. Although, this argument offers a valid viewpoint and it should be taken into account, it cannot be denied that familiar cognitive values can reduce misunderstandings, mitigate frictions, decrease reluctance and motivate actors in sharing their knowledge and thereby catalyse innovations.

### 2.4.5 Interrelations between the Dimensions

Three dimensions of social capital have constant impact on each other. Although
this research is dedicated to theorise and measure the impact of status as the antecedent of social capital and innovation, it is essential to acknowledge the potential interrelations between the dimensions of social capital, and discuss how they act mutually to stabilise and reinforce actors’ social capital.

Tsai and Ghoshal (1998) argue that centrality of an actor positively associates with the level of its perceived trustworthiness and their data supports this proposition. In this view, actors could utilise their social connections to create trusting partnerships. On the opposite direction, for more peripheral actors, gaining the trust of their existing partners creates a reputation of trustworthiness, which can spread through their current contacts and increase their chances in establishing new ties with other actors and thereby improving their position within the network (Gulati 1995, Wong and Boh 2010). This mutual influence indicates that while central network position can create stronger ties, on the other hand, reputation of trustworthiness could lead to better network position for actors.

Similarly, the structural and cognitive dimensions of social capital could also have reciprocal effect on each other. A central actor is often presented with the opportunity to be exposed to larger group of actors, and therefore has a better chance to familiarise itself with the collective goals, culture and norms (Biggart and Delbridge 2004, Van Maanen and Schein 1979). On the other hand, the actors who represent the collective goals and culture of the organisation could be seen as the shortcuts to those goals and become attractive exchange partners (Nahapiet and Ghoshal 1997, Pitts and Lei 1996).

Finally, the interrelation between the relational and cognitive dimensions of social capital is plausible. The trustworthy partners could develop better cognitive understandings and direct their efforts towards the mutual and collective objectives (Gabarro 1978, Barber 1983). Furthermore, following
similar goals and demonstrating similar culture and norms could catalyse the process of trust between actors (Sitkin and Roth 1993).

To summarise, social capital involves the aggregate of the resources that are obtained from structural, relational and cognitive dimensions. The continuous interrelations between these dimensions suggest that study of one dimension, while disregarding the other two could lead to an incomplete and biased understanding of social capital, its antecedents and consequences. Therefore, this study takes all three dimensions of social capital into account.

2.5 Theoretical Overlaps of Social Capital with Status and Innovation

This chapter hitherto has shed light on the core concepts of this research, and elucidated the theoretical foundations of its main constructs. The evolution of innovation studies, and growing role of knowledge exchange and social networks in cultivating innovative ideas and fostering their development has been discussed (Kogut and Zander 1992, Nonaka 1994). Furthermore, the shift of paradigm from psychological attributes to social capabilities in the study of innovation antecedents was highlighted. Subsequently, the concept of status and its conceptual underpinnings were introduced, and through discussing its mechanisms, the wide range of its implications on performance, power, network ties and knowledge acquisition were reviewed. Finally, the literature pertinent to social capital was discussed, and its characteristics were reviewed.

Having discussed the key concepts and theories, it is time to have a closer look to the literature to identify the most notable studies pertaining to the linkages between status, social capital and innovation, and discuss their key findings. A detailed review of those studies could clarify the theoretical gaps that this study is aiming to address, and find solid foundations for the development of the
hypotheses in the next chapter.

2.5.1 Effect of Status on Social Capital

There is a growing body of literature recognising the effective role of status in explaining the most intricate issues of the organisations (Reagans 2011, Bothner, Kim, and Smith 2012, Marr and Thau 2014, Bunderson and Reagans 2011, Metiu 2006). Some of those implications and their most noteworthy studies were discussed earlier in this chapter. I revisit those studies in order to pinpoint the theoretical interfaces between status and three dimensions of social capital.

2.5.1.1 Status and Structural Dimension of Social Capital

The potential relationship between status and structural dimension of social capital can be sought in two strands of status studies. The proposed popularity of high status actors as the favourable exchange partners (Podolny 1994, Podolny and Page 1998), as well as the ability of the high status actors in anchoring key network positions (Burt 2005, Bruggeman 2008, Burt and Merluzzi 2014) could offer theoretical justifications to explain the nature of relationship between these two constructs.

Firstly, scholars suggest the role of status in the selection of exchange partners. Chung, Singh, and Lee (2000) underline the impact of status similarity and social capital in strategic alliances, and identify status similarity as a determinant of alliance formation particularly in uncertain circumstances. Stuart et al. (1999) supports this notion and argues that high status actors tend to evaluate the potential partners in terms of status prior to the formation of strategic alliance, in order to assure their status ranking is not negatively affected through association with low status actors. This view suggests that actors tend to pursue partnerships with the actors who belong to the equal or higher social ranking (Podolny 2005). Stuart (2000) further argues that since high status actors are
“perceived as reliable evaluators that are capable of discerning quality differences among potential partners” (2000:795), passing the due diligence of a high status actor acts as an acknowledgement and sends a signal of competence. Hence, actors constantly follow new partnerships with high status members of their network. These studies argue how high status actors may be given more opportunities for forming new ties, while low status actors are not offered with equal prospects. However, the focus of these studies is mainly on the strategic alliances between organisations. Nonetheless, one can infer that the same logic could apply within the boundaries of an organisation as well.

A similar body of literature focuses on the potential role of legitimacy seeking on the formation of social networks. High status actors tend to be considered as the legitimate and respected members of the social network, and thus affiliation to them could be seen as a signal of legitimacy for actors who belong to the lower social rankings (Podolny 1994, Podolny and Page 1998). Being associated to the legitimate high status actors can offer various advantages such as survival (Jensen 2008, Baum and Oliver 1992) or economic benefits (Gulati, Nohria and Zaheer 2000, Stuart and Ding 2006) to actors. Stuart et al. (1999) characterise association with high status actors as an act of receiving endorsement. In sum, these studies accentuate the popularity of high status actors as advantageous exchange partners, due to the fact that they can offer approval and legitimacy to the low status actors.

Conversely, high status actors themselves are tipped to be capable of occupying desired network positions through establishing crucial social ties. Burt and Merluzzi (2014) suggest high status and brokerage as the complimentary attributes and contend that high status actors are more likely to occupy structural holes. They justify this claim by theorising that high status actors can alleviate the concerns of other actors regarding the occupancy of the broker position. Structural holes are the most valuable positions of the network (Burt
1992), and the majority of the actors would rather see a high status actor to occupy the valuable broker positions. The reasons behind this inclination could be found in the literature that examines the implications of having social ties with the brokers. Brass (2009) suggests that although being connected to the broker actors may be risky in terms of the informational imbalance and the perceived inferiority of the non-broker actors, it is generally beneficial to form associations with the brokers. Galunic, Ertug and Gargiulo (2012) expand this notion, by labelling it as the “second-order social capital”. They focus on the characteristics of the broker actors and find evidence that “employees will benefit from being connected to brokers when those brokers occupy higher positions in the structure of an organization than the actors themselves occupy” (2012:1214). This argument can elucidate why high status actors receive stronger support to occupy the broker position. This line of research corroborate the theory that was suggested earlier by Bruggeman (2008), who argued high status actors tend to take more advantage of brokerage and bridging ties across structural holes, while the low status actors often lack that vision and are more reliant on dense adjacent network.

Overall, the combination of popularity and capability can explain the premium position of high status actors in the social network. Not only high status actors are often approached by approval seeking actors, but also they are capable of using their potentials to evaluate prospective social ties and occupy the finest positions of the network. These arguments indicate a close relationship between status and the structure of social networks. However, the existing studies mainly have an egocentric view and examine how status affects the network positions or the social ties of a focal actor. There is a clear scarcity of studies that have a holistic approach and theorise how status affects the overall network structure. Particularly, lack of a study that investigates the effect of status on centrality is surprising.
2.5.1.2 Status and Relational Dimension of Social Capital

The theoretical justification regarding the potential impact of status on the relational dimension of social capital can be mainly found in the literature pertaining to the signalling mechanism of status. Podolny (1993, 2005) characterises status as a signal that reduces uncertainty regarding the quality and performance of the actors. In this view, “status serves as an informational cue that can be used to differentiate a focal set of actors when underlying quality differences are not transparent” (Sauder et al. 2012:272). In other words, actors use perceived status as a benchmark for estimating perceived trustworthiness of other actors.

Similarly, Uzzi (1997:52) argues that the “traits that signal reliability and competence are interpreted by potential exchange partners”. Although he does not single out status as the precursor of reliability, he suggests that reliability of the partners diminishes the complexity of risk taking, and thereby facilitate the creation of trust. Gulati, Nohria and Zaheer (2000) took this notion further and highlighted the significant role of reliability in the creation of trust between exchange partners. Hence, one can infer that the signal of quality emanating from the high status actors could be seen as a sign of competence and reliability, creating a feeling of confidence and assurance.

Despite the strong indications regarding the effect of status differences on the perceived competence of actors in social networks (Podolny 2005), and the solid findings that corroborate the theory of competence-based trustworthiness (Levin and Cross 2004) there has been little empirical evidence to unite these two relationships and examine the effect of status on perceived trustworthiness.
2.5.1.3 Status and Cognitive Dimension of Social Capital

Finally, the linkage between status and cognitive dimension of social capital is addressed in terms of the effect of power and status on the ability of actors in achieving the collective goals of the organisation. Guinote (2007) examines the effect of power on goal pursuit and suggests that high status actors demonstrate efficacy in adapting their behaviours toward attaining the goals, whereas low status actors tend to be involved with more constraints and hindrances in pursuance of those goals. She argues that powerful actors utilise their power to focus on the goals and make appropriate decisions freely, while powerless actors are often distracted by other limitations. Her results were in line with Overbeck and Park (2006) who found high status actors to be more attentive towards the social settings and more responsive to the organisational goals. Their results demonstrate that powerful actors tend to utilise their social awareness in order to achieve the their goals. By the same token, Smith et al. (2008) investigated the effect of power on executive functions and found evidence that powerless actors lack the ability to distinguish goal-relevant and goal-irrelevant factors. These studies highlight the fact that high status are the likely candidates to follow the collective goals and understand the collective culture of the organisation, therefore they could achieve higher level of cognitive similarity to their social network.

Furthermore, Bunderson and Reagans (2011) address the potential influence of status and power on the organisational learning from a social network perspective. They suggest “power and status differences can suppress collective learning by compromising the ability of those lower in social hierarchy to acknowledge, focus on and regulate their efforts toward collective goals” (Bunderson and Reagans: 2011: 1187). This claim indicates that high status actors could utilise their power to influence the collective cognitive values of the organisation to become more aligned to their cognitive standpoint. To be more
precise, these studies emphasise that high status actors are more able to understand the collective goals and norms of the organisation, and have less limitations to achieve them; therefore they can reach higher level of cognitive similarity with the organisation.

Overall, this review indicates that there are strong theoretical justifications that support status as the antecedent of social capital dimensions. Status affects structural dimension by playing a role in the process of selection and formation of social tie (Stuart 2000, Podolny and Page 1998, Burt and Merluzzi 2014). Status provides the signals of assurance, reliability and competence facilitating the process of trust between actors (Podolny 1993, 2005). Finally, status affects cognitive dimension of social capital by facilitating the pursuit of collective goals (Guinote 2007, Overbeck and Park 2006).

Despite irrefutable theoretical accounts, two concepts of status and social capital exist almost entirely detached within the literature. There have been limited efforts to theorise and measure the effect of status on different dimensions of social capital independent of other dimensions, but the potential influence of status on social capital, in the sense of accumulated resources from the social network, was beyond the scope of those studies. Bridging these two constructs could contribute to both status and social capital literature by furthering our understanding on how status as an important social attribute could influence the extent of resource acquisition from social networks, and thereby unearthing the social antecedents of social capital.

2.5.2 Effect of Social Capital on Innovation

This section aims to review the literature regarding the potential interrelations between three dimensions of social capital and innovation. I will review the most notable studies to identify the key findings and shed light on the potential theoretical gaps.
2.5.2.1 Structural Dimension of Social Capital and Innovation

The studies that address the effects of social capital on innovation are predominantly concerned about the role of structural dimension and network configuration on innovative outcomes. Tsai (2001) investigates the impact of network centrality on the innovation outcome of business units in two petrochemical and food manufacturing MNEs and argues that network centrality positively affects the innovative output of the business units. In this study he opted for degree centrality to measure the structural dimension of social capital. However, the selection of degree centrality was heavily challenged in other studies. McFadyen and Canella Jr. (2004) study the effect of social capital on scientific publications and find evidence that the “number of exchange partners has a positive, and then a negative, effect on the amount of knowledge that a person creates” (2004:743). They argue that the number of exchange partners per se does not necessarily improve the innovative outcomes, challenging the conventional view of the degree centrality. In a more complex model, Tsai and Ghoshal (1998) study a social network comprised of 15 business units, and find that the betweenness centrality directly affects the amount of knowledge acquisition by the business units, deemed influential in innovation. These studies provide clear indications that actors cannot rely solely on their direct ties to achieve centrality, and forming diverse ties is a necessity for lodging in the most central network positions. This idea is corroborated in the work of Phelps (2010). He examines the effect of network structure of alliances in exploratory innovations and highlights the positive role of diversity in alliance partners in innovative outcomes.

Burt (1992, 1995, 2005) takes a closer look into the structure of social networks and highlights the important role of structural holes (1992) and brokerage (2005) in access to non-redundant and novel knowledge. He regards broker position as the most valuable location of the network in terms of access to
organisational knowledge as well as power of passing or blocking it altogether, and suggests occupying structural holes increases the creativity and idea generation in the actors (Burt 2005, Haas 2006). The close relationship between structural holes and innovation could be clearly seen in the work of Ahuja (2000). He conducted an elaborate longitudinal research to cover a wide range of network attribute namely structural holes on the innovation. He discovered a duality in the literature regarding the role of structural holes in innovation, challenging Burt’s structuralist viewpoints. Burt (1992) champions the idea that insists the more structural holes actors span, the more non-redundant knowledge they acquire, and the more innovative they become. However, Ahuja (2000) found strong indications in the works of Coleman (1988) and Uzzi (1997) who support the role of dense social collaborations and embeddedness in promoting the exchange of valuable and tacit knowledge resources, which are required for innovation. Based on these two lines of work, he suggested two competitive hypotheses. The results favoured Coleman’s views, suggesting too many structural holes could create a negative effect of on the innovation.

The review of the literature that link network structure to innovation leads to the following discoveries. First, actors must create a balance between their direct and non-redundant ties. There is clear evidence that excessive number of direct ties diminishes knowledge acquisition, while a large number of structural holes could isolate the actors, and deprive them from the acquisition of high quality knowledge that is only available in the direct and intense interactions. Second, the current studies that address the effect of network structure on innovation predominantly follow an egocentric approach. They primarily focus on a focal actor, examine its neighbouring social networks, and test the effect of that specific configuration on the innovative outcome of the focal actor. The body of research would benefit from a study that has a holistic view of the social network and measures how the overall network structure affects the innovative
contribution of the actors.

2.5.2.2 Relational Dimension of Social Capital and Innovation

Despite the challenging arguments on how network structure may affect innovation, there is a general consensus amongst scholars that the well-positioned actors are more likely to be innovative. This relative harmony fades away when it comes to the relational dimensions of social capital. The literature is highly divided on the effect of tie strength on innovation. The first branch of studies argues that strong ties positively affect relational dimension of social capital and improve the quality of acquired knowledge (Krackhardt 1992, Tortoriello, Reagans, and McEvily 2012). They contend that strong ties provide the best channels of knowledge flow, and frequent and intense interactions can catalyse the exchange of tacit knowledge, and thereby facilitate the process of knowledge creation and innovation. The importance of strong ties is further highlighted in the works of David Krackhardt. Inspired by Simmel (1950), he introduced Simmelian ties as the strongest type of social tie between two actors. He defines Simmelian tie as follows: “two people are Simmelian tied to one another if they are reciprocally and strongly tied to each other and if they are each reciprocally and strongly tied to at least one third party in common” (1998:24). By suggesting the role of triads vis-à-vis dyad ties, Krackhardt argues that Simmelian ties are generally more trustworthy (due to durability and stickiness) and more intense (due to clique structure), therefore they provide the strongest conduits of knowledge exchange between actors within a social network and facilitate innovation (Krackhardt 1998, Tortoriello and Krackhardt 2010).

Other scholars, however, seriously challenge those arguments (Granovetter 1973, Levin and Cross 2004). They argue that strong ties often involve high level of commitments and responsibilities, and thus they could be costly to maintain
and inefficient to sustain. Building upon Granovetter (1973), they suggest that weak ties could be equally resourceful and provide actors with easy and unique knowledge and promote innovations (Levin and Cross 2004, Hansen 1999). Along the same vein, Perry-Smith (2006) studies the ties amongst the researchers in two laboratories, and finds concrete evidence that while weak ties facilitate creativity, strong ties do not show such an effect.

The dispute over tie strength is resolved by an agreement on the unequivocal role of trust in the process of knowledge exchange. Levin and Cross (2004) argue that as long as the social ties are trustworthy, weak ties could be considered as reliable sources of knowledge. Zaheer, McEvily and Perrone (1998) study the influence of inter-personal and inter-organisational trust on the performance of actors. They define trust as “confidence or predictability in one’s expectations about another’s behaviour, and confidence in another’s goodwill” (1998:143) and emphasise on the role of trust in the performance in both individual and organisational levels. Li (2005) also corroborates the positive effect of trust on the inward transfer of knowledge to the subsidiaries from both headquarter and external sources.

The review of studies that link the relational dimension of social capital to innovation could lead to the following interpretations. First, although strength of ties could be influential in the extent of knowledge exchange, it could not be an objective factor for understanding the relational dimension of social capital. Research indicates that the effectiveness of tie strength on knowledge exchange depends on other factors (Levin and Cross 2004). Second, trustworthiness is a characteristic that could increase the quality of social interactions, and expedite the process of knowledge exchange.

2.5.2.3 Cognitive Dimension of Social Capital and Innovation

The literature offers an abundance of theoretical accounts that suggest a strong
relationship between cognitive dimension of social capital and innovation. The first stream of studies focuses on the role of organisational climate on the innovative behaviour of the employees (Anderson and West 1998, Patterson et al. 2005). This group of scholars define climate as the “cognitive interpretation of an organisational situation ... [that represents] signals individuals receive concerning organisational expectations for behaviour and potential outcomes of behaviour” (Scott and Bruce 1994: 580). They suggest actors who have a better cognitive understanding regarding the norms and values of the organisation tend to show stronger innovative contributions. This viewpoint is largely associated with the organisational psychology, and is mostly focused on the effect of cognitive similarity on knowledge creation (see, Sternberg 1999, West 2002). To summarise, actors who share the psychological climate of the organisation, and have a clear understanding regarding the goals and culture of their network are more likely to come up with ideas that actually fits the needs of their organisation; whereas lack of cognitive understanding may result either in discouragement or creation of irrelevant ideas with no congruency to the needs of the organisation (Pearce and Ensley 2004, Ekvall 1996, Scott and Bruce 1994).

While the first group of scholars are predominantly focused on the effect of cognitive similarity on creativity, the second group is more attentive to the role of shared cognitive values in the process of developing innovative ideas into commercialised products (Tsai and Ghoshal 1998). They argue, besides creativity, actors require other resources such as expert knowledge and physical support in order to develop their innovative ideas, and sharing similar cognitive value could increase their chance of receiving such advantages. Tsai and Ghoshal (1998) theorise the positive effect of shared vision on knowledge acquisition, and subsequently product innovation. Pearce and Ensley (2004) corroborate this idea and propose a core role for shared vision within the process of innovation in teams. Moreover, Li (2005) hypothesised the effect of shared visions on the
inward knowledge transfer of the subsidiaries and compared it with the potential impact of trust. The results demonstrated that while trust was more influential in the inter-organisational networks, shared visions played a bigger role in the knowledge transfer in intra-organisational networks. These studies clearly indicate that the shared cognitive values facilitate the process of knowledge acquisition, and innovation (Inkpen and Tsang 2005).

Finally, the sociology scholars also validate the effect of cognitive dimension of social capital on innovation. They suggest sharing similar goals and values to facilitate stronger support between actors (Porter and Kramer 2011). The actors who behave relevant to the cognitive values of their social network are more likely to receive such supports to develop their ideas and achieve those goals (Rao et al. 2003, Guinote 2007), whereas violating the collective norms, and demonstrating unorthodox culture potentially deprive actors of receiving required support (Phillips et al. 2013). To summarise, understanding the collective cognitive values enables actors to create ideas that are relevant to the goals of the organisation (Scott and Bruce 1994, Anderson and West 1998), and acquire more relevant knowledge to develop those ideas (Tsai and Ghoshal 1998, Li 2005), and receive stronger support from their colleagues to finalise the innovative process (Porter and Kramer 2011, Rao et al. 2003).

2.5.3 Theoretical Gaps

2.5.3.1 Status and Innovation

The literature review thus far exhibited solid theoretical justification to support the effect of status on three dimensions of social capital on the one hand, and the influence of those dimensions on innovation on the other. Much less work has been done on theorising the potential effects of status on innovation. There is a lack of significant studies that directly theorise and measure the effect of status on innovation within the body of literature. Incidentally, establishing solid
theoretical foundations to justify the relationship between status and innovation is of absolutely essential in this study. Despite the lack of straightforward empirical research on this subject, delving into the existing literature could provide us with the theoretical accounts that validate the relationship between status and innovation (Stuart 2000, Stuart et al. 1999, Podolny 2005, Bunderson and Reagans 2011).

First and foremost, scholars theorise the impact of status on innovation by focusing on the role of legitimacy and acceptance of high status actors. Hollander (1961) conducted one of the earliest studies on this subject. He examined the effect of perceived status on innovative behaviour, and found evidence that high status actors show stronger innovative behaviour, because they are considered as the legitimate and authoritative members of the network. He argued that high status actors could be more innovative, because their behaviours and idiosyncrasies receive stronger acceptance by other actors. More recently, Stuart (2000) also found evidence that high status actors tend to achieve higher innovation rate due to their perceived legitimacy and quality. The perceived legitimacy of high status actors also enables them to access larger sources of knowledge, as the prerequisite of innovation (Podolny and Phillips 1996).

These arguments were corroborated in the works of other scholars, who highlight the positive effect of status on accessing necessary resources for innovation. The innovation literature emphasised that besides knowledge creation, actors needs other resources in order to develop the ideas into commercialised innovative products (Scott and Bruce 1994, Trott 2008, Katila 2002). The literature provides strong evidence that associates high status with securing larger share of financial resources (Stuart et al. 1999, Fombrun and Shanley 1990), stronger help and support from teammates (Van der Vegt et al. 2006), bargaining power (Phillips 2001), and other sources of intangible privileges (Anderson et al. 2006), which are all integral to the process of
innovation. All in all, these studies provide robust theoretical foundations regarding the positive effect of status on innovation.

While the direct relationship between status and innovation can be deduced from the available literature, the mechanisms by which such putative effects may apply remains rather unknown. Despite the ever-increasing attention to the role of social networks in the process of innovation (Trott 2008, Nonaka and Takeuchi 1995), there has been limited effort to incorporate the notion of social networks into a theoretical framework, in order to investigate the social origins of innovation. The mainstream body of literature explains the effect of status on innovation through the discussions of perceived legitimacy (Stuart 2000), perceived competence (Podolny 2005) and power (Phillips 2001) of high status actors, failing to address the critical role of social networks. Although, there is an abundance of studies, which theorise and test the interrelations between status, social capital and innovation as pairs (as reviewed earlier), there has not been an overarching study to encompass these constructs into one conceptual model. In other words, the body of research lacks a comprehensive study that observes the effect of status on innovation through the lens of social networks.

This study attempts to address this theoretical gap. It argues that the effect of status on innovation could be explained by focusing on the theoretical overlaps between status, innovation, and social capital. Building on the extant literature, this research will concentrate on developing a theoretical framework that rationalises how three dimensions of social capital explain the influence of status on innovation. This approach can create a stronger bridge between the two disciplines of sociology and business, by further integrating the concept of status and social networks into the body of business studies, and investigating their implications on innovation in business settings.

Furthermore, the mainstream body of research regarding the social antecedents
of innovation focuses either on organisational alliances (Li 2005, Phelps 2010) or networks of business units (Tsai 2001, Tsai and Ghoshal 1998), underrating the importance of individuals as the building blocks of innovation. The majority of studies on individual innovation remain within the territory of organisational psychology (West and Farr 1990, West 2002). Although business literature borrowed the concepts of social capital and status from sociology and social psychology disciplines, it has not paid similar attention to the unique role of individuals and their innovative contributions within organisational settings. The effect of social interaction on knowledge creation could be best explained in the context of interpersonal social networks (Nonaka 1994). The networks of business units are mainly reliant on explicit and documented forms of knowledge (Leonard-Barton 1995, Dhanaraj et al. 2004), whereas inter-personal networks thrive by sharing of tacit knowledge through socialisation between individuals (Leonard and Sensiper 1998, Winter 1987). Similarly, status is a notion with deep roots into the personal beliefs and judgements (Weber 1978, Gould 2002). Hence, this study will address this gap by focusing on the crucial role of individuals as the key beneficiaries of social interactions. Figure 12 depicts the interrelations amongst the underlying constructs of this study, and some of the most noteworthy studies. It pinpoints the areas that this research aims to address.

To sum up, this chapter underlines that seeking the roots of innovation in status and social networks is theoretically justified. The literature offers evidence regarding the effect of status on innovation and knowledge creation (Stuart 2000, Hollander 1961). Moreover, the effect of status on three dimensions of social capital can be theorised based on the current body of business and sociology literature (Podolny 2005, Bunderson and Reagans 2011, Brass 2009).
Finally, the three dimensions of social capital are suggested as direct antecedents of innovation (Tsai and Ghoshal 1998, Tsai 2001, Burt 1987, 2004, 2005, Brass 2009). However, there is a lack of studies that integrate these constructs, and explain the origins of innovation from a social standpoint. The fragmented theoretical and empirical evidence that exists within business, sociology, social psychology and social network disciplines could come together, to elucidate the social origins of innovation within organisations. The expectations states theory (Berger et al. 1985, Correll and Ridgeway 2006) and signalling mechanism of status (Podolny 2005, Correll et al. 2011), three-dimensional conceptualisation of social capital (Nahapiet and Ghoshal 1997, Tsai and Ghoshal 1998), social network model of knowledge transfer (Reagans and McEvily 2003, Inkpen and Tsang 2005), and network model of innovation (Nonaka and Takeuchi 1995, Tsai
2001) are amongst the theories that could complete a puzzle, which explains how initial distinction in actors’ social hierarchy could ultimately lead to distinct innovative contribution.
# Table 2.4 - Summary of the Literature Review - Social Capital and Knowledge Transfer

<table>
<thead>
<tr>
<th>Key Contributions</th>
<th>Sample Size</th>
<th>Level of Analysis</th>
<th>Purpose</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Closure and Diveristy</strong></td>
<td>Number of Network Ties as the Channels of Acquiring External Knowledge</td>
<td>Organization</td>
<td>Effect of Degree Centrality and Absorptive Capacity on Innovation and Performance</td>
<td>Phelps (2010)</td>
</tr>
<tr>
<td></td>
<td>Excessive Number of Ties Could Be Costly</td>
<td>Individual</td>
<td>Effect of Trust and Shared Visions on Inward Knowledge Transfer</td>
<td>(2004) Chen Jr. &amp; Cross</td>
</tr>
<tr>
<td></td>
<td>Effect of the Number of Ties and Strength of Ties on Knowledge Creation</td>
<td>Individual</td>
<td>Importance of Weak and Trustworthy Ties in Knowledge Acquisition</td>
<td>Levin &amp; Cross (2006)</td>
</tr>
<tr>
<td></td>
<td>Weak Ties Can Be Sources of Valuable Knowledge When Used Effectively</td>
<td>Individual</td>
<td>Both Trust and Shared Visions Are Important in Facilitating Inward Knowledge Transfer</td>
<td>Li (2005)</td>
</tr>
<tr>
<td></td>
<td>Structural and Relational Dimensions of Social Capital Are More Effective in Intra-Organizational Knowledge Transfer Than Inter-Organizational Knowledge Transfer. However, Trust Is More Influential in Knowledge Transfer</td>
<td>Business Unit</td>
<td>Effect of Alliance Network Structure on Exploratory Innovation</td>
<td>Phelps (2010)</td>
</tr>
<tr>
<td></td>
<td>Both Trust and Shared Visions Are Important in Facilitating Inward Knowledge Transfer</td>
<td>Organization</td>
<td>Effect of Degree Centrality and Absorptive Capacity on Innovation and Performance</td>
<td>Phelps (2010)</td>
</tr>
</tbody>
</table>


Table 2-5: Summary of the Literature Review - Status and Social Studies

<table>
<thead>
<tr>
<th>Key Contributions</th>
<th>Sample Size</th>
<th>Sample Size Analysis</th>
<th>Level of Analysis</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliance with large and partners improve firms' innovation</td>
<td>150</td>
<td>Organization analyses</td>
<td>Positive and negative effects of status on performance</td>
<td>Smith (2012)</td>
</tr>
<tr>
<td>Effect of coactor’s status on the performance of actors and the role of the nature of collaboration</td>
<td>595</td>
<td>Individual</td>
<td>Positive and negative effects of status on performance</td>
<td>Podolny (1999)</td>
</tr>
<tr>
<td>Benefits associated to the high status position regardless of quality</td>
<td>2200</td>
<td>Individual</td>
<td>High status position benefits associated to the organization</td>
<td>Benjamin (2012)</td>
</tr>
<tr>
<td>Explore the potential to the brokers</td>
<td>500/33</td>
<td>Individual</td>
<td>High status position benefits associated to the organization</td>
<td>Benjamin (2012)</td>
</tr>
<tr>
<td>Alliance as a trigger of status</td>
<td>383 events</td>
<td>Network analysis</td>
<td>High status position benefits associated to the organization</td>
<td>Flynn &amp; Amanatullah (2012)</td>
</tr>
<tr>
<td>Positive and negative effects of status on performance</td>
<td>95</td>
<td>Organization</td>
<td>High status position benefits associated to the organization</td>
<td>Benjamin (2012)</td>
</tr>
<tr>
<td>High status actors receive more recognition for the higher social status ranking</td>
<td></td>
<td></td>
<td>High status position benefits associated to the organization</td>
<td>Benjamin (2012)</td>
</tr>
<tr>
<td>Actors can create value when they are connected to the brokers who have seniority over the focal actor and belong to the higher social status ranking</td>
<td>200</td>
<td>Individual</td>
<td>High status position benefits associated to the organization</td>
<td>Benjamin (2012)</td>
</tr>
<tr>
<td>While the direct competition with high status actors, the performance of the low status actor</td>
<td></td>
<td></td>
<td>High status position benefits associated to the organization</td>
<td>Benjamin (2012)</td>
</tr>
<tr>
<td>Status directly affects performance until a very high performance is achieved. Then performance starts to diminish</td>
<td></td>
<td></td>
<td>High status position benefits associated to the organization</td>
<td>Benjamin (2012)</td>
</tr>
<tr>
<td>Complacency could be one of the reasons for this effect</td>
<td></td>
<td></td>
<td>High status position benefits associated to the organization</td>
<td>Benjamin (2012)</td>
</tr>
</tbody>
</table>

Higher status position can receive higher rewards (financial return) for their product, independently approved similar quality and they can ask for more recognition for the higher status position. While the direct competition with high status actors, the performance of the low status actor improved, however the presence of a high status actor can create value when they are connected to the brokers who have seniority over the focal actor and belong to the higher social status ranking. Actors can create value when they are connected to the brokers who have seniority over the focal actor and belong to the higher social status ranking.
3 Hypothesis Development

The previous chapter has shed light on the underlying concepts of this research, status, social capital, and innovation. The existing literature regarding those constructs has been reviewed and theoretical gaps were identified. The primary objective of this chapter is to further analyse the literature, theorise the linkages between the constructs, and develop relevant hypotheses in order to investigate the social construction of innovation.

3.1 Status and Social Capital Dimensions

3.1.1 Status and Structural Dimension

In an organisational social network, status is defined as the perceived ranking of actors within the social hierarchy of the organisation (Gould 2002). Structural dimension of social capital, on the other hand, is associated with the position of the actor within the organisational social network (Nahapiet and Ghoshal 1997). Sociology, business, and social network disciplines offer several arguments in order to theorise the nature of relationship between status and the network structure. These arguments generally view the respective relationship from two distinct perspectives.

The first stream of literature is built on the premise that high status actors are the desirable and vaunted exchange partners, and consequently are more likely to be offered with the opportunities of building new social ties (Podolny 2005). Scholars suggest various theories to justify this claim. The classic sociologists explain this theory through a resource-based view of status. They associate status with access to the larger and more valuable resources (Weber 1978, Parkin 1974), and maintain whether such an association is warranted or not, it nevertheless characterises high status actors as the holders of resources, making
them valuable exchange partners.

The expectation states theory and the signalling mechanism of status offer more elaborate arguments to explain the presumed popularity of high status actors. Status is characterised as the signal of quality and competence, and high status actors are expected to demonstrate higher standards of performance (Podolny 2005, Berger et al. 1985). Such expectations could increase the favourability of the high status actors as prospective exchange partners, due to various reasons. Seeking legitimation and approval could be one of the main motivators for the actors of the lower status to approach high status actors (Stuart et al. 1999). If they can pass the evaluation of the high status actors and succeed in forming a tie with them, they could enjoy the “fruits of legitimacy” in a wider range of their social network, and thereby improve their reputation across the organisation. Performance improvement could be the second benefit of association with high status actors. The expected quality of the high status actors creates high benchmarks for the low status actors, which could encourage them in achieving higher standards of performance. Flynn and Amanatullah (2012) found evidence that the presence of high status coactors in a non-competitive context increases the performance of focal actors.

Finally, the alleged popularity of high status actors could be explained as a result of their visibility and celebrity role. The associated “visibility provides actors with greater number of opportunities to gain additional resources and increase their capacity to communicate” (Sauder et al. 2012:272). According to this argument, the stronger attention to the high status actors could improve their opportunity of being noticed and approached by other actors.

These arguments epitomise high status actors as the popular exchange partners. They suggest that high status actors are offered more opportunities to establish

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social ties. However, they consider a passive role for the high status actors, because they focus on the efforts of the other actors to approach high status actors.

The second stream of literature, however, addresses this issue by suggesting an active role for high status actors in shaping their social ties. Scholars argue that not only high status actors are given more opportunities to establish social ties, but also they take advantage of their premium status to select the advantageous ties (Willer 1981), and occupy the most valuable network positions (Podolny and Phillips 1996, Burt 2005).

The prime focus of these studies is on the ability of high status actors in achieving brokerage (Burt 2005, Brass 2009). Several arguments could be derived from the literature to validate this proposition. First, high status actors are often approached by the approval-seeking actors, thus they have the upper hand to thoroughly assess the potential candidates (Stuart et al. 1999, Stuart 2000), and pursue a social tie with the actors, with whom they can achieve better network positions, namely structural holes. In this view, high status actor can reject the approach of the actors, who offer them redundant social ties, and create a tailor-made effective network structure. Second, even if low status actors were presented with the equal opportunity to establish a non-redundant social tie, one could argue that high status actors would have an advantage in terms of persuading others into forming social ties (Podolny and Phillips 1996). They tend to use their perceived competence and power as motivational tools in order to convince the actors of external clusters that a potential collaboration would be mutually advantageous, whereas low status actors lack this persuasive ability (Ridgeway 1997, Lovaglia 1997). Third, a growing body of literature suggests that high status actors tend to receive more support from the actors to occupy the structural holes (Burt and Merluzzi 2014). A social tie with brokers is considered very valuable, thus actors prefer a high status actor to achieve
brokerage so that they can enhance the benefits of association to the broker (Galunic, Ertug and Gargiulo 2012). These three arguments signify why high status actors are more likely to seize structural holes.

All in all, the two discussed streams of literature indicate a strong connection between status and structural dimension of social capital. On the one hand, high status actors are argued as attractive exchange partners, and on the other, they possess the required capabilities to select the most rewarding ties and establish partnerships that could offer them valuable network positions.

Hence, I hypothesise:

\textit{H1: Status positively affects the centrality of an actor in an organisational social network.}

\textbf{3.1.2 Status and Relational Dimension}

The potential relationship between status and the relational dimension of social capital can be theorised by focusing on the role that status can play on building trust between actors. The signalling mechanism of status combined with the competence-based view of trust offer the most relevant explanation on how status dispositions could eventually affect the process of trust between actors (Podolny 1993). On the one hand, high status actors send out the signals of high quality and strong performance (Correll et al. 2011, Podolny 2005). These signals create an expectation of competence and capability in the minds of the other actors. On the other hand, it is suggested that competent actors are more likely to create the feeling of assurance and confidence in other actors (Podolny 2005), and thereby gain their trust (Butler and Cantrell 1984, Levin and Cross 2004). Combining these two arguments completes the mechanism, by which
status could affect trustworthiness. In this view, the perceived strong performance could reduce the risk of partnership with high status actors due to the sense of reliability (Granovetter 1995). The extent of risk taking and reliability are closely integrated to the concept of trust (Mayer, Davis, and Schoorman 1995), and naturally the actors who are perceived as reliable and less risky could become more trustworthy partners (Gulati, Nohria and Zaheer 2000).

An alternative explanation could come from the resource-based view of status. High status actors are associated with resourcefulness and power (Weber 1978, Lovaglia 1997). In this view, high status actors have access to a larger pool of tangible and intangible resources, and they can differentiate themselves from the low status actors by tapping into their available resources, utilising their capacity to deliver their promises and commitments, and build up their reputation as trustworthy actors.

These two arguments suggest, not only high status actors can create a feeling and expectation of trust through their perceived competence, but also they can actually support their partners through their available resources. Furthermore, the reputation of trustworthiness tends to spread across social networks (Wong and Boh 2010), become a self-fulfilling prophecy and consequently reinforce the perceived trustworthiness of the high status actors.

Hence, I hypothesise:

\[ H2: \text{Status of an actor positively affects its perceived trustworthiness in an organisational social network.} \]
3.1.3 Status and Cognitive Dimension

Cognitive dimension of social capital is characterised as the goals, norms and cultures that actors share with their organisational social network (Nahapiet and Ghoshal 1998). Actors tend to pursue certain goals that are aligned to their personal benefit and comply with their norms, culture and belief system. Simultaneously, they are obliged to follow the communal goals and visions, and adhere to the collective social codes, norms and culture of their organisation (Inkpen and Tsang 2005). The direct relationship between status and cognitive dimension of social capital can be justified theoretically. The following arguments aim to elaborate on the theoretical premises that connect these two constructs.

First, high status actors are often perceived as successful, competent and legitimate members of the organisational network (Stuart 2000, Podolny 1994, 2005). Therefore, their belief system and cultural values tend to become salient as trends or examples, triggering an effort from low status actors to jump on the bandwagon and adopt those goals and values (Podolny 2005). Scholars studied the role of high status actors as trendsetters and that of low status actors as followers (Rao et al. 2003). This argument finds strong support within the social psychology discipline and particularly is accepted by social identity theorists (Tajfel and Turner 1986). In line with the idea of correspondence bias (Gilbert and Malone 1995), the social identity theorists maintain that the cognitive values that are associated with high status actors become cherished and valuable by the majority of the actors (Stryker 2000). Those values are then used as the yardsticks to categorise the actors into in-group and out-group. Rao et al. (2003) define those values as institutional logics. They indicate that “institutional logics create distinctive categories, beliefs, expectations, and motives and thereby constitute the social identity of actors” (2003:797). According to this view, the actors who adhere to those values tend to gain self-esteem and identify
themselves with the better group in comparison to the actors who do not follow the same traits (Bergami and Bagozzi 2000). In extreme cases, this comparison could turn into in-group favouritism and out-group discrimination (Brewer 1979, Bettencourt et al. 2011). The perceived merits of belonging to the dominant group prompt actors to demonstrate conformist behaviour and adopt the values of the high status actors (Phillips et al. 2013). This behaviour further propagates the cognitive values of the high status actors and strengthen them across organisational social network.

Second, the isomorphism theory offers another explanation for the imitative behaviour of the low status actors (Di Maggio and Powell 1983). In particular, the normative isomorphism theory argues that the actions and behavioural traits of the high status actors tend to be copied by the low status actors, because it is believed to be the reason behind their success (Mizruchi and Fein 1999). As a result, the collective cognitive values of the organisation will evolve to become similar to the values of the high status actors. This argument has been also confirmed in political science literature. Simmons and Elkins (2004) argue that the policies of the high status governments are usually imitated and followed by low status governments as the models of success. Westernisation of the eastern countries could be considered as a result of this theory.

Finally, high status actors could exert their power to achieve the collective goals (Guinote 2007, Bunderson and Reagans 2011). Scholars theorise that high status actors have a better understanding regarding the goals and norms of the organisation (Overbeck and Park 2006) and face fewer constraints in achieving them (Guinote 2007). Furthermore, they tend to utilise their power to impact the goals and norms to their favour (Phillips 2001, Inkpen and Beamish 1997). This behaviour echoes the rent seeking theory, which highlights the role of powerful actors in manipulating the regulations in order to receive special privileges (see, Tullock 2001, Krueger 1974).
These arguments signify not only low status actors imitate the cognitive values of high status actors as a method for gaining legitimacy (Podolny and Page 1998, Stuart 2000), belonging to the dominant group (Rao et al. 2003, Bergami and Bagozzi 2000), and reproducing strong performance (Mizruchi and Fein 1999); but also high status actors apply a variety of strategies to preserve, propagate and reinforce their values across the organisational network (Magee and Galinsky 2008, Tullock 2001). These arguments eliminate any shadow of doubt regarding the influence of high status on cognitive dimension of social capital, suggesting that the collective organisational goals, norms and cultural values are more likely to be similar to those of the high status actors.

Hence, I hypothesise:

\[ H3: \text{Perceived status of an actor positively affects similarity of its cognitive values with the collective cognitive values of an organisational social network.} \]

3.2 Social Capital Dimensions and Innovation

3.2.1 Structural Dimension and Innovation

Theorising a linkage between structural dimension of social capital and innovation is arguably the most straightforward aspect of this study. Network model of innovation highlights the importance of network structure (Burt 1987, 2004). Structural dimension of social capital comprises of the advantages that an actor can receive merely through its network position (Coleman 1988, Nahapiet and Ghoshal 1997). “Different network positions represent different opportunities for a unit to access new knowledge that is critical to developing new products or innovative ideas” (Tsai 2001: 997). This statement suggests that a potential relationship between the structural dimension of social capital and
innovation must be sought in the effect of network position on the acquisition of knowledge.

The following arguments aim to rationalise the mechanisms, in which network position could affect innovative outcomes. Firstly, central actors are located on the paths between any pair of actors more frequent than marginal actors (Freeman 1977). Although I explained that exposure to the sources of knowledge does not guarantee the exchange of knowledge, nonetheless it would certainly increase the likelihood of knowledge acquisition (Burt 2004). Hence, central actors could potentially be more exposed to diverse sources of knowledge.

Tenancy of the structural holes has also been portrayed as one of the prime features of the premium network position (Burt 1987, 2004, Ahuja 2000). Besides the fact that brokers tend to become central actors of their social network (because they connect two otherwise disconnected clusters and thus they appear on any path that connects those two clusters), occupying a structural hole offers brokers the power of controlling and regulating the diffusion of knowledge (Brass 2009, Ahuja 2000). Imagine actor X as the broker between actor A and B. Since A and B have no other way of communicating, any exchange of knowledge between them must pass through X. This arrangement puts X in a position of power to choose how to handle the acquired knowledge. It can pass the knowledge further, block the flow of knowledge altogether, or most importantly change the acquired knowledge and pass a manipulated version (Brass 2009, Burt 1992). Hence, not only brokers access diverse resources of knowledge, but also they can deprive or control the level of access to valuable knowledge resources for others (Burt 2010). In other words, brokers can exploit their position to be more innovative in the expense of other less central actors.

These arguments are fully focused on the role of network position on the extent of knowledge acquisition, deemed decisive in knowledge creation. However,
there is another aspect to innovation, which is realisation of the generated knowledge into commercialised products (Trott 2008). Although the literature is lacking in dedicated studies to address this relationship, it could be argued that possession of dense and diverse social ties could enable actors to disseminate their ideas into a wider range of network and gain more support for their ideas (Burt 1987), whereas the ideas generated by marginal actors could remain peripheral and ultimately fade away due to the lack of a supportive network. Central actors have more network visibility, thus their ideas could also be noticed and attract more attention (Brass 2009).

Overall, the potential effect of network position on innovation could be explained from two perspectives. First, network position can regulate actors’ potential access to the sources of knowledge, and thereby determine the extent of knowledge acquisition. Second, they could utilise their network connections to diffuse their ideas and gain support to materialise them.

Hence, I hypothesise:

\[ H4: \text{The centrality of an actor in an organisational social network positively affects its innovative contribution.} \]

### 3.2.2 Relational Dimension and Innovation

The potential influence of the relational dimension of social capital on innovation is addressed from two perspectives within the literature. The first strand of studies focuses on the effect of tie strength, as the source of knowledge exchange, on innovation, while the second viewpoint highlights the impact of trustworthy ties as the conduits of knowledge.

Scholars define tie strength as the frequency and intensity of social interactions
between actors. The potential consequences of tie strength have been studied in both business and social network literature, and the results are somehow controversial. While some studies have found unequivocal proofs that strong ties can positively affect the exchange of knowledge across social networks (Krackhardt 1992, Tortoriello, Reagans, and McEvily 2012), others argue that weak ties can be equally considered as sources of unique and valuable knowledge (Hansen 1999, Granovetter 1973). The first group suggest that strong ties create solid channels of knowledge exchange and enable actors to acquire knowledge through close collaboration. They advocate that frequent interactions can lead to the exchange of larger volume of knowledge between actors (Uzzi 1997). However, the second group of scholars challenge this idea. They suggest that strong ties can be costly and time-consuming and lead to homogeneity of knowledge stocks between actors (McFadyen and Canella Jr. 2004). They argue that large volume of knowledge exchange does not play a decisive role in an innovation process, and only unique and non-redundant knowledge could trigger innovative ideas (Burt 1987). Weak ties could be the providers of such distinctive knowledge (Levin and Cross 2004, Hauser, Tappeiner and Walde 2007, Hansen 1999). The apparent contradictions between these two arguments demonstrate that tie strength as an ambiguous construct that does not offer an straightforward explanation for the process of innovation, and there must be another factor to rationalise the effect of relational dimension of social capital on innovation.

Trustworthiness has the right characteristics to fill that gap. Trust reduces resistance, reluctance and cynicism amongst collaborative actors, and thereby improves the quality of knowledge sharing (Szulanski 1996, Li 2005, Granovetter 1995). Actors could be structurally connected or even have very strong interactions, but lack of trust could cause minimum share of valuable knowledge between them (Podolny and Page 1998). By the same token, trustworthiness can
enhance a weak tie into a solid conduit of high quality knowledge.

Independent from tie strength, trustworthiness could persuade actors into sharing their valuable knowledge resources without any fear or hesitation. Levin and Cross (2004) suggest that perceived trustworthiness mediates the effect of tie strength on knowledge transfer. Trustworthiness demonstrates the nature of relationship between two actors, and thereby captures the essence of relational dimension of social capital. Overall, one can deduce that trustworthy actors are most likely to access knowledge resources from other actors of the network.

Hence, I hypothesise:

\[ H5: \text{The trustworthiness of an actor in an organisational social network positively affects its innovative contribution.} \]

### 3.2.3 Cognitive Dimension and Innovation

The potential effect of cognitive dimension of social capital on innovation finds strong support within literature. Scott and Bruce (1994) argue that the cognitive understanding of the organisational climate can directly affect actors’ innovative behaviour. According to this argument, actors with stronger understanding of organisational cognitive values are more likely to develop innovative ideas that fit the needs and goals of their organisation. Anderson and West (1998) corroborate this argument, and highlight the positive effect of cognitive understanding of the climate on creativity and knowledge creation. Higher cognitive dimension of social capital means higher similarity between the cognitive values of the actor and the collective cognitive values of the organisation (Nahapiet and Ghoshal 1997). Actors with high cognitive similarity have a better understanding of the goals and culture of their organisation (Gulati,
Nohria and Zaheer 2000); therefore they can distinguish between relevant and irrelevant ideas, and only follow those ideas that are congruent to the goals and culture of the organisation (Overbeck and Park 2006). On the other hand, lack of cognitive similarity could cause actors chasing irrelevant innovative ideas (Smith et al. 2008, Tsai and Ghoshal 1998). This argument suggest actors who share similar cognitive values with their organisation are more likely to understand the innovative needs of the organisation, and consequently be more innovative.

Moreover, sociology literature provides further evidence to support the positive effect of cognitive similarity on innovation. Sociologists explain the effect of shared values on knowledge acquisition and innovation through in-group bias theory (Hogg et al. 1995). According to this theory, sharing similar cognitive values tends to act as a bonding mechanism between actors. Actors, who adhere to the shared visions and culture, tend to receive favouritism and support, while violating those values could ostracise actors as outsiders. Thus, shared cultural traits could secure actors’ position within the dominant group of the network and thereby increase the likelihood of receiving special privileges in the shape of valuable resources (Bettencourt et al. 2001). In other words, actors who understand the cognitive values of the network and behave accordingly are rewarded with larger share of resources and stronger support, while disregarding those cognitive values may exclude the actors and limit their access to the useful sources of knowledge, required for innovation.

These two arguments suggest that a direct relationship between cognitive dimension of social capital and innovation is theoretically justified. Actors, who share the collective goals and culture of the organisation, can understand the relevant innovative goals of their organisation, and receive larger resources and stronger supports to develop their innovative ideas.

Hence, I hypothesise:
**Hypothesis Development**

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**H6:** The extent to which an actor shares the collective cognitive values of the organisational social network positively affects its innovative contribution.

### 3.3 Status and Innovation

The first three hypotheses theorised the relationship between status and three dimensions of social capital, while the next three hypotheses postulated the effect of those dimensions on innovation. However, the ultimate goal of this study is to examine the nature of the relationship between status and innovation. The theoretical premises regarding the linkages between status and innovation have been discussed in the previous chapter (see, 2.5.3). This section aims to theorise how three dimensions of social capital could explain the effect of status on innovation. This brings about the concept of mediation. Prior to any further discussions, it is necessary to review the notion of mediation and its theoretical premises.

#### 3.3.1 Simple Mediation

The primary model of mediation is simple mediation, which is built on the premise that a mediator variable (M) explains the effect of the independent variable (X) on the dependent variable (Y). It suggests that although a direct effect from X to Y is perceivable, it could best be explained by the effect of X on M, and the subsequent effect of M on Y. The following figure depicts the concept of simple mediation and its premises. Model (I) illustrates the total effect of X on Y when there are no mediators in the model. Model (II) however adds a mediator variable to the model to explain the relationship between X and Y. As a result, the total effect of X on Y is divided into two paths of direct effect (c) and indirect effect (ab). The mediating effect of M is calculated by using formulas 2 and 3.
In this model, four conditions must be present in order for M to be considered as the mediator variable (Preacher and Hayes 2004, Field 2013).

1. X must significantly predict Y.
2. X must significantly predict M.
3. M must significantly predict Y.
4. The total effect of X on Y must be bigger than the direct mediated effect ($c > c'$).

**Figure 13- Simple Mediation Model – (Based on Preacher and Hayes 2008)**
If all four conditions are true and the mediation is supported, the calculated indirect effect would represent the extent to which the mediator variable explains the relationship between independent and dependent variables. Thus, the larger the indirect effect is, the stronger of a mediator M will be.

3.3.2 Multiple Mediation

Multiple mediation follows the same logic as the simple mediation but it is designed to test the mediation effect of multiple mediators simultaneously. “Testing the total indirect effect of X on Y is analogous to conducting a regression analysis with several predictors, with the aim of determining whether an overall effect exists” (Preacher and Hayes 2008:881). If an overall mediation effect exists, one can interpret that the combination of those proposed mediators have mediating effect on the relationship between independent and dependent variables.

Preacher and Hayes (2008:881) associate four advantages to multiple mediation:

“First, testing the total indirect effect of X on Y is analogous to conducting a regression analysis with several predictors, with the aim of determining whether an overall effect exists, ...... second, it is possible to determine to what extent specific M variables mediate the X → Y effect, conditional on the presence of other mediators in the model. Third, when multiple putative mediators are entertained in a multiple mediation model, the likelihood of parameter bias due to omitted variables is reduced ...... fourth, including several mediators in one model allows the researcher to determine the relative magnitudes of the specific indirect effects associated with all mediators. In other words, including several mediators in the same model is one way to pit competing theories against one another within a single model. Theory comparison is a good scientific practice.” (2008:881)
3.3.3 Mediation of Social Capital Dimensions

The literature pertaining to the direct relationship between status and innovation was discussed in the literature review chapter, and the theoretical justifications regarding the effect of status on innovation were established. However, prior to theorising a potential mediating role for three dimensions of social capital, it is essential to revisit those studies, in order to further confirm the first condition of mediation.

Firstly, scholars highlight the role of legitimacy to explain the direct effect of status on innovation contribution of the actors. They argue that high status actors tend to achieve higher innovation due to their perceived legitimacy and...
acceptance (Stuart 2000, Podolny 2005, Hollander 1961). Based on this argument, high status actors are the legitimate members of their social network; and they can benefit from the perceived legitimacy through having easier access to organisational resources, and receiving stronger support from the legitimacy-seeking low status actors; and consequently be more successful in terms of facilitating their innovative aspirations; whereas low status actors usually struggle to acquire those privileges and have to deal with more constraints (Podolny 1994, 2005, Smith et al. 2008).

Secondly, researchers argue that high status actors are the likely candidates to receive other types of resources that are required for innovation. There are abundance of studies that directly relate high status to securing larger financial resources (Stuart et al. 1999, Fombrun and Shanley 1990), and stronger help, support from their colleagues (Van der Vegt et al. 2006, Anderson et al. 2006) and other sources of intangible privileges (Anderson et al. 2006).

Finally, high status actors are tipped to be successful to achieve their goals (Guinote 2007, Benjamin and Podolny 1999). According to this line of research, high status actors could apply their perceived power to achieve their goals, including innovative goals and aspirations (Magee and Galinsky 2008, Smith et al. 2008). High status actors receive less resistance and hindrance, and can violate certain rules and norms (Phillips et al. 2013, Guinote 2007) to achieve their innovative goals, while low status actors do not have this luxury. In other words, “individuals with power can focus attention on the task at hand, whereas low-power individuals are distracted by other considerations.” (Bunderson and Reagans 2011:1183).

These studies corroborate the idea that the positive relationship between status and innovation is theoretically justified. However, there is a lack of evidence on the mechanisms by which status affects innovation. The conceptual gap between
the two constructs calls for relevant intermediary variables to provide explanations of how status may influence innovative outcomes.

This research pinpoints social capital to be the fitting construct to explain the mechanism, by which status influences innovation. This suggestion is built on strong theoretical justifications. Firstly, social networks bestow meaning to status (Gould 2002). Status rankings develop within the context of social networks through the demonstrated acts of deference, and they can affect all aspects of network dynamics (Magee and Galinsky 2008). Secondly, Innovation is theorised as the result of knowledge exchange across the network of social ties (Nonaka 1991, 1994, Nonaka and Takeuchi 1995, Tsai and Ghoshal 1998). Thus, this study maintains that social networks could offer the most suitable platform to explain the relationship between status and innovation. This proposition is in full accord with Ibarra (1993) who suggested actors’ individual and social attributes “affect innovation process because they affect access to information and resource flows; thus, a mediating role of network variables is implicit” (1993:477). Based on this logic, social capital could be the central piece of the jigsaw, completing the relationship between status and innovation. Structural, relational and cognitive dimensions create a diverse capacity for social capital to explain the effect of status on innovation from different perspectives.

The primary objective of this study is to measure the effect of status on innovation, through the introduction of three dimensions of social capital as multiple mediators. Although the research relies on the results of the multiple mediation to test the mediation of social capital dimensions, it also theorises simple mediation of those dimensions separately. There are two reasons behind this decision. First, examining the mediation of each dimension separately could provide added assurance and reliability that the proposed mediator variables are theoretically justified to be included in the multiple mediation model, and also offer a benchmark to have a better understanding regarding the effect of the
said variable in the multiple mediation analysis (Preacher and Hayes 2008). Second, testing the simple mediation of each dimension could have an extra advantage. Many scholars are solely interested in the potential role of each dimension individually, and independent of other dimensions. For example, network structuralists such as Burt, Gulati or Coleman exclusively study the role of network structure without the influence of trustworthiness or cognitive similarity. Therefore, theorising the mediation of each dimension separately (and not conditioned by other mediating variables) could contribute to their dedicated fields of study. To summarise, examining simple mediation of three dimensions not only solidifies the theoretical foundations of the multiple mediation model, but also it satisfies the researchers that are dedicated to the study of those dimensions separately rather than collectively. This subject will be further discussed in the following chapters.

3.3.4 Mediating Role of Structural Dimension

Structural dimension of social capital is the first potential mediator to explain the effect of status on innovation. The relationship between status and innovation has been discussed and theoretically justified (Stuart 2000, Hollander 1961). Moreover, the theoretical linkages between status and structural dimension of social capital were reviewed prior to the hypothesis 1 (Podolny 1994, 2005, Chung, Singh and Lee 2000). Finally, hypothesis 4 discussed the potential effect of structural dimension on innovation (McFadyen and Canella Jr. 2004, Tsai 2001).

These three lines of arguments provide the necessary requirements to justify the mediating role of structural dimension of social capital in the relationship between status and innovation. Building upon these theories, one could posit that status affects actors’ innovative contribution, because it has the functions to regulate their position within the network, and thereby orchestrate the extent to
which they acquire necessary resources for innovation.

Hence, I hypothesise:

*H7 (a): The centrality of an actor in an organisational social network mediates the effect of its perceived status on its innovative contribution.*

### 3.3.5 Mediating Role of Relational Dimension

Relational dimension of social capital is the second potential mediator to explain the effect of status on innovation. The discussion regarding the direct effect of status on innovation provided the first requirement of the mediation (Stuart 2000, Hollander 1961). Furthermore, the effect of status on relational dimension of social capital was theorised on hypothesis 2 (Podolny 2005). Finally, hypothesis 5 discussed the theoretical backgrounds regarding the influence of trustworthiness on innovative contribution of the actors (Tsai and Ghoshal 1998, Uzzi 1997, Szulanski, Cappetta and Jensen 2004).

These three blocks of theories provide the essential justifications to stipulate a mediating role for the relational dimension of social capital in the effect of status on innovation. Building upon these theories, one could hypothesise that status influences actors’ innovative contribution, because it can apply its signalling mechanism to create the expectation of competence, increase the number of trustworthy ties, and thereby secure reliable sources of knowledge and support.

Hence, I hypothesise:

*H7 (b): The trustworthiness of an actor in an organisational social network mediates the effect of its perceived status on its innovative contribution.*
### 3.3.6 Mediating Role of Cognitive Dimension

Cognitive dimension of social capital is the third potential mediator to explain the effect of status on innovation. The direct linkage between status and innovation, as the first condition of mediation, has been justified theoretically (Stuart 2000, Hollander 1961). Moreover, the effect of status on cognitive dimension of social capital was discussed extensively leading to hypothesis 3 (Overbeck and Park 2006, Bunderson and Reagans 2011). Finally, hypothesis 6 elucidated the theoretical foundations regarding the effect of cognitive dimension of social capital on innovative contribution of the actors (Tsai and Ghoshal 1998).

These three strands of theories offer solid justifications to suggest a mediating role for the cognitive dimension of social capital on the relationship between status and innovation. Building upon these theories, one could theorise that status impacts actors’ innovative contribution, because high status actors have less constraints in achieving collective goals, and more power to dictate the dominant norms and culture.

Hence, I hypothesise:

\[ H7 (c): \text{The extent to which an actor shares the collective cognitive values of the organisational social network mediates the effect of its perceived status on its innovative contribution.} \]

### 3.3.7 Mediating Role of Social Capital

Three dimensions of social capital are three viable mediator variables to explain the effect of status on innovation. They offer three alternative logics to clarify
how the distinction in actors’ status could ultimately affect their innovative contribution. Although each dimension of social capital can individually play a mediating role in the effect of status on innovation, they are not conceptually contradictory.

The potential advantages of multiple mediation over simple mediation were discussed (see, Preacher and Hayes 2008). A multiple mediation model could provide a more complete picture and offer a more accurate explanation for the effect of status on innovation. Therefore, this study suggests a comprehensive multiple mediation model consisting of all three dimensions of social capital as the mediator variables. It must be noted that all constructs, including three dimension of social capital are treated as a unidimensional constructs rather than multidimensional (Law, Wong, Mobley 1998). In other words, it theorises that the effect of status on innovation could be explained through the simultaneous mediation of three dimensions of social capital.

Hence, I hypothesise:

\[ H7: Social \text{ capital mediates the effect of status on its innovative contribution.} \]
## Proposed Hypotheses

<table>
<thead>
<tr>
<th>H1</th>
<th>Status positively affects the centrality of an actor in an organisational social network.</th>
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<tbody>
<tr>
<td>H2</td>
<td>Status of an actor positively affects its perceived trustworthiness in an organisational social network.</td>
</tr>
<tr>
<td>H3</td>
<td>Perceived status of an actor positively affects similarity of its cognitive values with the collective cognitive values of an organisational social network.</td>
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<tr>
<td>H4</td>
<td>The centrality of an actor in an organisational social network positively affects its innovation outcome.</td>
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<tr>
<td>H5</td>
<td>The trustworthiness of an actor in an organisational social network positively affects its innovation outcome.</td>
</tr>
<tr>
<td>H6</td>
<td>The extent to which an actor shares the collective cognitive values of the organisational social network positively affects its innovation outcome.</td>
</tr>
<tr>
<td>H7 (a)</td>
<td>The centrality of an actor in an organisational social network mediates the effect of its perceived status on its innovative contribution.</td>
</tr>
<tr>
<td>H7 (b)</td>
<td>The trustworthiness of an actor in an organisational social network mediates the effect of its perceived status on its innovative contribution.</td>
</tr>
<tr>
<td>H7 (c)</td>
<td>The extent to which an actor shares the collective cognitive values of the organisational social network mediates the effect of its perceived status on its innovative contribution.</td>
</tr>
<tr>
<td>H7</td>
<td>Social capital mediates the effect of status on its innovative contribution.</td>
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Table 3-1 – Summary of the proposed hypotheses
4 Methodology and Research Design

This chapter firstly aims to clarify that a realist research philosophy is followed in this study. Secondly, a quantitative methodology and an empirical study are justified due to the nature of the proposed hypotheses. In order to conduct the empirical study, a fitting research design is proposed and the vital role of social networks in designing the empirical study is discussed. This chapter follows with the discussion on the potential measures of the involved constructs and suggestion of the appropriate measures. According to the research objectives and proposed measures relevant data analysis methods are suggested and discussed.

The second part of this chapter is dedicated to a discussion involving the empirical study. First, it describes the pilot study and its contribution to the research design. It continues with introduction of the empirical study. All steps of conducting the empirical research including the selection process, preparation and implementation are discussed in detail.

4.1 Research Philosophy

Prior to any discussion regarding the appropriate methods, it is necessary to determine the pertinent research paradigm and philosophical beliefs. Guba and Lincoln (1994:105) define paradigm as the “basic belief system or world view that guides the investigation”. Saunders et al. (2007:118) characterise it as “a way of examining social phenomena from which particular understandings of these phenomena can be gained and explanations attempted”.

This study follows a realist research philosophy. Realism is defined as “the view that theories refer to real features of the world. ‘Reality’ here refers to whatever it is in the universe (i.e., forces, structures, and so on) that causes the phenomena
we perceive with our senses" (Schwandt 1997:133). To be precise, this research identifies with the epistemology of the critical realists, and presumes that the any phenomenon of the social world can only be understood through comprehending the social structure that has caused it (Bhaskar 1989). From ontological standpoint, critical realism assumes truth as an objective concept that exists independent of the human thought or beliefs, however it can be misinterpreted in different social conditions. From epistemological standpoint, critical realism is a milder version of positivism. Although, it acknowledges potential misinterpretations, critical realism relies on observable phenomena as the sources of credible data (Saunders et al. 2007).

These characteristics make critical realism the most suited philosophy for my research questions. I theorise status and social capital as the antecedents of innovation. Although, the concepts of status and social capital exist independently in the social world, they are understood through the perception of the social actors.

4.2 Research Methodology

Based on the selected research paradigm as well as the nature of the study, this section justifies the selection of a quantitative methodology to conduct this research. In order to select the research methodology, however, it is essential to determine a suitable research approach. The degree to which theory and the current literature contributes to the development of hypotheses can determine the appropriate research approach. Two research approaches are generally suggested in the literature. Inductive approach involves collection of data and development of theories and hypotheses as a result of data analysis. This approach is mostly suitable for the theory-building and exploratory studies (Bryman 2008). Deductive approach, however, follows the route of natural science studies and involves deducing hypotheses from the theory, and testing
those hypotheses to confirm (or reject) those propositions. This study follows a deductive approach for testing the proposed hypotheses.

According to Robson (2002), a deductive approach constitutes of five stages, which are:

1) Deduction of hypotheses from available theory
2) Operational expression of the hypotheses indicating the measurements for the involved variables
3) Testing the proposed hypotheses
4) Examining the outcomes
5) Possible modification of the theory according to the findings.

This study begins with a thorough review of the literature, and continues with deduction of hypotheses that aim to theorise the relationship between status, social capital and innovation. In the next step, it tests the hypotheses empirically to examine the significance of those hypotheses and thereby contribute to the theory and practice. Thus, this study remains loyal to all five stages of the deductive approach.

A combination of deductive approach in a realist research paradigm calls for a quantitative research methodology. Quantitative methods offer suitable frameworks to pursue the research questions by testing and measuring the suggested hypotheses and achieve reproducible results. A quantitative research normally involves literature review, hypothesis deduction, empirical research design (developing objective measures for the involved variables, selecting suitable research location, data collection methods and sampling techniques), data collection implementation, analysing the collected data and examining the key findings (Bryman 2008).
4.3 Research Design

4.3.1 Introduction

Research design acts as a roadmap that defines all steps of conducting the empirical research. It is essential to prepare a clear research design prior to the implementation of the empirical study. The research design of this study not only should consider all aspects of facilitating a quantitative approach, but also must take into account the social network nature of the study, and follow the specific design that accommodates conducting a network-based research.

The main constructs of this study are all embedded within social networks, and are elicited from social interactions between actors. Network scholars propose two distinct perspectives to study social networks (Carrington, Scott and Wasserman 2005). The first type of social networks is called 'ego network', which focuses on the social network around a certain actor. Ego network studies are developed based on the perceptions and views of a focal respondent (Wellman 1983, Scott and Carrington 2011). They enable researchers to analyse the social ties between one single actor (ego) and its adjacent actors (alters) in a network. The majority of qualitative network studies focus on ego networks to investigate the process of social relations. These studies are mainly conducted in social psychology and sociology disciplines (Moody 2001, Granovetters 1973). One of the main applications of ego network is to study brokerage. The second type of social networks is labelled as 'complete network'. In complete network studies, researchers draw boundary around the population of interest, and consider the social ties between all involved actors of the network in order to measure their hypotheses. This approach requires quantitative methods of data collection and analysis, and due to its holistic view of the network it is suitable for centrality studies, such as the current thesis.
Conducting a study that involves social networks requires a specific research design. It aims to prepare a detailed blueprint of the methods that will be applied within empirical study. A standard social network analysis study comprises of the following steps (Prell 2011). However, these steps do not necessarily occur in the suggested order.

1. Literature review
2. Developing theoretical framework
3. Developing hypotheses
4. Determining population of interest (empirical research setting), sample, network boundary and unit of analysis
5. Data collection
6. Data preparation
7. Structuring collected data into matrices
8. Network visualisation
9. Data analysis

The first three steps are already accomplished in the previous chapters. Status, social capital, and innovation literature were reviewed; the theoretical gaps have been identified and relevant research questions have been raised. Finally, hypotheses and research models have been posed accordingly. This chapter aims to discuss steps four and five, which are the key steps in designing the empirical research.

**4.3.2 Social Network Selection Criteria**

Following the development of fitting hypotheses, and prior to the data collection and analysis, it is essential to select the most suitable sample for conducting the empirical research. This step includes defining criteria for the selection of suitable organisation, network boundary and the level of analysis.
Three criteria must be taken into account to select the right setting for the empirical study.

I) **Relevance to the research models:** This research attempts to theorise and measure the social antecedents of innovation. The impact of social networks as the conduits of knowledge is integral to this research. Accordingly, the empirical study must be conducted in an organisation that promotes the exchange of knowledge between its actors. Hence, presence of an organisational structure that supports the network of knowledge diffusion is the main criterion for selecting the suitable setting. It is essential to select an organisation that exchange of knowledge is encouraged by its Headquarter, and culture of collaboration exists within its boundaries.

The role of MNEs as the pioneers of innovation is established within the current business environment. The ability of the MNEs to absorb, retain and create knowledge cannot be compared with any other types of organisation. As a result, they could offer the most suitable settings for an innovation study. However, MNEs differ in terms of structure and culture of knowledge sharing. Looking back at the discussion regarding the MNE typology, one can identify that transnational configuration has the relevant characteristics to serve the objective of this research. Transnational enterprises promote the exchange of knowledge between their actors, support a decentralised structure of innovation, and minimise the Headquarter interference. As I discussed earlier, it may be unrealistic to confidently label an organisation as a transnational. However, this definition can offer a benchmark to select the organisation that retains these attributes and demonstrates similar stance towards innovation.

II) **Strong focus on Innovation:** The second criterion for selecting the
appropriate organisation is the presence of innovation in its core competency. It is essential that the selected organisation to be heavily involved in innovation, so that the effect of status and social capital can be measured more effectively. Presence of a complex network of R&D centres is a way to ensure the significance of innovation to the organisations. R&D centres are the main hubs of innovation. Although, the classic linear model of innovation emphasise on empowering R&D centres as standalone centres of knowledge creation, the network model of innovation focuses on the social interactions and collaboration between them.

III) **Innovation Type**: The third criterion is the selection of innovation type. Innovation involves a wide range of products, services or processes. Products offer the most quantifiable type of innovation, whereas the extent to which an actor contributes to a process or service is more difficult to be measured objectively. Accordingly, this research limits the selection criteria to the industries that are involved in product innovation.

Overall, the following table summarises the criteria that I have followed in order to select the most suitable organisation for conducting the empirical research.

<table>
<thead>
<tr>
<th>Selection Criteria</th>
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<tbody>
<tr>
<td>1. MNE with transnational configuration</td>
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<tr>
<td>2. Culture of knowledge exchange between actors and presence of supporting network</td>
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<tr>
<td>3. Strong focus on innovation</td>
</tr>
<tr>
<td>4. Presence of intricate network of R&amp;D departments and interactions between R&amp;D staff</td>
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<tr>
<td>5. Industry with focus on product innovation</td>
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</table>

Table 4-1- Empirical Study Selection Criteria
4.3.3 Network Boundary

Demarcating the network boundaries is a crucial step in designing any complete network social network research. The borders of the network must be clarified in advance, and any influence from the actors outside the predefined boundary must be controlled. Simply put, network boundary determines the inclusion/exclusion of actors from the study and represents the population of interest (Prell 2011).

The focus of this research would be on the social network of one organisation. Although I acknowledge that actors may acquire knowledge from external sources (Wu and Wu 2014), this study excludes those ties and concentrates on the social network within the boundaries of the selected organisation. Thus, inclusion of external actors could risk the integrity of this research. Firstly, complete network study requires the identification and quantification of all social ties between actors. Adding selective social ties with external actors contradicts the notion of complete network and can compromise the results due to the lack of data. Secondly, this research aims to explore the extent to which status and social capital within an organisation affect the innovative outcome of the actors. Adding the potential contributions of external actors could violate the consistency of the research model and impacts the results. Thirdly, the external actors may be in different industries and possess different roles. Such a wide distinction makes it virtually impossible to compare the innovative results.

4.3.4 Sampling Techniques

In complete network studies, selecting the network boundary must be combined with the fitting sampling technique (Wasserman and Faust 1994, Prell 2011). Social network scholars propose three sampling approaches for conducting such a research; reputational approach, nominalist approach and snowball approach. Reputational or realist techniques are often used when there are no clear
network boundaries. Researcher relies on the knowledge of informants to identify and name other actors to be included in the network of study. Nominalist techniques, on the other hand, fully rely on the theoretical justification of the researcher to include certain actors to the network of study according to specific criteria. They can be used when the researcher wants to study a clear social network or specific type of relationships. For example, it is ideal to use nominalist technique to study the social ties between colleagues who work in the same office. Snowballing technique begins with a small group of informants and continues by asking them to nominate others to be included into the study (Scott 2000, Bryman 2008). Those nominees are also studied and asked to nominate others. This chain will continue and the sample becomes bigger and bigger like a snowball. This process proceeds until there is a little progress in the sample and the number of new nominees is lower than a predetermined limit (Scott 2000). In networks with clear positions and roles, snowballing can be applied, starting from the most well positioned actors (Wasserman and Faust 1994). This method uses the social relationships in order to select relational data and the sample network will be based on relationships rather than isolated actors (Scott 1991). The major concern regarding this method is the subjectivity of selecting the first study group.

This study takes place within the clear boundary of a certain organisation. Thus, reputational and snowballing techniques are not suitable. Since the network boundary is defined, and the potential respondents are known, the nominalist technique becomes the most fitting sampling approach. All actors who are somehow involved in the process of product innovation should be considered as candidates to be included to the sample. The only pitfall of the nominalist sampling technique is the potential loss of few actors from the sample due researchers’ lack of familiarity with the setting. This shortcoming can be resolved through consultation with the Headquarters and possibly few
knowledgeable actors. This can minimise the risk of excluding an important actor from the final sample.

### 4.3.5 Unit of Analysis

Selecting the unit of analysis is the next step in designing a social network analysis study. Unit of analysis determines the entity that will be analysed within the research. This study selects individuals as the units of analysis. The following discussion sheds light on the considerations that have led to this decision.

Since this study aims to delve deep into the social construction of innovation, it is essential to avoid high-level analysis, and instead incorporate the social ties between individuals as the birthplace of knowledge creation; as Nonaka (1991:97) emphasised: “New Knowledge always begins with the individuals”. Individuals are the building blocks of organisations and the social interactions between them can offer a more accurate portrait of the social context of an organisation, and its capacity in creating new knowledge. Rubenstein (1976) takes this argument further by suggesting that the innovation process is in fact a people process, and the formal aspects of the organisation are not necessary for a successful innovation. He found evidence that certain individuals are the main contributors to the innovation of a new product, by undertaking several informal responsibilities in innovation projects. The critical role of individuals to the innovation process was strongly supported in the literature (Utterback 1975, Martins and Terblanche 2003)

Moreover, recording a social tie between two business units often relies on the opinion of a few individual representatives (Tsai 2001). The studies that aim to map the social network of the units usually consider two units connected, if they find any ties between a pair of individuals in two units (Tsai and Ghoshal 1998). Although one may argue that examining the social network of the units could have its merits, I contend that it could become biased.
The following figure illustrates the potential bias of the network studies in business unit level of analysis. Business units A and B each consist of 3 individuals. Scenario 1 represents an intense relationship between the two business units, in which all individuals are in direct contact. However, scenario 2 depicts a case, in which there is only a single tie between two individuals, while there are no contacts amongst the others. Despite the unequivocal difference regarding the nature of relationship between the two units in these scenarios, the business unit level of analysis views these cases as similar, suggesting that the two units are connected. This example clearly shows that the individual level of analysis can offer a more accurate view on the actual social interactions within the organisations.

![Diagram of potential bias in the unit level of analysis](image)

**Figure 15 – Potential Bias in the Unit Level of Analysis (Own Figure)**

Despite these arguments, the number of studies on individual innovation remains very scarce within business literature. “Although individuals propose
innovative ideas, develop them, and advocate their implementation, most innovation research has been conducted at the organizational level of analysis” (Ibarra 1993:471-472). One reason for the inclination towards business unit or organisational level of analysis could be the relative easiness of measuring innovation in those levels. Innovative performance of units and organisations could be measured more objectively due to the availability of financial data. However, most organisations lack objective methods for measuring the contribution of individuals to the product innovation. As long as scholars stay within their comfort zone and measure the overall innovative outcome of the organisations, the social origins of innovation cannot be fully understood and measured.

Apart from innovation, perceived status as the independent variable of this research model has been historically viewed as an attribute associated to individuals (Weber 1948, 1978, Bourdieu 1979). Status beliefs reside within the perception of people regarding the social hierarchy. Since units as entities do not have opinions, measuring status of the business units must rely on the opinion of limited individuals from each business units, which may not fully represent the perception of the whole group (Podolny 2005). An individual level of analysis resolves this issue by integrating the opinion of all individuals and identifying their position in organisational social hierarchy.

From an empirical perspective, due to the quantitative and theory-testing nature of this research, individual level of analysis offers a larger sample in comparison to the business unit level. The number of business units, which contribute to the product innovation tends to be limited within most enterprises. This creates a major limitation in conducting a strong quantitative study in business unit level, while focusing on individuals removes this limitation and enables researcher to achieve larger samples.
4.3.6 Data Collection Methods

4.3.6.1 Relational Data

Conducting a quantitative research in social networks requires collection of relational (or network) data. Data collection methods for relational data are similar to the conventional data collection methods; however the difference remains on the type of data that a researcher looks for. In contrast with the traditional research that generally aims to collect data regarding certain attributes of the respondents, the ultimate purpose of social network research is to identify and measure the relationships between actors of a network. Therefore, social network researchers need to collect data that manifest the nature of relationship between actors (Scott and Carrington 2011). This type of data does not attempt to convey any ideas about the individual characteristics of the actor (e.g. age, gender, income, etc.); instead it concentrates on a specific relationship between actors (e.g. social tie, friendship, respect, etc.). The collected relational data are often presented in the matrix form, generating an $N$-by-$N$ adjacency matrix, when $N$ is the size of social network.

Figure 16 offers an example on how relational data derives from a social network to form an adjacency matrix. The value of the cell $(B, C)$ represents the value of the given relationship between actor $B$ and actor $C$, and since a tie exists between $B$ and $C$, the $(B, C)$ cell shows the value of 1. This matrix is diagonal; therefore the value of $(C, B)$ is equal to $(B, C)$. Since actors do not have social ties with themselves, the diagonal in the relational matrices tends to be ignored.

Note that the adjacency matrix of $N$ actors produces $N * (N – 1)$ applicable data points. Relational matrix could be either binary or valued. The cells in a binary matrix demonstrate presence or absence of a relationship, whereas in a valued matrix they show any valued attribute of the respective relationship. For instance, existence of a social tie between actors creates a binary matrix,
whereas the frequency of interactions tends to be valued. Figure 16 represents a binary adjacency matrix.

![Binary Adjacency Matrix](image)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Figure 16 – An Example for the Adjacency Matrix of a Social Network (Own Figure)*

### 4.3.6.2 Data Collection Method Selection

This study opts for questionnaire as the most suitable method of data collection. The following discussions compare different methods of data collection and by comparing their strengths and weaknesses rationalise the decision of choosing questionnaire for this research.

There are several techniques to collect relational data for a social network research. Questionnaires, interviews, observations or archival records are the most convenient techniques (Scott and Carrington 2011). The nature of the research and the variables that must be measured determine the appropriate data collection method. For example, for financial transactions between a network of institutions, it may be best to look at archival records; observations could be fitting for the exploratory studies in small networks, and questionnaires are suitable tools to collect data for the variables such as friendship or trust in large networks.
Perceived status and social ties certainly belong to the latter group of variables. Organisations do not keep any records regarding the status or social ties between actors in any database or repository, thus they cannot be retrieved from the archival records. Furthermore, a large number of actors combined with geographical dispersion of modern enterprises make it virtually impossible to extract these data through observation. In addition, conducting interviews with all actors could become biased, due to the lack of anonymity, and time-consuming due to rather large number of the sample. Aligned with the deductive theory-testing nature of this research, questionnaire appears as the most viable option of data collection for this research. Questionnaire is the only tool that can create a similar platform for all actors in expressing their viewpoints about the nature of their relationship with other actors, and thereby provide unbiased relational data from the complete network (Wasserman and Faust 1994).

In order to achieve this goal, I apply a dyadic approach for data collection, which concentrates on collecting data from all social ties between any pair of actors. For this quantitative research, collecting data from all actors regarding their social interactions with other actors is achievable only through applying sociometric\(^9\) questionnaire as the primary data collection method.

However, other methods can be used as secondary data collection methods. The innovative outcomes of the individuals must be extracted based on the actual contribution of the individuals to the product development projects. This data

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\(^9\) Sociometry is a quantitative method introduced by Moreno (1953). He defines sociometry as the inquiry into the evolution and organisation of groups and the position of individuals within them. The purpose of sociometric methods is to discover the social status, structure based on measuring the extent of attraction or repulsion between individuals in groups. In researches, which include inter-personal or inter-unit relationships, sociometric questionnaires help researchers to extract actors’ attitude towards each other (Moreno 1953, 1960, Northway 1967). The responses to sociometric questionnaire can generate a sociogram, which is a graph of relationships, and it facilitates the understanding of relationships in a group of actors (Hoffman et al. 1992). The result of sociometric questionnaire is relational data that can be analysed in our data analysis.
should be retrieved from the internal documents and the supervisors of each individual. Simply asking people about their innovative performance could become biased and inaccurate. However, personnel appraisal and evaluation forms, project timesheets, and project evaluation reports could offer solid material for developing an objective measure for innovation. Other secondary data collection could involve respondents’ personal data, which are recorded in organisational databases and can be omitted from the questionnaire (see, 4.6.2.). Additionally, interviews with knowledgeable individuals in the Headquarter could improve the quality of the empirical study.

The following discussion introduces two major approaches of the sociometric questionnaire regarding the data collection. It evaluates their merits and limitations, and ultimately selects the appropriate approach for this study.

**Free and Fixed Recall.** A free recall technique is usually applied, when researcher does not know all the actors of the network. In this technique, researcher identifies a selected group of actors and asks respondents to recall and nominate other actors of their social network. This technique relies on the memory of individuals, and it could become biased in large networks, and it is often employed in ego network studies (Prell 2011, Scott and Carrington 2011). Alternatively, fixed recall technique can be used when researcher knows all the actors, but she/he wants to identify the most significant social ties. In this case, researcher allows respondents to nominate a limited number of actors. For example, respondents can be asked to nominate 3 colleagues whom they trust the most.

**Roster.** The second technique of data gathering is to provide respondents with a roster of all actors. When the boundaries of the network are determined, researcher is aware of all involved actors and she/he wants to capture the relationship between all actors using rosters is suggested (Prell 2011).
approach eliminates any possibility of forgetfulness and leads to more complete responses. This technique is often used in complete network studies with limited number of actors. Respondents are asked sociometric questions, and they should respond those questions for all actors whose name is mentioned on the roster. The main drawback of this approach could appear in the studies with very large samples, resulting in equally long rosters.

This research is a complete network study that attempts to capture all social ties between the individuals in an organisational social network. Since the boundary of the network is clear and all actors are known prior to the research, roster is the preferred approach for designing the questionnaire. I decided to use the roster approach in order to assure all influential actors remain unforgotten, and the final matrices are as complete as possible.

The following table summarises the specifications of the selected research design:

<table>
<thead>
<tr>
<th>Steps</th>
<th>Current Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Setting</td>
<td>Transnational MNE</td>
</tr>
<tr>
<td>Network Boundary</td>
<td>Intra-organisational network</td>
</tr>
<tr>
<td>Sampling Technique</td>
<td>Nominalist approach</td>
</tr>
<tr>
<td>Unit of Analysis</td>
<td>Individuals</td>
</tr>
<tr>
<td>Data Collection</td>
<td>Sociometric Questionnaire - Roster</td>
</tr>
</tbody>
</table>

Table 4-2- Summary of the Empirical Research Design

4.4 Measures

This section elaborates on the measures for independent, mediator, dependent and control variables of this study. The measures are suggested based on solid
theoretical justifications, and existing measurement of the literature. Furthermore, various tests including face validity, content validity, discriminant validity, and alpha Cronbach will be conducted on the constructs throughout pilot study and the empirical study in order to assure validity and reliability of the constructs.

4.4.1 Perceived Status

A search within the literature regarding the applicable measures of status leads to a myriad of diverse approaches (e.g. Podolny and Phillips 1996, Smith, Menon and Smith 2012, Bothner, Kim, and Smith 2012, etc.). Status values are so intrinsic to their network that it would be virtually impossible to suggest a universal measure that would be appropriate in any type of settings. Due to the subjective nature of status (Adler et al. 2000, Singh-Manouk, Adler and Marmot 2003), it is even difficult to find two different studies that use exactly similar measure for status. Therefore, identifying an appropriate measure of status relies heavily on theoretical justifications. As Bianchi, Kang, and Stewart (2012) found, status values differ in different network, and an attribute that is associated with status in one network, is not necessarily is a valuable trait elsewhere. Hence, status must be measured case by case and according to the specifications and characteristics of each specific network. It would be a fatal mistake to formulate status according to a predefined set of characteristics.

However, despite the apparent differences of approach in measuring status, all available measures follow similar theoretical premise, which is to find the ranking of the actors in the social pecking order. Reviewing the literature regarding status measures suggests three criteria as the key considerations for measuring status.

I. Status indicates actors' ranking in the social hierarchy: This consideration indicates that the prospective measure must demonstrate
the position that actors occupy within the social hierarchy of the network. This condition is in line with the definition of status in this study, which is similar to the mainstream deference-based view of status (Podolny and Phillips 1996, Podolny 2005).

II. **Status exists inside social network and should not be measured based on external observations:** This consideration maintains status as an intricate notion that is built socially within the boundary of a social network (Gould 2002). Since this study is focused on individual actors, it is more appropriate to take a stance that is similar to the opinions of social psychologists. In this view, status structure is built based on the judgments and perceptions of the actors (Ridgeway 1997). These perceptions are often not recorded; therefore status measurement must be able to capture them in order to determine actors’ position within the social hierarchy. This view distances this research from the studies that have a competitive-based view (Bothner, Kim, and Smith 2012) of status and rely on recorded data and decision of the researcher in measuring status.

III. **Status values are consensual:** This consideration is built on the premise that status rankings are rather consensual and widely accepted across social network (Ridgeway 1991), and once actors are associated to a specific status category, various mechanisms help them stabilise and reinforce their position.

Based on the identified criteria, and a thorough research of the literature, this study identifies the approach used by Smith, Menon and Thompson (2012) to be the most fitting measure for perceived status. They have measured perceived status by directly asking respondents to register their own perception of status. In this study, I follow their approach to capture the perception of actors regarding the status of the others. Simply put, an actor is considered as high
status, only if other actors acknowledge his position at the high rankings of the social hierarchy (Magee and Galinsky 2008), and capturing that subjective opinion is important.

The collected data creates a relational matrix that indicates perceived status of each actor. This matrix could directly be used in the social network studies that are focused on dyadic level of analysis. However, this study is in collective level and aims to examine the effect of status on overall innovation contribution. Hence, the overall perceived status of actors should be extracted from the relational matrix by simply averaging the received score. Since the opinions of every actor are equally important due to the consensuality of status (Ridgeway 1997), average of received scores could be a solid measure for perceived status.

4.4.2 Centrality

Based on the requirements and objectives of this study, and following upon Cross and Cummings (2004), Shaw et al. (2005) and Tsai and Ghoshal (1998), I select betweenness centrality over degree, eigenvector or closeness measures. Betweenness centrality, which is extensively used as the prime measure of structural dimension of social capital (Shaw et al. 2005, Tsai & Ghoshal 1998), measures actors’ network position based on their overall location within the network and does not have the local view of the degree and eigenvector measures. It also has a delicate advantage over closeness, because it measures the extent to which a network position could be beneficial to actors, rather than how actors can take advantage of their network position. Borgatti (2005) argued that whatever flows across networks tends to find the shortest paths, therefore betweenness centrality could be the most suitable measure for the networks that involve flowing entities namely knowledge. Betweenness centrality also takes into account the vital role of brokerage in accessing diverse sources of knowledge, and thereby is more suitable for a status study. Bruggeman (2008)
argues high status actors take more advantage of the broker position and the bridging ties, while low status actors tend to rely on their direct and local set of social ties.

The most recent advancement to the betweenness centrality is the introduction of distance-weighted betweenness centrality measure to the UCINET package (Borgatti 2012). This function is built on the premise that the impact of the social ties diminishes with distance. It offers researcher the option of either exclude social ties that are longer than a fixed length or reduce the effect of those ties with a fix beta value. When the beta value equals 1, the distance will have no effect on the centrality of the actors, conversely smaller beta values will increase the impact of distance on centrality. Although, this measure is quite similar to the standard betweenness centrality, it can be very helpful in innovation and knowledge transfer studies by refining the old version of betweenness centrality and offering a more realistic view on the process of knowledge exchange by reducing the impact of very long paths that practically have no added value to the knowledge exchange and innovation processes.

Hence, I use distance-weighted betweenness centrality with UCINET default beta value of 0.8 to measure the structural dimension of social capital in order to improve the accuracy of the measurement (Borgatti 2012).

4.4.3 Perceived Trustworthiness

The relational dimension of social capital is measured by the perceived trustworthiness of the actors. Although, social network literature suggests variety of measures for this dimension, trustworthiness is the only determinant that is widely accepted as the representative of the relational dimension of social capital. Scholars also suggest other measures such as frequency of interactions and tie intensity (Tsai and Ghoshal 1998), which can be all categorised under tie strength. However, there are clear evidences that challenge the linear and direct
influence of tie strength on knowledge exchange and innovation and argue that weak ties could also contribute to the relational dimension of social capital and be considered as sources of unique and diverse knowledge (Levin and Cross 2004, Granovetter 1973). Although, strength (or weakness) of social interactions could affect the nature of ties, it will not provide an objective touchstone for measuring the relational dimension of social capital.

Trustworthiness, conversely, is a well-established determinant to measure the nature of social ties (Nahapiet and Ghoshal 1997, Tsai and Ghoshal 1998, Levin and Cross 2004). Whether actors are perceived trustworthy due to long-term interactions, or solely through their perceived competence, trustworthiness acts as a catalyst to improve the quality of social interactions. This idea is confirmed by Levin and Cross (2004), who found trustworthiness to mediate the effect of tie strength on knowledge transfer.

Following Wong and Boh (2010), Tsai and Ghoshal (1998) and Mehra et al. (2006), I measure perceived trustworthiness by asking actors to select the actors whom they find trustworthy based on reliability and benevolence factors. The number of nominations that each actor receives (in-degree trustworthiness) represents their perceived trustworthiness. The binary nature of this approach makes it possible to measure the aggregate trustworthiness of an actor based on the number of times they have been nominated as trustworthy, whereas a continuous variable cannot be aggregated and would become very biased based on the number of direct ties.

4.4.4 Cognitive Similarity

Cognitive similarity is the indicator that I apply to measure the cognitive dimension of social capital. This indicator comprises of two major components, which are goal and cultural similarity of actors with the organisational goals and culture. An effective collaboration requires a mutual cognitive standpoint, and
actors tend to adjust their cognitive values in order to improve the quality of their social interactions (Arregle et al. 2007). Cognitive dimension of social capital is measured as the degree to which actors share the dominant collective cognitive values of their organisation. Tsai and Ghoshal (1998) suggest shared visions as the determinant of cognitive dimension of social capital and measure the similarity between the goals of business units and the visions of the organisation as a whole. Following Nahapiet and Ghoshal (1997, 1998), Inkpen and Tsang (2005) argued that culture and norm similarity can also determine the cognitive dimension of social capital.

In this study, I measure cognitive dimension of social capital by using a measure of cognitive similarity, which consists of shared goals culture. This measure has been tested in previous studies, most importantly by Tsai and Ghoshal (1998). Actors will be asked to compare their personal goals, and culture to those of the organisation and indicate the degree of similarity between them. The responses given to these two questions are averaged to measure the cognitive similarity of each actor to the overall organisational cognitive values.

Cognitive similarity is the dimension of social capital that is not measured based on the relational data. The main reason behind this method is due to the fact that a single system of governance, and a confined network often create dominant and widespread cognitive values. As opposed to the strategic alliances, where each firms follows specific objectives, and carries distinct culture and norms, the intra-organisational networks often have defined collective goals, norms and culture. In this context, collective goals and culture of the network provide actors with a mutual cognitive standpoint that facilitates the interactions between them. Therefore, the more an actor shares those values, the easier he could collaborate and receive support from its colleagues.
4.4.5 Innovative Contribution

Measuring innovation in individual level is a very challenging task. The standard measures of organisational innovation such as number of new products (Tsai 2001), or financial measures such as the percentage of sales derived from new products (Wu and Wu 2014) cannot be applied in individual level of analysis. An innovative product can rarely be fully associated to only one person, and it often requires contributions of several individuals. In order to circumvent this issue, some scholars focused on measuring innovative behaviour of the individuals. They have developed intricate multivariate measures to quantify the innovative behaviour of the employees in a firm (Scott and Bruce 1994, George and Zhou 2001).

In terms of measuring the innovative performance of individuals, academia has fallen behind businesses. Modern technological breakthroughs in developing dedicated innovation management software (e.g., HYPE, Spigit, Brightidea), talent management suites (e.g., SuccessFactors, Cornerstone OnDemand, Oracle), intricate timesheets (e.g., Kronos, SAP CATS), and project logbooks (e.g., MS Project, Scrum) have given managers strong tools to appraise the performance of their employees in terms of innovation. It is essential for theorists to embrace these methods, and through strong theoretical justifications develop robust measures for individual innovation.

Prior to the development of the innovation measure for this study, some considerations were taken into account. First, the study focuses on the commercialised products (Trott 2008, Scott and Bruce 1994). Contributions to the products that were not marketed, or have been relaunched with minor adjustments were excluded from the measurement. “Most innovations cannot influence firm performance until the ideas have been put into use and introduced to the market” (Katila: 2002:995). A good measure of individual innovation must
capture the level of contribution of each employee to the development of new commercialised products. Second, a clear timespan must be set and all products that have been launched outside the given period must be excluded. It is essential to include all innovations within the defined period and avoid selective approach towards innovations. Damanpour (1988:562) argues that the "studies that arbitrarily select only one or a few innovations- among the many innovations adopted by an organization- cannot provide accurate data about structural requirements for innovation". Thus, I have selected all product innovations that occurred within the last 12 months prior to the data collection.

Inspired by the methods of innovation appraisal in modern MNEs, and building upon literature regarding individual innovative behaviour (Scott and Bruce 1994, George and Zhou 2001, Ibarra 1993), I have developed a scoring model that measures the innovative contribution of individuals to the product innovation. The measure consists of four criteria that cover the whole lifecycle of product innovation from the generation of the innovative idea to the commercialisation of the final product.

All four criteria are widely used and validated within the existing innovation literature (George and Zhou 2001, Ibarra 1993). The four steps of innovation are built upon the theoretical definition of product innovation, and represent all necessary steps of innovation from the conception of new idea to final commercialisation of the innovative products, ensuring content validity of the construct (Trott 2008). Although some researchers tend to combine two steps into a larger step, or breakdown one into two smaller steps (Ibarra 1993), the majority of studies on individual innovation follow similar criteria to cover the lifecycle of product innovation. For example, Ibarra (1993) used a very similar
coding scheme for measuring innovative involvement of individuals\textsuperscript{10}.

Overall, the suggested criteria are based on solid theoretical foundations, and are consistent with the body of literature regarding the measurement of innovative contribution of individuals (George and Zhou 2001, Scott and Bruce 1994, Ibarra 1993). Measuring innovation must be based on factual data, and since actors would be biased advocates of their own innovative contribution, it is logical to exclude them from the data collection process. Simple put, whether an individual believes that she/he was involved in the development of a new product, does not prove their actual contributions. Following Scott and Bruce (1994), in order to offer further assurance regarding the validity of the innovative contribution scale, it is crucial to obtain “an objective measure of each respondent’s innovative history from the organisation’s archive” (1994:590).

<table>
<thead>
<tr>
<th>Innovative Contribution Scoring Model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Criteria</strong></td>
</tr>
<tr>
<td>1. Generation of the initial innovative idea of the product.</td>
</tr>
<tr>
<td>2. Investigating the feasibility and securing funds for implementation of new idea.</td>
</tr>
<tr>
<td>3. Development and transformation of the idea into usable process and structure.</td>
</tr>
<tr>
<td>4. Implementation of the project that has helped achieving the goals and objectives.</td>
</tr>
</tbody>
</table>

Table 4.3 - Innovative Contribution Scoring Model

\textsuperscript{10} Ibarra (1993) used all four criteria that are suggested in this study. The only difference in her model was an extra criterion of obtaining approval. However, she admits that being involved in only four of those criteria suffices to acknowledge actors’ involvement in innovation. Since this step was not confirmed in other sources, and it is already covered in the second criterion of our model, it has been removed from the final model.
For each individual, all four questions must be answered regarding each new product, so that the contribution of the respective individual is determined. It must be kept in mind, that the purpose of this measure is to calculate the overall innovative contribution of each individual to the whole range of commercialised innovative products of the organisation.

The suggested weights may raise the question on why all four criteria are equally weighted within the model. The following arguments aim to justify this decision. The weight of each criterion in a scoring model must represent their importance to the construct (Belton and Stewart 2002). According to the innovation literature the four suggested criteria are equally important in development of innovative products (Katila 2002). Generation of new ideas, securing the funds and feasibility study of the ideas, development of those ideas into innovative products, and development of commercialised products are equally necessary for the whole process of innovation (Dougherty 1992, Danneels 2002), therefore they must be weighted similarly.

The literature does not provide any valid arguments to suggest that one step of product innovation to be more important than the others. Creativity researchers may consider idea generation as the most important step of product innovation. They could argue that without an innovative idea, there will not be any innovative product (West 2002, West and Farr 1990, Perry-Smith 2006). On the other hand, innovation scholars with marketing and commercial approach challenge this idea. They argue that even the best innovative ideas cannot become a tangible innovative product without technical development and strong marketing strategies (Slater and Mohr 2006, Snow et al. 2011, Lukas and Ferrell 2000). Therefore, there is no solid evidence to indicate that one step to be more critical than the others. However, it would be valid to suggest if any of the required steps of product innovation are incomplete the whole process of
innovation could fall through (Trott 2008). Hence, due to the equal importance of all four steps for the completion of product innovation, it is theoretically justified to break the total score to four equally distributed scores for each step.

The following arguments aim to justify the decision on opting for scoring model over the traditional Likert-Scale method for measuring individual innovation. A scoring model approach generates stronger and more accurate quantification of the innovative contributions, and facilitates the decision-making towards the innovativeness of the actors (Triantaphyllou 2000). Because of the limited scores, the respondent must make a decision and distinguish between the actors according to their performance, while the Likert-Scale questions would not create such control mechanisms for the respondents, and for example several actors could have received the maximum point for their contribution to the idea generation. Furthermore, another advantage of the scoring model is the accessibility of the whole continuum, whereas the categorical nature of Likert-Scale could be restricting, and raise the concern whether the intervals are equidistant (Jamieson 2004, Norman 2010). Hence, the scoring model approach offers a more realistic view of the actual innovation process and provides a more objective measure.

4.4.6 Control Variable

4.4.6.1 Unit Size

Although, transnational enterprises promote the social interaction between all employees, each actor is often assigned to a specific business unit. Naturally, it is easier for the actors to access the resources that reside within their own business unit. Thus, size of the business units could be an influential factor in innovation outcome of the individuals who are assigned to (Tsai and Ghoshal 1998). Larger units tend to have access to larger share of resources (e.g. knowledge, technological tools and devices). Actors can utilise those resources to
improve their innovation processes. Furthermore, larger units tend to gain more support from the Headquarters. In this study, I measure size of a business unit with the logarithm of their total assets, which has been tested by Tsai and Ghoshal (1998).

4.4.6.2 Unit Age

I also control for the age of the business units. The effect of unit age on innovation is widely researched, and acknowledged within business literature (Huergo and Jaumandreu 2004, Hansen 1992). Older units tend to have two main advantages in terms of innovation. First, they tend to have more experience and larger accumulation of historical knowledge, which can be exploited by its employees in innovation process. Second, they are often the powerful actors of the MNE. Since they have been established earlier, they are more likely to be integrated with the organisational power structure and use their precedence as a closure technique to reinforce and stabilise their power. Hence, I measure the business unit age by the number of years since the business unit has been founded.

4.4.6.3 Actor’s Educational Background

The educational background could play a role in innovation through its influence on actors knowledge stock as well as their absorptive capacity. Since, the purpose of this study is to measure the impact of social interaction and acquired knowledge on innovation, it is essential to control for any other effective variables.

Due to the complex and specialised nature of product innovation, academic education can offer actors a head start in developing innovative ideas. Not only the educated actors tend to have better grip on research methods, but also the specialised studies offers them a basic background knowledge that can positively
influence their absorptive capacity. Following Ibarra (1993), I use academic degree to measure educational background of the employees. Educational background is coded as 4-level variable (1= no university degree, 2= Bachelor Degree, 3= Masters Degree, 4= Doctorate Degree).

4.4.6.4 Actor’s Tenure

The potential effect of tenure on innovation must be controlled in this research. Senior actors tend to have better awareness of the political structure and cognitive values of the organisation. They are also likely to be more experienced and have larger stock of historical knowledge. Thus, they could have an advantage in accessing resources (Kimberley and Evanisko 1981). Tenure is measured in years since the individual has been employed by the organisation (Ibarra 1993).

4.4.6.5 Actor’s Age

Finally, I control the influence of age on the innovation outcome as well. Age could be a double-edged sword in terms of knowledge acquisition and innovation (Binnewies, Ohly, Niessen 2008, Simonton 1988). On the one hand, older actors are potentially respected, experienced and have stronger control over their job, and could potentially use those privileges to find stronger support to develop their ideas; on the other hand younger actors could be more creative, and have better knowledge of modern technological tools. Age of the actors is also measured in years.
4.5 Questionnaire

The relational measures of perceived status, centrality, trustworthiness and cognitive similarity would be derived from the collected relational data of the questionnaire. This section discusses the considerations regarding the design of the sociometric questionnaire, and then reviews its content.

4.5.1 Questionnaire Design

The merits of roster approach in designing a social network questionnaire, and its relevance to the specifications of this study were discussed previously. According to the proposed measures, perceived status, centrality and perceived trustworthiness are all considered dyadic relational measures because they are designed to measure actors’ opinion regarding one another. Thus, they require collection of relational data.

Designing a sociometric questionnaire that uses rosters, as the primary method of data collection is a very sensitive and challenging task, which requires the following considerations (Prell 2011, Faust and Wasserman 1994). Firstly, the respondents are asked to state their viewpoints about others rather than themselves. This notion tends to increase the reluctance of the respondents to provide truthful answers. Thus, they must be assured that their responses will remain completely anonymous. Secondly, since the collected data is used to map the social ties between actors, any missing data can have negative consequences on the results. Failing to record an existing social tie may affect the network structure significantly (Prell 2011). Hence, it is essential to take every step in order to minimise the missing data and capture all social ties between actors. Finally, it is crucial to avoid long questionnaires. Although it is important for the research to collect all necessary data, the questionnaire design should achieve this goal with minimum number of questions. Responding to sociometric
questions could become time-consuming and tedious, and consequently increase the risk of low response rate. Note that respondents are asked to answer each sociometric question $N - 1$ times. Taking these considerations into account and based on the proposed measures, I developed a questionnaire to collect required data from the prospective social network.

4.5.2 Questionnaire Content

In this section, I will only discuss those questions, whose data were used in the statistical analysis. Additional and complementary questions can be all seen in appendix I.

4.5.2.1 Identification

The first section of the questionnaires is often designed to collect personal data from the respondents. However, this approach is not common in social network questionnaires. Sociometric questions inquire for the opinion of actors about the others. The judgmental insinuation of such questions tends to raise reluctance amongst respondents to provide honest answers (Wasserman and Faust 1994). Thus, the importance of anonymity is doubly important in sociometric questionnaires (Scott 2000). A common method of creating the feeling of anonymity is to retrieve respondents’ personal data from the organisational human resources master data. Name, business unit, position, tenure, educational background, gender, marital status and other personal data are recorded in databases. In order to link the personal data to the filled questionnaires, each respondent is assigned with a random unique identification code. The researcher keeps the list of respondents and their assigned IDs. Respondents are communicated with their unique ID code, and are requested to enter the code at the beginning of the questionnaire. They are assured once more that the identification codes will remain confidential with the researcher.
This approach spares respondents from sharing their name and personal details on the questionnaire, leading to increased confidence in sharing truthful answers. Moreover, it shortens the required time for completing the questionnaire, which could lead to higher response rate.

4.5.2.2 Perceived Status Question

The first section of the questionnaire focused on collecting data on the status as the independent variable of this research. Perceived status was selected as the measure for quantifying status. It entails collection of data regarding the perception of actors about the position of all other actors within the social hierarchy of the organisation.

First a definition of status is given as follows:

\[ \text{Status is defined as the perceived ranking and position of each individual within the social hierarchy of your organisation, regardless of their formal position.} \]

Then, respondents are asked to answer the following questions, based on the similar method used by Smith, Menon, Thompson (2012):

\[ \text{How do you perceived the status of the following colleagues?} \]

The data is collected from a roster of all actors in a 5-point Likert-scale, in which respondents assign each actor to one of the five status categories (1= very low status, 2= low status, 3= average status, 4=high status, 5= very high status).

4.5.2.3 Centrality Question

Structural dimension of social capital was measured based on the distance-weighted betweenness formula, originally suggested by Freeman (1977) and improved by Borgatti (2012). As for any centrality measure, in order to measure distance-weighted betweenness centrality, it is essential to identify all existing
social ties, construct a corresponding binary matrix of 1s and 0s that indicate the presence or absence of ties (Tsai 2001), and map the pattern of interactions between actors. Thus, following Tsai and Ghoshal (19998) and Tsai (2001, I asked the following question:

*Please select the colleagues with whom you have had any sort of social interactions over the last year.*

The answer to this question is given through selecting the names of the social contacts from an attached roster.

**4.5.2.4 Perceived Trustworthiness Question**

Relational dimension of social capital was measured by collecting relational data regarding the level of perceived trustworthiness of the actors. The full roster is customised for each respondent through piping technique, so that they only see their social contacts instead of the complete initial roster. This technique reduces the response time dramatically, and more importantly assures that the perceived trustworthiness is measured based on the opinion of the actors who actually interact.

Trustworthiness is associated with benevolence and reliability. Benevolent actors are perceived to harbour good intentions and create confidence in their exchange partners that their knowledge will not be misused or arrogated. Reliable actors also considered as dependable sources of knowledge as well as potential long-term allies. Following Wong and Boh (2010), I developed the following question:

*Please select the colleagues who you find trustworthy based on their benevolence and reliability.*

This question may raise another question, that why did not I ask two questions
to measure benevolence and reliability separately? Similar to perceived status, perceived trustworthiness is a subjective concept. The feeling of trust has deep roots into the minds of people. Asking two questions about benevolent and reliable actors would have raised an issue of aggregation for the binary variable of trustworthiness. It would have been arbitrary to consider trustworthy actors as benevolent and reliable, vis-à-vis benevolent or reliable. This question provides respondents with a guideline regarding the definition of trustworthiness but it leaves the decision to the actors themselves whether to nominate others as trustworthy or not.

Responses to this question create a matrix of perceived trustworthiness. In contrast to social ties, trust is not a reciprocal notion. As a result, trustworthiness network is directional and its adjacency matrix is not diagonal.

4.5.2.5 Cognitive Similarity Question

Finally, cognitive dimension of social capital was measured by overall cognitive similarity of the actors. Cognitive similarity measure aims to record the extent to which personal goals and culture of the actors is similar to the collective organisational goals and widespread consensual culture. In order to capture the cognitive similarity, two Likert-scale questions were used in the questionnaire. Goals and culture are the two prominent features of cognitive values (Nahapiet and Ghoshal 1997, Inkpen and Tsang 2005). Following Tsai and Ghoshal (1998) I first developed the following question:

*What is the level of similarity between your personal goals and objectives to the collective goals of your organisation?*

Building on the theory that was suggested by Nahapiet and Ghoshal (1997) and developed by Inkpen and Tsang (2005), I have designed the second question to incorporate norms and culture into the cognitive similarity measure.
What is the level of similarity between your personal norms and working culture to the collective norms and working culture of your organisation?

4.5.2.6 Additional Questions

Besides the abovementioned questions that were designed to collect required data for the data analysis, I have developed a few additional questions. Although those questions were not to be used in the analysis and hypothesis testing, they could provide further insights, and suggest new ideas for future studies. (See, Appendix I for the questionnaire)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Status</td>
<td>Based on the provided definition of status: How do you perceive the status of the following colleagues?</td>
</tr>
<tr>
<td>Centrality</td>
<td>Please select the colleagues with whom you have had any sort of social interactions over the last year.</td>
</tr>
<tr>
<td>Perceived Trustworthiness</td>
<td>Please select the colleagues who you find trustworthy based on their benevolence and reliability.</td>
</tr>
<tr>
<td>Shared Goals</td>
<td>What is the level of similarity between your personal goals and objectives to the collective goals of your organisation?</td>
</tr>
<tr>
<td>Shared Culture</td>
<td>What is the level of similarity between your personal norms and working culture to the collective norms and working culture of your organisation?</td>
</tr>
</tbody>
</table>

Table 4-4- The Key Questions of the Questionnaire

4.6 Data Analysis Methods

4.6.1 Simple and Multiple Mediation Analysis

This study applies both simple and multiple mediation models. The nature the hypotheses, combined with the mediational research models calls for structural mediational analysis to test the hypotheses (Kline 2011). Traditionally, such studies are operated through dedicated structural equation modelling (SEM)
programmes such as LISREL, AMOS, MPlus, or Eqs. However, those programmes are more suitable for the studies that involve latent variables. There have been recent advancements in mediational analysis programmes that offer improved analysis for both simple and multiple mediations.

Most recent breakthrough in mediational analysis is the introduction of PROCESS (Hayes 2012). PROCESS is an SPSS Macro that is solely designed for mediation and moderation analysis. Not only PROCESS has the ability to test simple mediation analysis, but also it can measure the indirect effects in the multiple mediation models. It also ha the option to include several control variables to the model. This macro is built in order to make the Preacher and Hayes mediation tool (Hayes 2013) accessible through a dialog box in SPSS. “By far the best way to tackle moderation and mediation is to use PROCESS command” (Field 2013: 393).

**4.6.1.1 Bootstrapping**

PROCESS uses bootstrapping technique for testing the mediation effects, and measuring the indirect effect of X on Y (Hayes 2013). In this approach, researchers “bootstrap the sampling distribution of ab and derive a confidence interval with the empirically derived bootstrapped sampling distribution. Bootstrapping is a nonparametric approach to effect-size estimation and hypothesis testing that makes no assumptions about the shape of the distributions of the variables or the sampling distribution of the statistic” (Preacher and Hayes 2004:722). The bootstrapping is based on sampling with replacement for multiple times and calculation of the indirect effect for each sample. This technique has become extremely popular in mediational analysis (Bollen and Stine 1990, Lockwood and McKinnon 1998). Shrout and Bolger (2002) argue that bootstrapping can be used in multiple mediation models. It allows researchers to avoid non-normality of the sampling distribution.
In order to test the mediation, a confidence interval is computed and checked whether it contains zero. If the confidence interval does not include zero, one can reject the null hypotheses and be confident that the indirect effect is not equal to zero (Preacher and Hayes 2004, 2008, Efron 1987). The bootstrapping approach is gradually replacing the previously popular Sobel test, which “involves computing the ratio of \( ab \) to its estimated standard error (SE)” (Preacher and Hayes, 2008:880). Sobel test assumes normal distribution and is mainly applicable for very large samples. In smaller samples, bootstrapping can replace Sobel test because it does not require the normal distribution. Although PROCESS uses bootstrapping to measure the indirect effect and test the mediation, it also provides supplementary Sobel test for more conservative researchers.Preacher and Hayes (2008:886) propose that “bootstrapping provides the most powerful and reasonable method of obtaining confidence limits for specific indirect effects under most conditions, so our primary recommendation is to use bootstrapping — in particular, BC bootstrapping— whenever possible.”

Overall, despite few constraints\(^{11}\), PROCESS Macro still offers the most suitable tool for data analysis and hypothesis testing.

### 4.6.2 Social Network Analysis

The relational nature of the collected data calls for the inclusion of network analytic methodology and social network analysis (SNA) into the data analysis methods. The gathered data regarding perceived status, centrality and perceived trustworthiness are relational, derived from the social networks. SNA tools must be applied to analyse the collected data and measure these constructs so that they can be further used in the statistical analysis. Furthermore, SNA can also offer supplementary analysis to reassure the significance of the statistical analysis.

\(^{11}\) PROCESS does not provide effect size for multiple mediation models, which include covariates. It also does not automatically calculate the asymptotic critical ratio in multiple mediations.
analysis. Prior to discussing the application of SNA in this study, it is important to review its theoretical backgrounds, historical development, and implications in different disciplines. This review sheds light on how social network analysis was initiated and expanded from psychology into business literature.

4.6.2.1 Introduction

Social network analysis is an approach for studying social relations and their structure. This approach comprises of theoretical concepts, methods and techniques to unravel the social relations between individuals or groups, structure of the relations, and their influence on social behaviour, beliefs and knowledge (see, e.g. Scott and Carrington 2011, Wasserman and Faust 1994). Basically SNA consists of theories, models and applications that are expressed in terms of relational concepts or processes. It is based on assumption of the importance of relationships among interacting actors (Wasserman and Faust 1994). It aims to map, measure, and quantify social ties between actors. Although SNA is nowadays considered as a multidisciplinary approach, it has first developed by Jacob Moreno in the field of psychology through presentation of sociogram (Moreno and Jennings 1934). Moreno was a Gestalt psychology theorist (see, e.g., Wertheimer 1938), and he was interested on human social relations and its influence on mind well-being. He also developed sociometry (1953), as a quantitative method of measuring structure of groups and actors’ position within a group. Building upon Moreno, other social psychology scholars have expanded the study of social networks. Some of the most significant theories that were influenced by Moreno are as follows, field theory (Lewin 1936, 1951), centrality theory (Bavelas 1948, 1950), and structural balance theory (Cartwright and Harary 1956).

Simultaneously social anthropologists were also attracted to SNA to explain the social structures. The most prominent social anthropologists who contributed to
advancement of this approach are Radcliff-Brown, Warner and Gluckman. In the late 60s and early 70s, SNA became very popular by the sociology scholars. Homan, Merton, Blau and White are the most prominent sociologists who applied social network analysis into their research. Great contributions of mathematicians in integrating graph theory and algebraic models into SNA and developing algorithms and software to conduct SNA is undeniable.

Business studies are the latest discipline that recognised the huge potential of SNA in explaining and measuring the structural issues of an organisational network. In an MNE, individuals and groups act based on their position in the organisational network, and according to the nature of their relationship with their colleagues. In organisational studies, SNA enables researchers to study the behavioural patterns of actors (individuals or subsidiaries) within MNE network in regards of their position and relations as interdependent actors rather than independent units. Therefore the number of research in business journals applying SNA is increasing dramatically. In terms of inter-organisational knowledge transfer, SNA applies quantitative methods to map the ties between actors, recognise the central actors, identify informal exchange ties between actors and discover strong and weak channels of resource exchange.

4.6.2.2 UCINET VI

Several social network analysis software applications have been developed in order for researchers to address different issues of social networks. Each software has its unique characteristics and features and is suitable for specific type of network. Researchers must apply the most appropriate software based on the nature of collected data, type and size of the network and the variables they want to measure.

UCINET VI (Borgatti, Everett, and Freeman 2002) is one of the most popular software for a complete network research. UCINET has been developed by
Borgatti, Everett and Freeman (1992) and has been used as the most reliable software for social network analysis. Its popularity within the field of social network analysis has grown lately versus other software applications such as Pajek or Siena. This software includes strong matrix analysis routines (Hanneman and Riddle 2005) such as matrix algebra and it supports both binary and valued matrices. It also includes the NetDraw programme for visualisation of the social networks. UCINET VI is a matrix-oriented programme and data are stored and entered in matrix format (Wasserman and Faust 1994, Carrington, Scott and Wasserman 2005), however non-relational data can be also analysed by this programme. Furthermore, UCINET VI includes powerful routines in analysing and measuring different social network concepts such as centrality (degree, eigenvector, betweenness, etc.), identifying cohesive subgroups and clusters and cliques, analysing structural holes as well as structural redundancies within social networks (Scott and Carrington 2011). This software also works perfectly with all standard text processing programmes as well as Microsoft Excel for importing and exporting data.

The unique characteristics of UCINET have led to its growing popularity amongst social network analysis scholars. This study requires social network analysis methods in two stages. First, the adjacency matrices that are derived from the collected relational data must be analysed, and three constructs of status, centrality and trustworthiness must be measured using social network analysis techniques. Overall, UCINET VI stands out as the most fitting social network analysis software that can be used in study. In this study I use distance-weighted betweenness centrality procedure for measuring the structural dimension of social capital, degree centrality of the trustworthiness matrix for quantifying the relational dimension of social capital.\textsuperscript{12}

\textsuperscript{12} Additionally, MRQAP analysis and NetDraw function were also used in UCINET.
4.7 Pilot Study

4.7.1 Preparation

The first version of the questionnaire was tested in two pilot studies. The main objectives of the pilot studies were to refine the questionnaire, conduct an initial analysis of the hypotheses, and test the face and content validity of the constructs. Prior to the pilot studies, I have consulted two experts in academia and business to review the questionnaire. I have received feedbacks regarding the phrasing of some questions as well as the order of the questions. Although, all measures were either already used in the literature, or were developed based on the solid theoretical justifications, the opinions of the experts further increased the face and content validity of the constructs.

I have selected two settings in different industries for the pilot study. An MNE with strong focus on digital products, as well as a food and consumer product MNE were selected for the pilot study. The reason behind choosing two distinct industries was to test the potential external validity and generalisability of the study across different industries. Furthermore, the results from two different samples were highly correlated for all constructs, which further ensures the validity of the constructs.

4.7.2 Implementation

Interviews were schedules with three representatives from each multinational. The purpose of these interviews was to review the selected measures, discuss alternative measures for status, social capital and innovation, and examine the questionnaire in order to find possible improvements.

The pilot study has been conducted in three stages. The first stage involved one-to-one interviews with all prospective respondents. The research questions,
hypotheses and particularly measures have been discussed. The suggestions and recommendations of the representatives were noted. In the next stage, the representatives were asked to respond to the questionnaire. Although, respondents were aware of the measures, they have not had seen the questions prior to taking the questionnaire. This decision has been made to remove any negative effect of prejudice and preconceptions towards questions. In order to test whether the questions were formulated clearly and accurately it was essential to test how respondents would react in their first attempt of answering the questions. The final stage of the pilot study involved setting up a group meeting to discuss the design and content of the questionnaire. The open discussion has enabled respondents to exchange opinions and come up with suggestions to improve the vague parts of the questionnaire.

These suggestions have led to the modifications of the questions, and reshuffle of their arrangement. The most salient contributions of the pilot study to the measures and questionnaire are as follows:

4.7.2.1 Status

Although I was expecting perceived status to be a challenging construct to measure, I have received positive feedbacks from the respondents. Status is a subjective notion that is inherent to human nature (Weber 1978, Bourdieu 1963). All respondents had subconscious opinions regarding the status of other actors in the social network. However, I have also received some valuable feedbacks during the discussions. One interviewee mentioned:

“Why don’t you define status before asking the first question? It would help people to relate to the question easier.”

This comment was supported by the majority of the participants. I realised that a clear definition of status can provide respondents with a guideline that reduces
ambiguities. Hence, I have added the following definition of status,

“Status is defined as the perceived ranking and position of each individual within the social hierarchy of your organisation, regardless of their formal position.”

This definition was then followed by the following question:

“Based on the provided definition of status, how do you perceive the status of the following colleagues?”

4.7.2.2 Phrasing

The wordings of the questions have been revised prior to the pilot study by two experts. However, the questions pertaining to the relational dimension of social capital required further amendments based to results of the pilot study. I have noticed that some respondents have nominated only 1 actor as trustworthy. At first, it appeared as if they trust only one person in the whole organisation (which is a viable option). When I raised the issue in the follow up meeting, I have realised that the question was misunderstood. Those participants assumed to select their most trustworthy colleague. Hence, I have made a minor modification to remove the vagueness of that question.

The revised version of the question is as follows:

Please select all colleagues who you find trustworthy based on their benevolence and reliability. (Multiple Responses are possible)

4.7.2.3 Question Arrangement

As I discussed in the questionnaire content section, I have included few additional questions in the questionnaire. In the initial questionnaire, I have put these questions in a dedicated sections as the “complementary questions”. I have chosen this design to maximise the response rate for the main questions.
However, this design was not popular by the participants. They suggested that it would be more effective to divide questionnaire into two partitions of status and social capital, and include the additional questions in their corresponding section.

Based on this suggestion, I have modified the arrangement of the questions. All questions regarding the perceived status were moved to the first part of the questionnaire, followed by the questions regarding three dimensions of social capital. The new design does not interrupt the stream of consciousness. It enables respondents to conclude all relevant questions of a subject while they are fully focused on the respective subject.

4.7.2.4 Control Techniques

Based on my suggestion and the positive feedback of the participants, I decided to set the main 5 questions as mandatory. Due to the utmost importance of collecting complete network data, it is essential to take any measure to minimise the missing data. Moreover, I have set the identification code field as mandatory, because failing to associate a questionnaire to an actual actor makes that questionnaire useless. Answering other questions were optional due to the fact that they would not interfere with data analysis and measuring the key constructs.

4.8 Empirical Study

4.8.1 Industry Selection

Once the questionnaire was tested and finalised, the actual empirical study could commence. Selecting an industry that fits to the requirements of the research is the first step in conducting the empirical study. Product innovation is the dependent variable of this study, and therefore the empirical study must be
conducted in an industry that is involved with product innovation. The following discussion justifies the decision to select food industry as the fitting context to conduct this product innovation research. The food industry is one of the largest and fastest growing business sectors. According to Datamonitor, world leading business information provider, the global food market is valued at $4.2 trillion (USD) with estimated growth rate of 3.7% and the global growth rate of food industry will grow to 4.4% between 2012 and 2017, and the market size will expand to $5.3 trillion (USD).

The world population has reached the 7 billions mark last year. The ever-increasing world population has augmented the worldwide consumption of food. However, agricultural resources are very limited, and relying on the traditional methods of food production will naturally lead to scarcity of food products. These concerns accentuate the vital role of innovation in the food industry for the upcoming years and decades as a necessity rather than luxury (Pretty, Morison and Hine 2003). Solely through innovative methods of food production, we can increase the yield of the agricultural products and produce more calories from limited resources (Trail and Grunert 1997).

Simultaneously, recent economic growth in the developed world and the emerging markets coupled with rapid urbanisation and faster pace of life call for innovation in the food industry from a totally different perspective. The increasing request for the frozen foods and ready meals is the direct consequence of urbanisation and modern way of life. This makes the role of innovation in the food industry doubly difficult, and thus food manufacturers are often involved in vigorous R&D activities to respond to the needs of their customers (Sarkar and Costa 2008).

These arguments suggest food industry as one of the most innovative fields of business. Despite the significance of innovation in the food industry, to my
knowledge, there have been very few empirical studies that examine innovation within this industry (e.g. Tsai 2001). The majority of empirical studies on product innovation focus on electronic, hi-tech or pharmaceutical products. This study will address this shortcoming by testing hypotheses in an MNE that is involved in the food industry.

4.8.2 Location Selection

MENA (The Middle East and North Africa) and especially its oil-rich GCC (Gulf Cooperation Council) zone is one of fastest growing markets in the world. Although recent political upheavals in the region slowed down their economic growth in the past two years, it is expected that the region continue its growth in 2014. MENA countries cover over 15 million square kilometres and have the same population as the European Union. According to Population Reference Bureau (PRB), MENA has recorded world’s highest population growth in the second half of the 20th century and its population will keep growing in the upcoming years. The constant population growth and recent economical advancement of these countries increase the importance of food supply. A report from The Economist Intelligence Unit shows that only in the GCC zone the food import is expected to reach $53.1 billion (USD) in 2020 from $25.8 (USD) in 2010.

These statistics makes MENA a very attractive market for food manufacturers. However world’s pioneer food manufacturers have not penetrated to this market as expected. Political instability (e.g. Iraq War, Syrian Civil War, The Arab Spring), economical embargos (e.g. Iran) and lack of infrastructure and modern marketplace (e.g. Horn of Africa) are few reasons that have limited the presence of leading food manufacturer in MENA. The collection of these factors has created a unique opportunity of internationalisation for the emerging local food manufacturers. Small psychic distance between the home and host countries,
knowledge of the native gastronomies, geographical proximity, and diminished competition with the world market leaders enabled local MNEs to thrive in the last few years.

4.8.3 MNE Selection

Despite the great opportunity for local food manufacturers to expand their business across MENA territories, only a handful of organisations have achieved this goal, while the rest are confined within their national borders. This research is designed to test the hypotheses in a multinational setting that supports a large network of innovative actors. This criterion has reduced the number of candidates into a small shortlist.

Based on these arguments, I have selected a large food manufacturing MNE, headquartered in Dubai, United Arab Emirates, with the main manufacturing sites in Iran. The MNE has a strong presence across the MENA countries including United Arab Emirates, Iran, Iraq, Saudi Arabia, Qatar, Oman, Bahrain, Yemen, Kuwait, Egypt, Syria and Lebanon. They also operate in the CIS (Commonwealth of Independent States) countries, which are Azerbaijan, Armenia, Turkmenistan, Georgia, Tajikistan, and Uzbekistan. They also operate in other key neighbouring countries such as Turkey and Pakistan and are ambitious to grow further in those markets.

The selected MNE currently employs over 13,500 employees and operates in 5 major branches including Dairy Products, Meat Products, Beverages, Sauces and Condiments, Ready Meals and Frozen Foods, and Ice Cream. These five branches are divided into 17 product lines, and each product line has a corresponding R&D unit. The R&D teams are scattered in multiple locations across the globe in the UAE, Iran, Iraq, Germany, and United States. With over 1600 Shelf Keeping Units (SKUs), they are considered as one of the most prolific food manufacturers in terms of innovation of new products.
Furthermore, they have a strong and intricate network of collaborative R&D units that are constantly involved in product innovation activities. The Headquarter fully supports and motivates the direct communication between R&D units to improve the process of product innovation, and therefore there is bidirectional exchange of knowledge between R&D employees, and each R&D unit is considered as a centre of excellence for its product line. Transnational structure of the MNE, combined with the heavy focus on product innovation, and collaborative network of knowledge exchange between actors makes them a fitting candidate for conducting empirical research. This study, therefore, focuses only on the members of R&D units as the contributors to the product innovation.

4.8.4 Data Collection

This section aims to discuss all steps that were taken in order to complete the data collection. An effective data collection process requires meticulous planning, thorough preparation and strong execution.

4.8.4.1 Initial Setup

The first step of data collection process was to set up a meeting with the R&D director of the MNE. Since they were also one of my pilot study settings, the initial relationship was already established. During a video conference call, I have presented the R&D director with an abstract of my research, explained the research questions, hypotheses and research objectives. I have also discussed the potential empirical contribution of the research. As a result, I was granted an access to all recorded data regarding the R&D projects. Moreover, they allowed me to conduct a survey to collect data from the R&D staffs. In November 2013, I have received an invitation to attend an organisational social event, in which all R&D managers were also present. During the event, the R&D director has introduced me to those executives and asked them to cooperate with my project. Afterwards, I have arranged a short meeting with the managers to explain the
scope and objectives of my study, in order to build stronger relationship with them and have them on-board.

### 4.8.4.2 Preparation

The next step of data collection process was to prepare a sample of participants. A designated member of staff was assigned to the project to assist me regarding the sampling and communication with the prospective participants.

Since this study was a complete network research, I proposed to include all R&D employees who have been involved in the product innovation over the last year to the final sample.

The R&D network was clearly defined and there were no ambiguity regarding the network boundary. Since the characteristics of the respondents and the boundary of the network were clear, the nominalist sampling technique was preferred. Through consultation of the Headquarter, the names and other personal data of the individuals who were employed by the 17 R&D units were acquired from the human resources department. Those names were communicated to their corresponding managers, and after one round of amendments, a sample of 136 individuals was created. It included all R&D employees who were involved in the innovation process in one of the R&D units during the last 12 months.

Out of the 136 nominated actors, 6 have left the company over the course of the last year, while 9 people have joined during that period. Those 15 individuals were removed from the sample. The final sample contained 121 individuals who have been involved in an R&D unit during the whole last 12 months prior to the conduct of study. The final sample was then approved by the R&D director.
4.8.4.3 Implementation

The Headquarter has sent a notification letter to all respondents in order to introduce me and ask their full cooperation to the study. Subsequently, I have sent an email to the participants to explain the research questions, and reassure that their anonymity will be respected and all responses will be kept confidential. I also sent a separate email to the managers to ask their support once more. Due to the internal policies of the MNE, no incentives were offered for filling the questionnaires; therefore strong communications were absolutely important along the process of data collection to assure maximum response rate. The official language of the MNE is English, and all respondents were proficient in understanding and responding in English. Therefore, all communications including the questionnaire, interviews and emails were implemented in plain English language.

Prior to sending out the questionnaires, I have assigned random ID codes to each actor. The unique ID code and a link to the questionnaire were sent to the participants through Qualtrics Online Software. Due to my close connection to the organisation and constant communication with all R&D managers I have achieved 100% response rate and 121 filled questionnaires have been received within 12 working days. Once the data collection was concluded, I have sent a thank you email to all participants.

Furthermore, the data regarding the innovative contribution of the actors were collected with the assistance of the R&D director. Asking an impartial director level executive, who is not one of the participants, and has the authority is the most common approach on measuring innovation, because it is less biased than the self-reporting method. Anderson et al. (2004) investigated 9 major journals and found that 60% of the studies had used supervisor opinion to measure innovation. As recommended by Scott and Bruce (1994), the R&D director
devoted time to review all reports and project logs in order to be as objective as possible while scoring the innovative contribution of each actor to the product innovation.
5 Results

This chapter aims to explain all steps that were taken to analyse the collected data. It starts with data preparation, and standard screening process, and continues with measuring the underlying constructs and descriptive statistics. It ultimately tests the proposed hypotheses and offers relevant results.

5.1 Data Screening

Once the data collection phase was completed, I have examined the collected data by checking for missing data, and cleansing it from irrelevant data.

5.1.1 Missing Data

In the first step, the collected data was monitored and tested for missing values. Hair et al. (2010) suggest removing cases with over 10% missing values. When it comes to the relational data the effect of missing data could be detrimental (viz. due to the dyadic nature of relational data, each data point involves two actors directly, and a larger network indirectly) (Prell 2011). Social network studies rely heavily on their perception of the social interactions between actors, thus failing to capture an existing social tie leads to misinterpretation and incomplete picture of the whole social network.

In this study, all completed questionnaires have passed this criterion and were included in the data analysis. The key questions of the questionnaire were made mandatory and could not be skipped by the participants. This approach would have been risky in a larger or in less controllable sample. However, constant communication with the managers and strong support of the Headquarter in demanding full response from their employees has led to a complete response rate.
5.1.2 Data Cleansing

Once the initial examination was completed, I have imported the collected data into UCINET VI software. UCINET VI organises data into matrix structure. UCINET VI offers strong tools to detect and remove irrelevant and/or incorrect data, prior to conducting any analysis.

As I explained, the diagonal in the adjacency matrix of the relational data is ignored. It indicates the opinion of the actors about themselves, which is irrelevant in social network analysis. However, this issue was detected in three questions. Some respondents have rated their own status, registered social ties with themselves, and nominated themselves as trustworthy actors in the questionnaire. In order to solve this issue, the diagonal of the status, social ties, and trustworthiness matrices were transformed to zero.

The second required action was to control the validity of reported social ties. I applied a dyadic approach to confirm the existence of social ties between two actors. If actor A claims to have a social tie with actor B, a social tie between A and B is confirmed in the matrix, only if the actor B also claims the existence of a social tie with A. This approach obviates false responses and assures that a tie is indeed reciprocated between any pair of actors. As a result the social tie matrix must be diagonal. This can be achieved through applying the diagonal function of UCINET VI. Simply put, a tie between A and B was approved only if both \((a, b)\) and \((b, a)\) data points in the social ties matrix were 1.

5.1.3 Construct Validity

Face Validity. The face validity of the constructs were assured through following the criteria suggested by Hardesty and Bearden (2004):

- All measures were suggested based on solid theoretical foundations, and in full accord to the definition of the construct
The measures were developed based on the existing measures of the literature.

- Two experts in academia and business reviewed the suggested measures and provided feedbacks. Their feedbacks were applied on the construct measurements, as well as the questionnaire.
- Moreover, all measures were tested in two independent pilot studies.

**Content Validity.** “Content validity is the degree to which elements of an assessment instrument are relevant to and representative of the targeted construct for a particular assessment purpose” (Haynes et al. 1995:238). This study addressed content validity by an extensive review of the literature and consultation of experts in order to identify the whole domain of each construct and include them in the construct measurement.

**Discriminant Validity.** Discriminant validity aims to assure that a measure is not related to other distinct constructs (Messick 1980). Although most of the constructs were directly adapted from the existing measures of the literature, this study applied factor analysis to test the discriminant validity of the constructs. All constructs demonstrated good discriminant validity based on factor analysis. All expected factor loadings were above 0.5, whilst measures did not load significantly on alternative constructs.

### 5.2 Descriptive Statistics

Once the correctness of the collected data was assured, the main constructs of the study including perceived status, centrality, perceived trustworthiness and cognitive similarity were calculated.
5.2.1 Perceived Status:

Perceived status of the actors was measured by the average of the 120 scores that they have received from their colleagues. In the adjacency matrix of the perceived status, the average score of each column represented the overall perceived status of the corresponding actor.

In a 5-point Likert-scale question, the highest recorded status was 4.608 and the minimum was 1.008. The mean for perceived status was calculated at 2.025.

5.2.2 Centrality:

In order to measure centrality, the distance-weighted betweenness formula in UCINET VI was utilised. The diagonal matrix of social ties was used as the input network, and beta value was set as UCINET VI default value of 0.8 (Borgatti 2012). The most central actor was measured with the centrality of 1850.194, while the mean for centrality was computed at 161.214. A relatively large numbers of the centrality measure is due to the aggregating betweenness formula, which is in direct correlation with the size of the network. The larger the network, the longer the potential geodesics between a pair of actors, and therefore the larger figures for the centrality measure.

5.2.3 Perceived Trustworthiness

The perceived trustworthiness of the actors was measured by calculating the number of nominations they have received as trustworthy by other 120 respondents. In contrast to the social ties matrix, the trustworthiness matrix was not diagonal. The perception of trust is not reciprocal, which means that while actor A could nominate actor B, as a trustworthy contact the opposite is not necessarily true (Tsai and Ghoshal 1998). In order to measure the perceived trustworthiness, the binary matrix of trustworthiness was used as the input
network and in-degree centrality was measured for each actor (The out-degree centrality would have shown the number of people that each actor trusts). The most trustworthy actor has received 12 nominations, while the least trustworthy actors were not trusted by anyone of their colleagues. The mean for perceived trustworthiness was registered at 4.41, meaning that on average each actor was trusted by 4.41 of their colleagues.

5.2.4 Cognitive Similarity

The cognitive similarity was measured by the average of two 5-point Likert-scale questions. Cognitive similarity is the only composite variable of social capital. The Cronbach’s alpha is a widely accepted reliability measure, and is recommended to be above 0.70 (Fornell and Larcker 1981). I have conducted the Cronbach’s alpha test to examine the internal reliability of the construct and measured it at 0.8299, assuring the reliability of the construct (Flynn et al. 1990). Furthermore, both goal similarity, and cultural similarity were built on strong theoretical backgrounds (Tsai and Ghoshal 1998, Nahapiet and Ghoshal 1998), and were both tested during the pilot study, ensuring their content validity.

In two 5-point Likert-scale questions, two actors reported the maximum cognitive similarity of 5, while 4 actors registered the minimum of 2. The mean for cognitive similarity was measured at 3.314.

5.2.5 Product Innovation

The contribution of the actors in product innovation was measured based on the project reports, project logbooks, and under the supervision of R&D director. This step took place upon completion of the questionnaires, in two separate meetings with the director of R&D. Based on the suggested measure, I asked the R&D director to score the innovative contribution of each actor to four steps of innovation for each product. The sum of the points that each individual received
Results


determined their overall innovative contribution to the product innovation. The most innovative actor has secured 7 points, while the lowest recorded score was 0.1. The mean innovative contribution was 1.497.

The following table depicts the descriptive statistics of all variables including the control variables and supplemental measures such as degree centrality.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>121</td>
<td>3.600</td>
<td>.000</td>
<td>4.608</td>
<td>2.024862</td>
<td>.0983390</td>
<td>1.081728</td>
</tr>
<tr>
<td>Centrality</td>
<td>121</td>
<td>18.50</td>
<td>0.000</td>
<td>185.0194</td>
<td>24.920</td>
<td>274.126209</td>
<td>75145.179</td>
</tr>
<tr>
<td>In-Degree</td>
<td>121</td>
<td>16</td>
<td>2</td>
<td>18</td>
<td>5.54</td>
<td>.269</td>
<td>2.964</td>
</tr>
<tr>
<td>Trust</td>
<td>121</td>
<td>12</td>
<td>0</td>
<td>12</td>
<td>4.41</td>
<td>.246</td>
<td>2.707</td>
</tr>
<tr>
<td>Cognitive</td>
<td>121</td>
<td>3.00</td>
<td>2.00</td>
<td>5.00</td>
<td>3.3140</td>
<td>.05693</td>
<td>.62627</td>
</tr>
<tr>
<td>Innovation</td>
<td>121</td>
<td>6.90</td>
<td>.10</td>
<td>7.00</td>
<td>1.4975</td>
<td>.11641</td>
<td>1.28046</td>
</tr>
<tr>
<td>Education</td>
<td>121</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>2.41</td>
<td>.056</td>
<td>.615</td>
</tr>
<tr>
<td>Tenure</td>
<td>121</td>
<td>22</td>
<td>1</td>
<td>23</td>
<td>6.15</td>
<td>.362</td>
<td>3.987</td>
</tr>
<tr>
<td>Age</td>
<td>121</td>
<td>36</td>
<td>22</td>
<td>58</td>
<td>35.76</td>
<td>.722</td>
<td>7.940</td>
</tr>
<tr>
<td>Unit Size</td>
<td>121</td>
<td>.8368</td>
<td>5.0879</td>
<td>5.196</td>
<td>5.5711738</td>
<td>.01886752</td>
<td>.20754267</td>
</tr>
<tr>
<td>Unit Age</td>
<td>121</td>
<td>13</td>
<td>3</td>
<td>16</td>
<td>8.76</td>
<td>.372</td>
<td>4.091</td>
</tr>
<tr>
<td>Valid N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Listwise)</td>
<td>121</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5-1- Descriptive Statistics

5.2.6 Correlations

The following table demonstrates the bivariate correlations between the main constructs of this study. Three dimensions of social capital were highly correlated with both perceived status and product innovation. There was also strong correlation amongst three dimensions of social capital. Perceived status and product innovation were correlated as well. In terms of control variables, the individual level variables, namely educational background, tenure and age of the actors have shown stronger correlation with both dependent and independent
variables, in comparison to other unit level control variables namely unit size and unit age.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>s.d.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Perceived Status</td>
<td>2.025</td>
<td>1.082</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Centrality</td>
<td>161.214</td>
<td>274.126</td>
<td>.707**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Perceived Trustworthiness</td>
<td>4.410</td>
<td>2.707</td>
<td>.703**</td>
<td>.651**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Product Innovation</td>
<td>1.497</td>
<td>1.280</td>
<td>.723**</td>
<td>.735**</td>
<td>.697**</td>
<td>.592**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Education</td>
<td>2.410</td>
<td>.615</td>
<td>.379**</td>
<td>.285**</td>
<td>.252**</td>
<td>.288**</td>
<td>.306**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Tenure</td>
<td>6.150</td>
<td>3.987</td>
<td>.303**</td>
<td>.252**</td>
<td>.213*</td>
<td>.226*</td>
<td>.342**</td>
<td>.192*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Age</td>
<td>35.76</td>
<td>7.940</td>
<td>.288**</td>
<td>.275**</td>
<td>.204*</td>
<td>.163</td>
<td>.217*</td>
<td>.287**</td>
<td>.537**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Unit Size</td>
<td>5.571</td>
<td>.208</td>
<td>.129</td>
<td>.099</td>
<td>.092</td>
<td>.124</td>
<td>.209*</td>
<td>.277**</td>
<td>.092</td>
<td>.101</td>
<td></td>
</tr>
<tr>
<td>10. Unit Age</td>
<td>8.76</td>
<td>4.091</td>
<td>.136</td>
<td>.083</td>
<td>.033</td>
<td>.056</td>
<td>.165</td>
<td>.176</td>
<td>.482**</td>
<td>.346**</td>
<td>.213*</td>
</tr>
</tbody>
</table>

* Correlation is significant at p < .05
** Correlation is significant at p < .01

| Table 5.2- Means, Standard Deviations, and Bivariate Correlations |

5.3 Mediational Analysis and Hypotheses Testing

The following section provides the results of the mediational analysis. Once, the measures were calculated, I have exported the data to IBM SPSS. Using PROCESS Macro (Hayes 2012) in SPSS, I have conducted both simple and multiple mediational analysis, using status as the independent variable and innovation as
the dependent variable. Three dimensions of social capital were also applied as mediator variables. This study focuses on the results of multiple mediation to test the mediation of social capital and examine hypothesis 7, however it is important to reiterate the reasons behind the inclusion of simple mediation analysis as well. As it has been mentioned previously, the simple mediation of each dimension of social capital could contribute the three different branches of studies including network structure (e.g. Burt, Coleman), trust (e.g. Levin, Zaheer), and cognitive studies (e.g. Bunderson, Reagans). Scholars, who are interested in the mediating role of each dimension individually and irrespective of their interrelations to other dimensions could benefit from the results of the simple mediation analysis. Therefore, offering the results of the simple mediation could advance those fields of study, while corroborating the credibility of each dimension as the valid mediator on the relationship between status and innovation.

5.3.1 Simple Mediation of Centrality

First, the simple mediation of centrality as the sole mediator in the effect of status on innovation was examined. The total effect of perceived status on innovation was \( c = 0.8011 \) and the indirect effect was measured at \( f = 0.3625 \) with bootstrap period of \([0.1570, 0.5538]\). Since the interval between low and high bootstraps does not include 0, it can be interpreted that the indirect effect cannot be 0. The Sobel test also supports the significance of the results \((p = .000, Z = 4.85)\).

The results also support all four necessary criteria of the mediation. 1) Perceived status significantly predicted innovation \((0.8011, 95\%CI [0.64,.97])\), 2) perceived status significantly predicted centrality \((\beta = 172.08, p = .000)\), 3) centrality significantly predicted innovation \((\beta = 0.002, p = .000)\), and 4) the direct effect of perceived status on innovation was reduced once it was controlled for
centrality ($0.44, 95\% CI [0.25, 0.63])$. As discussed earlier, the large value of $\beta$ in the effect of perceived status on centrality, and the rather small value of $\beta$ in the effect of centrality on innovation is entirely due to the large figures of betweenness centrality measure.

The results of this simple mediation confirm centrality as the mediator on the effect of perceived status on innovation. centrality.

**Figure 17 – Simple Mediation of Centrality - Results**

### 5.3.2 Simple Mediation of Perceived Trustworthiness

Similarly, the theorised mediation of perceived trustworthiness in the effect of perceived status on product innovation was tested. The indirect effect of was calculated at $f = 0.3136$ and zero was not contained in the bootstrap confidence interval of $[0.1631, 0.5425]$. Sobel test was also significant ($p = .000, Z = 4.14$).

This model also supports the four criteria of mediation. 1) Perceived status significantly predicted innovation ($0.8011, 95\% CI [0.64, 0.97]$), 2) perceived status significantly predicted perceived trustworthiness ($\beta = 1.76, p = .000$), 3) perceived trustworthiness significantly predicts innovation ($\beta = 0.18, p = .000$), 4) the direct effect of perceived status on innovation is reduced once controlled for perceived trustworthiness ($0.49, 95\% CI [0.29, 0.69]$).
The results confirm perceived trustworthiness as the mediator to in the effect of perceived status on innovation.

5.3.3 Simple Mediation of Cognitive Similarity

Mediating role of cognitive similarity in the effect of perceived status on product innovation was the third examined simple mediation. The indirect effect of independent variable on the dependent variable was calculated as \( f = 0.1542 \). The bootstrap confidence interval was \([0.0574 - 0.3028]\) that did not contain zero. Sobel test confirms the significance of the results as well \( p = .003 \), \( Z = 2.94 \).

Furthermore, the four conditions of mediation were all met. 1) Perceived status significantly predicted innovation \((0.8011, 95\%CI [.64, .97])\), 2) perceived status significantly predicted cognitive similarity \((\beta = 0.30, p = .000)\), 3) Cognitive similarity significantly predicted innovation \((\beta = 0.51, p = .001)\), 4) the direct effect of perceived status on innovation is reduced once controlled for cognitive similarity \((0.65, 95\%CI [.47, .83])\).

The results denote that cognitive similarity mediates the effect of perceived status on innovation.
5.3.4 Multiple Mediation of Social Capital

The last and the most elaborate model of this study was the multiple mediation model, which intended to measure the simultaneous mediating role of three dimensions of social capital in the effect of perceived status on innovation. One issue that is more or less unavoidable in multiple mediations is multicollinearity. I measured the potential multicollinearity amongst variables by calculating the variance inflation factor (VIF). VIF evaluates the degree to which each variable can be explained by the other variables. High multicollinearity can lower the significance of the estimates. As a rule of thumb, scholars suggest a VIF of 5, or 10 could suggest a high multicollinearity (O’Brien 2007). The measured VIFs for the three dimensions of social capital were all below 2, which signifies that multicollinearity is not a serious concern and the results cannot be attributed to collinearity.

The results of multiple mediation analysis supported all four necessary criteria of mediation. 1) Perceived status significantly predicted innovation ($0.8011, 95\% CI [0.64, 0.97])$, 2) perceived status significantly predicted all three dimensions of social capital in the presence of the other two dimensions$^{13}$, 3) all dimensions of social capital significantly predicted innovation in the presence of

$^{13}(\beta = 172.08, p = .000), (\beta = 1.76, p = .000), (\beta = 0.30, p = .000)$
the other two dimensions\textsuperscript{14}, and 4) the total effect of perceived status on innovation was reduced from 0.8011 to 0.2410, when it was controlled for the three dimensions of social capital (0.24, 95\%CI [.04, .45]).

The total indirect effect (mediated effect) was measured by summing the indirect effect of each dimension of social capital, that is:

$$ f = f_1 + f_2 + f_3 = 0.2828 + 0.1887 + 0.0886 = 0.5601 $$

Furthermore, since the asymptotic critical ratio (Z) cannot be automatically computed for multiple mediation, I have used the following formulae to calculate it (Preacher and Hayes 2008). The asymptotic variance of the indirect effect is $\text{var}[f] = 0.00943141$. The asymptotic critical ratio for the total indirect effect therefore is calculated as follows.

$$ Z = \frac{\text{Total Indirect Effect}}{\sqrt{\text{var}[f]}} = \frac{0.5601}{\sqrt{0.00943141}} = 5.76736, $$

Hence, the null hypothesis that the total indirect effect is zero is rejected.

The results offer strong evidence that the combination of centrality, perceived trustworthiness and cognitive similarity (also known as social capital) mediates the effect of status on innovation. The total effect of perceived status on product innovation was measured as $c = 0.8011$. The direct effect is calculated as $c' = 0.2410$ and the total indirect effect is $f = 0.5601$. In addition, zero is not contained in the bootstrap confidence interval ([0.3194, 0.8494]).

These numbers signify that while total effect of perceived status on innovation is 0.8011, introduction of three dimensions of social capital as the mediator variables can explain 0.5601 of the effect.\textsuperscript{15}

\textsuperscript{14} ($\beta = 0.002, p = .000), (\beta = 0.11, p = .005), (\beta = 0.29, p = .03)$
Hence, the results supported hypothesis 7, which suggests three dimensions of social capital to be the mediator variables in the effect of status on innovation. The collection of three dimensions of social capital within one comprehensive multiple mediation model provides a solid theory to explain the mechanisms, by which status could influence innovative outcomes. The multiple mediation model is certainly an upgrade from simple mediation analysis, because it confirms the mediating effect of those dimensions in the presence of other two dimensions of social capital, rather than their effect in isolation (Preacher and Hayes 2008).

The total mediated effect was broken down in order to examine the contribution of each mediator to the total indirect effect. The results suggest that although the

\[
\frac{Total\ Indirect\ Effect}{Total\ Effect} = \frac{0.5601}{0.8011} = 0.6991
\]
mediating effect of the three dimensions of social capital alters in the multiple mediation model, they all remain as significant mediators even when they are tested simultaneously with the other two dimensions. In the multiple mediation model, centrality keeps its position as the most influential mediating variable ($f_1 = 0.2828, 95\% CI [0.0432, 0.4778]$). It is followed by perceived trustworthiness as the second influential mediator variable, ($f_2 = 0.1887, 95\% CI [0.0277, 0.3885]$). Finally, although the mediating effect of cognitive similarity diminishes even further in the presence of centrality and perceived trustworthiness, it remains significant in the multiple mediation model ($f_3 = 0.0886, 95\% CI [0.0148, 0.1901]$).

Confirming hypothesis 7 by extension confirms hypotheses 1-6 as well. It is inherent to the definition of mediation that the independent variable must significantly predict the mediator variable, which itself must significantly predict the dependent variable (criteria 2 and 3). Therefore, results of the mediational analysis supports perceived status as the predictor of three dimensions of social capital, and subsequently confirm those dimensions to predict innovation significantly. Hence, all suggested hypotheses were supported by multiple mediation analysis. Table 5.3 demonstrates the results of the first 6 hypotheses, while table 5.4 summarises the results of the mediational analysis.

Furthermore, I have also conducted supplementary MRQAP analysis to analyse the data from dyadic approach and further assure the robustness of the results against potential autocorrelation. The outcomes confirmed the significance of the reported results (Please see appendix II for discussions and results of MRQAP).
### Coefficients and Standard Errors for Hypotheses 1-6

<table>
<thead>
<tr>
<th></th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Status</td>
<td>172.08**(18.72)</td>
<td>1.76**(19)</td>
<td>.30**(.050)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centrality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.002**(0.00)</td>
</tr>
<tr>
<td>Perceived Trustworthiness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.18**(0.04)</td>
</tr>
<tr>
<td>Cognitive Similarity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.51**(0.15)</td>
</tr>
<tr>
<td>R²</td>
<td>.5070</td>
<td>.5000</td>
<td>.3380</td>
<td>.6559</td>
<td>.6265</td>
<td>.5971</td>
</tr>
</tbody>
</table>

#### Control Variables

<table>
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<tr>
<th></th>
<th>Perceived Status</th>
<th>Education</th>
<th>Tenure</th>
<th>Age</th>
<th>Unit Age</th>
<th>Unit Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.04(.02)</td>
<td>2.48(33.36)</td>
<td>1.75(5.89)</td>
<td>2.82(2.79)</td>
<td>-3.56(5.17)</td>
<td>14.42(91.93)</td>
</tr>
<tr>
<td></td>
<td>.03(.02)</td>
<td>-0.069(33)</td>
<td>0.02(0.02)</td>
<td>0.01(0.03)</td>
<td>-0.57(0.05)</td>
<td>0.26(9.11)</td>
</tr>
<tr>
<td></td>
<td>.02(.02)</td>
<td>0.09(09)</td>
<td>0.02(0.02)</td>
<td>0.00(01)</td>
<td>0.01(01)</td>
<td>0.13(24)</td>
</tr>
<tr>
<td></td>
<td>.02(.03)</td>
<td>0.02(13)</td>
<td>0.05**(0.02)</td>
<td>-0.02(01)</td>
<td>0.01(02)</td>
<td>0.67(36)</td>
</tr>
<tr>
<td></td>
<td>.01(14)</td>
<td>0.03(14)</td>
<td>0.5**(.02)</td>
<td>-0.01(01)</td>
<td>0.01(02)</td>
<td>0.65(38)</td>
</tr>
<tr>
<td></td>
<td>-0.02(14)</td>
<td>-0.02(14)</td>
<td>-0.02(14)</td>
<td>-0.01(02)</td>
<td>-0.01(02)</td>
<td>-0.67(39)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Unit Size</th>
<th>Constant</th>
<th>N=121</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-354.19(498.04)</td>
<td>-25(4.95)</td>
<td>1.89(1.32)</td>
</tr>
<tr>
<td></td>
<td>-3.16(1.96)</td>
<td>3.86(2.03)</td>
<td>4.87(2.13)</td>
</tr>
</tbody>
</table>

Standard errors are shown in the parentheses

---

**Table 5-3: Results of the Hypotheses 1-6**

<table>
<thead>
<tr>
<th></th>
<th>Point Estimates</th>
<th>Product of Coefficient</th>
<th>Bootstrapping (BC 95% CI)</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>SE</td>
<td>Z</td>
</tr>
<tr>
<td><strong>H7a</strong></td>
<td></td>
<td>Indirect Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centrality</td>
<td>0.3625</td>
<td>0.1035</td>
<td>4.8474</td>
<td>0.1570</td>
</tr>
<tr>
<td><strong>H7b</strong></td>
<td></td>
<td>Indirect Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Trustworthiness</td>
<td>0.3136</td>
<td>0.0936</td>
<td>4.1407</td>
<td>0.1631</td>
</tr>
<tr>
<td><strong>H7c</strong></td>
<td></td>
<td>Indirect Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive Similarity</td>
<td>0.1542</td>
<td>0.0601</td>
<td>2.9439</td>
<td>0.0574</td>
</tr>
<tr>
<td><strong>H7</strong></td>
<td></td>
<td>Indirect Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL (Social Capital)</td>
<td>0.5601</td>
<td>0.1340</td>
<td>5.7674</td>
<td>0.3194</td>
</tr>
<tr>
<td>Centrality</td>
<td>0.2828</td>
<td>0.1126</td>
<td>2.9120</td>
<td>0.0432</td>
</tr>
<tr>
<td>Trustworthiness</td>
<td>0.1887</td>
<td>0.0934</td>
<td>1.9430</td>
<td>0.0277</td>
</tr>
<tr>
<td>Cognitive Similarity</td>
<td>0.0886</td>
<td>0.0439</td>
<td>0.9123</td>
<td>0.0148</td>
</tr>
</tbody>
</table>

Table 5.4: Results of the Meditational Analysis

This chapter presented the results of the statistical analysis, and provided support to the proposed hypotheses. The next chapter sheds more light on the results by elaborating on their theoretical significance and discussing their implications.
6 Discussions

The purpose of this chapter is to discuss the results of the empirical study in more detail, explore their relevance to the existing body of literature, and find theoretical accounts that could provide further justifications to the achieved results. The forthcoming discussions pave the path for the final chapter, in which the theoretical and empirical contributions of the study will be discussed.

However, prior to discussing the results, it is necessary to elaborate on the validity of the study. A rigorous theoretical discussion has been conducted in order to support the effect of status and social capital on innovation. The literature pertaining to status, social capital and innovation was thoroughly reviewed in order to find theoretical foundations to support to this research. Following notion of temporal precedence (Brewer 2000), it has been examined that status and social capital are indeed precedents of innovation, rather than the opposite. Furthermore, several potential confounding variables were controlled for in order to minimise alternative explanations (Cook and Campbell 1976). However, internal validity can be reached up to a certain level, and many scholars argue that internal validity can never be claimed with absolute certainty (Cronbach 1982, Kruglanski and Kroy 1976). Nevertheless, this research has taken any step possible in order to maximise the internal validity through solid theoretical justifications, and controlling for several cofounding variables. Moreover, “external validity requires analysing whether causal relationships hold over variations in persons, settings, treatments, and outcomes” (Shadish, Cook and Campbell 2002:464). External validity and generalisability are arguably even harder to achieve than internal validity, due to the presence of numerous background variables that could potentially affect the results in other studies (Lynch 1982). The sensitivity of external validity has made many
Discussions

scholars hesitant on addressing the issue, however as Calder, Phillips and Tybout (1982) emphasise that the issue needs to be addressed. They suggest:

“any study can turn out to be wrong. But this does not imply that a researcher can or should try to make a study infallible. As a practical matter, engaging in an obsessive quest for relevant background variables can only dilute the research effort. If it is obvious that a variable moderates the theoretical relationships of interest, then this variable should not be treated as a background factor in an effort to increase external validity rather, it should be incorporated in the theory being tested. When the impact of background factors is not apparent, these variables are best held constant in any single study so that the researcher can concentrate on other validity inferences.” (1982:242)

In order to address the external validity and generalisability of the results, this study focused on a solid research methodology, careful sampling, rather sizable number of observations, theoretically validated constructs, and the inclusion of the variables that were identified as potential influencers (Shadish, Cook, and Campbell 2002, Calder, Phillips, and Tybout 1982). Furthermore, two independent pilot studies were conducted, and results showed strong correlations between the collected data, which further assures the generalisability of the constructs. These steps were taken to make the study as objective as possible, maximising the possibility of reproducibility of the results. However, only future studies could test and verify how successful those efforts have been.

This chapter begins with taking a close look into the linkages between each pair of the constructs, and then it will discuss the results of the mediation models.
6.1 Perceived Status and Centrality

The findings strongly supported the first proposition of this study, regarding the positive impact of status on centrality ($b = 172.077$, $p = .000$). To be specific, they indicate that high status individuals are more likely to locate on the shortest paths of knowledge flow in their organisational social network.

This finding is in accord with the existing studies that link status to the network structure, theorising an effective role for status in the formation of social network (Stuart et al. 1999, Burt and Merluzzi 2014, Shipilov, Li and Greve 2011). However, it also challenges the mainstream egocentric body of literature by indicating that the impact of status on innovation is not limited to the selection of social ties or achieving brokerage, but it constitutes a more complex nature and a wider range of influence. This study provides empirical evidence that confirms the direct effect of perceived status on distance-weighted betweenness centrality, and thereby it advances the current studies through shifting the dominant ego network view to a complete network outlook.

The literature pertaining to the relationship between status and network structure is dominated by the studies that examine the role of status as the criterion of partner selection (Cook et al. 2013, Podolny and Phillips 1996, Stuart et al. 1999, Chung, Singh, and Lee 2000). The key finding of those studies is to suggest high status actors as the attractive exchange partners. The role of high status actors in offering endorsement and legitimacy, and positively affecting the performance were listed as the reasons behind this conclusion (Stuart 2000). Conversely, it has also been suggested that high status actors engage in a social tie with low status actors, only after accurate assessments and evaluations, and if the prospective exchange partner is a potential risk to their status, they do not pursue a partnership with them. This behaviour may limit the number of their social ties (Stuart 2000, Podolny and Page 1998).
The findings of this study show strong correlation between status and the degree centrality (0.745, p=. 00), which support the former dialogue regarding the popularity of high status actors. The results, however, do not exhibit any signs that the assumed diligence and particularity of the high status actors in selecting “worthy” partners would have any negative effect on the number of their direct relationships. The larger pool of potential candidates that offer their partnership to the high status actors could be one explanation for this result. Even if high status actors reject the actors who they see as liability, they could end up with a larger number of ties in comparison to the low status actors, who were not even given the luxury of selecting their future partners.

The findings enhance our knowledge regarding the linkage between status and network structure, by replacing the commonly used degree centrality (Tsai 2001, Reagans and McEvily 2003), with a recently developed distance-weighted betweenness centrality (Borgatti 2012). While degree centrality represents the accessibility of knowledge from actors’ adjacent social ties, the betweenness centrality offers a more holistic view of the network and measures the exposure of actors to the whole flowing resources across organisational network (Freeman 1977). The results validate the idea that high status actors, not only take advantage of their direct ties, but also they locate the most advantageous positions of the network, and occupy those spots to maximise their share of the resources that flow through social ties, as if they have a vantage point over the whole network (Burt 2005). Confirming the positive effect of status on betweenness centrality could associate high status actors with various advantages that are intrinsic of the central positions. The findings suggests that high status actors could expect to access a larger share of knowledge and other resources that flow across network (Bruggeman 2008), strong structural power (Lovaglia 1997), survival (Phillips 2001), gatekeeping role (Burt 2005), and reinforced status ranking (Magee and Galinsky 2008).
Finally, the findings are closely associated to two other strands of studies. First, the positive effect of status on degree centrality reiterates the works of social identity theorists (Hogg et al. 1995). They maintain high status actors are popular because being associated to them offers actors the feeling of belonging to the legitimate and rightful group of the network, triggering a sense of superiority (Tajfel 1978, Bettencourt et al. 2001). According to this view, being affiliated to the high status actors is seen as a value across social networks, which often leads to a larger network of relationships around high status actors (see, Stryker and Burke 2000). Second, the direct effect of status on betweenness centrality could validate the works of social network researchers, who theorised a role for status in attaining brokerage (Galunic, Ertug and Gargiulo 2012). This strand of studies is still nascent, however scholars found evidence that high status actors are more likely to occupy broker positions (Burt and Merluzzi 2014, Brass 2009). Since betweenness centrality measure incorporates structural holes into its formula, the results could advance this line of work by contributing a complete network study to the primarily ego network viewpoint.

6.2 Perceived Status and Perceived Trustworthiness

Perceived status was also positively related to the perceived trustworthiness ($b = 1.76, p = .000$). The findings specifically confirm that when an individual is perceived as high status, he is more likely to be perceived as trustworthy by a larger number of his colleagues. Conversely, low status individuals tend to be trusted by a smaller group of people.

The results could contribute to the trust literature by offering a new perspective to explain the formation of trustworthiness. Reviewing the literature does not lead to a replica of this results. However, the results could be justified based on solid theoretical foundations in both trust and status literature.
The main justification of the results comes from integration of two existing streams of studies. First, competence-based view of trustworthiness (Butler and Cantrell 1984, Mayer, Davis, and Schoorman 1995, Levin and Cross 2004) proposes trustworthiness as a function of perceived abilities and competencies. This viewpoint identifies trustworthiness as a product of perceived quality and competence (Butler and Cantrell 1984). Second, the signalling mechanism of status suggests status as a cue and signal for quality and competence (Podolny 2005). Basically, this viewpoint seeks the origins of perceived competence in perceived status of the actors (Podolny, Stuart and Hannan 1996). The results of this study emphasise that these two theories are closely associated, and together they can explain the entire process of trustworthiness. In search for the antecedents of trustworthiness, this study does not stop at perceived competence, instead it digs deeper and finds the social origin of perceived trustworthiness in the perception of social rankings. In essence, the results build upon the competence-based view of trustworthiness and expand it into a status-based view.

The Matthew effect and its characteristics could offer an alternative theoretical explanation regarding the impact of status on trustworthiness (Merton 1968). Supportive actions shown by high status actor could become exaggerated, while low status actors could go unrecognised for similar actions (Correll et al. 2011, Podolny 2005). In other words, when a high status actor demonstrates goodwill towards others, this action could become overrated and be translated into the perception of trustworthiness, whereas low status actors do not receive such privileges. This argument interprets the impact of status on trustworthiness from a psychological viewpoint, and contributes to the Matthew effect literature by finding its footprints in the formation of trustworthiness.

Finally, the results could possibly be explained from a resource-based view of status. Besides the higher expectations that emanate from higher perceived
status, high status actors are suggested to be more resourceful in comparison to the low status actors (Bourdieu 1979, Gould 2002). This notion roots into the early status literature, which associates status to the availability of tangible or intangible resources (Weber 1948, 1978, Blau 1964). Drawing upon this theory, it is plausible to claim that not only high status actors are expected to be trustworthy, but also they can actually employ their available resources (e.g. material resources, human resources, power, etc.) to deliver better support to their partners and gain their trust, whereas low status actors lack such capacities (Cross and Parker 2004).

It is difficult to single out one of these theories as the sole responsible for the achieved results. Most possibly high status actors exploit the high expectations and simultaneously apply their resources to increase their reputation as the trustworthy actors. The findings could link high status to the advantages that were traditionally associated to the high trustworthiness. The results could indicate that high status actors would access a larger share of tacit knowledge (Szulanski, Cappetta and Jensen 2004). Moreover, they could receive more deference and respect (Magee and Galinsky 2008, and face less resistance and second-guessing (Guinote 2007). Whether these advantages would actually be realised for the high status actors requires further research.

6.3 Perceived Status and Cognitive Similarity

The direct impact of perceived status on cognitive dimension of social capital, measured by cognitive similarity was also supported in this study \( b = 0.30, p = .000 \). The results exhibit that actors’ perceived status predicts the extent to which they share the collective goals and culture of their organisation.

The findings can be theoretically justified through two distinct strands of argument. Firstly, in terms of shared goals, the findings reverberate the works of organisational sociologist who highlight the role of power and hierarchy in
actors’ ability to follow organisational collective goals (Guinote 2007, Smith et al. 2008, Magee and Galinsky 2008). Guinote (2007) argued that powerful actors tend to adapt their behaviours towards achieving the collective goals of their organisations, while powerless actors are hindered by constraints to achieve same level of goals. While the results of this study are fully aligned with this proposition, they distinguish themselves by highlighting the role of perceived status rather than power. Although power and status may seem correlated, their effecting mechanisms tend to be of different natures (Magee and Galinsky 2008, Lovaglia 1997). The scholars focus on power as a liberating attribute that minimises the constraints and offers actors more freedom for taking actions (Smith et al. 2008). High status not only benefits its possessor with more power, but also it can cause deference and positive perception in the minds of the others (Sauder et al. 2012). In essence, while power is an egocentric attribute, status is a quality that is awarded externally from the social network.

Secondly, the effect of status on the collective culture and norms is entirely confined within the sociology and social psychology disciplines (Overbeck and Park 2006), and the current business literature has yet to provide an empirical account to test this relationship. The findings of this study expands the definition of cognitive dimension of social capital, and find empirical evidence that suggest the extent to which actors share similar culture with their network is in direct relationship with their perceived status. The theoretical justifications for these results could be also found in the normative isomorphism (Mizruchi and Fein 1999) and social identity theories (Tajfel 1978). Isomorphism theory suggests that the successful and competent actors tend to attain the role model position, their norms and behaviours are to be idealised and followed by others as the codes of proper acting, leading to the propagation of those norms and cultural values, and eventually their dominance across the social network (Rao et al. 2003, DiMaggio and Powell 1983). Moreover, in-group favouritism and out-
group discrimination theories, which are suggested in social identity literature, can provide further theoretical explanations in order to substantiate the dominance of high status actors’ cultural traits (Hogg et al. 1995, Brewer 1979). In this view, the prospects of favouritism and the threat of discrimination could affect actors’ decision to conform to the attributes that are affiliated with the high status actors and abandon the norms that could lead to their exclusion from the dominant group of the network.

In sum, the results suggest that high status actors are more capable of pursuing the collective goals and culture (Smith et al. 2008, Bunderson and Reagans 2011). The findings advocate a strong cognitive homogeneity between high status actors and the organisation as a whole, which could signify that high status actors are better integrated to the body of organisation.

6.4 Centrality and Innovation

This study found strong support for the effect of centrality on innovation \( (b = 0.0016, p = .000) \). The results corroborate the effective role of overall network position on innovation outcomes. More accurately, they signify that the individuals, who locate more often on the shortest paths of knowledge exchange, demonstrate stronger innovative contribution in the development of new products.

This outcome creates no surprise and it fully reflects the generally accepted idea that considers strong connection between premium network position and innovative contribution (Burt 1987, 2004, Dhanaraj and Parkhe 2006, Ibarra 1993). Notwithstanding of this notion, the previous empirical studies produced inconclusive results. The main reason for this pitfall could be identified as the usage of the measures that were not fully representative of the true meaning of centrality. Wide usage of degree centrality as a measure of centrality has led to vague results. While Tsai (2001) found support for the direct influence of degree
centrality on innovation, McFadyen and Canella Jr. (2004) discovered that the excessive number of ties reduces the innovativeness. Recently, there has been a growing interest amongst scholars in measuring the effect of brokerage on innovation. The results of this stream of studies showed similar inconsistency. While Burt (1987) found a positive impact of structural holes on idea generation, Ahuja (2000) discovered that excessive number of structural holes would diminish innovation, and a balance between dense networks and brokerage is necessary to optimise innovation.

These reported contradictions were resolved in this study, by taking a complete network view of the social network instead of the ego network approach. The overarching measure of betweenness centrality finds the right balance between the direct ties and brokerage by taking a step further and viewing the overall position of the actors in social network. It also takes into account the diminishing effect of long paths in the flow of useful knowledge.

Furthermore, in contrast to the majority of similar studies that either focus on the knowledge acquisition (Hamel and Prahalad 1994, Miller, Fern and Cardinal 2007) or idea generation as the determinant of innovation (West 2002, Amabile 1983), this study measured innovation by the innovative contribution of actors to the accomplished commercialised products. Hence, the results demonstrate the effect of central position not only on the knowledge acquisition and creativity, but also to the capability of actors to take practical actions to materialise their ideas. Therefore, the results indicate that high status actors are more likely to contribute across the whole range of product innovation, and not only idea generation, by locating on the central positions of the network.

6.5 Perceived Trustworthiness and Innovation

The study finds support for the effect of perceived trustworthiness on innovation ($b = 0.107, p = .005$). This finding denotes that the individuals, who are
considered trustworthy by a larger number of colleagues, tend to achieve more success in terms of innovative contribution.

These results are in accord with the studies that suggest a direct relationship between trustworthiness and knowledge acquisition. Tsai and Ghoshal (1998) found trustworthiness to positively affect knowledge acquisition and consequently innovation within business units. Similarly, Li (2005) discovered that trust in alliances affects the amount of inward transferred knowledge for the firms. This study verifies these results, but expands the effect of trustworthiness from knowledge acquisition to innovation. The findings indicate that perceived trustworthiness could indeed predict the innovative contribution. Two arguments could offer theoretical justification to this outcome. Firstly, trustworthy actors could receive more valuable and high quality knowledge, due to their perceived reliability and benevolence (Correll et al. 2011). Trustworthy actors are often not considered as threatening or unreliable, therefore other actors tend to feel relaxed in sharing their knowledge with them (Tsai and Ghoshal 1998, Wong and Boh 2010). Secondly, a vast network of trustors, who may work as possible allies, could help high status actors to support their innovative ideas into realisation (Podolny 2005, Brass 2009). According to the definition of innovation, development of creative idea into a product is an important step of innovation (Scott and Bruce 1994, Katila 2002). Trustworthy actors could count on the support of other actors to advance their ideas, whereas untrustworthy actors may be hindered to pursue their ideas.

### 6.6 Cognitive Similarity and Innovation

The study finds evidence to support the influence of the cognitive similarity on innovation ($b = 0.294, p = .033$). The results signify that the individuals who share more similar goals and cultures with the network as a whole tend to be stronger contributors to the innovation of new products.
The results confirm the role of organisational climate in the innovative contribution of the actors (Scott and Bruce 1994, Anderson and West 1998). The findings of this study corroborate the idea that cognitive understanding of the organisational values could have a positive effect on actors’ innovative contribution (Pearce and Ensley 2004). Besides organisational climate theory, the results could be explained through the body of literature that theorises the effect of cognitive similarity on the transfer of knowledge (Nahapiet and Ghoshal 1997, Yli-Renko et al. 2001, Inkpen and Tsang 2005). Tsai and Ghoshal (1998) hypothesised the effect of shared visions on knowledge acquisition, however the results of their empirical study were not conclusive. Conversely, Li (2005) found evidence that supports the positive influence of shared visions on intra-organisational knowledge transfer, arguing that the positive impacts of shared visions overcome its potential disadvantages. The results of this study are in line with those theoretical accounts; however this study expands the effect of cognitive similarity from knowledge acquisition into innovative contribution.

Furthermore, this study includes shared culture within the measure of cognitive similarity. The role of cultural similarity was strongly suggested theoretically (Håkanson 1995, Inkpen and Tsang 2005), but has not been put into practice in an empirical research. Inkpen and Tsang (2005) argued that cognitive similarity and adhering to the cognitive values of the organisation could facilitate the process of knowledge acquisition. The results indicate that sharing the acceptable norms and culture of the organisation could improve the innovative contribution of the actors.

**6.7 Status and Innovation**

Discussing the nature of relationship between status, social capital dimensions, and innovation paves the path for understanding the results of the mediational analysis. In this study, a multiple mediation model was suggested in order to
conceptualise the effect of status on innovation through the mediating role of social capital dimensions. The first condition for the mediation analysis to be applicable was to assure that the independent variable significantly predicts the dependent variable. The results demonstrated that status indeed predicts innovation (Total Effect = 0.8011, 95%CI [.64, .97]), which could lead to two interpretations. One, the initial assumption of status as the distal social antecedent of innovation is valid. The perceived status of the actors is highly correlated to their innovative contribution (0.72, p<0.01), and significantly predicts it. Two, the idea of suggesting one or more mediator variables to explain how status influences innovation is valid.

The mediation of social capital was measured both separately and collectively. The results of multiple mediation was used to test the hypothesis 7, however providing the results of simple mediation could also be advantageous. First, discussing the potential mediation of each dimension separately corroborates the theoretical discussion that justifies their position within the multiple mediation model. Second, it can contribute to the body of literature that is specifically dedicated to each dimension of social capital rather than their collective effects.

6.7.1 Mediation of Centrality

The mediating role of centrality in the effect of status on innovation was supported through mediational analysis (Indirect effect: 0.36, 95%CI [.16, .55]). The results indicate that the impact of status on the network centrality could be responsible in the effect of status on innovation. Simply put, the findings show that high status individuals are more likely to be innovative, because they tend to occupy the central positions of the network. The indirect effect of centrality was measured at 0.36.
The mediation of centrality has solid theoretical justifications. The results further highlight the fact that scholars' attention to network structure was not unwarranted (Burt 2005, Brass 2009). The positive effect of status on the position of actors in their social network has been widely discussed within the body of literature (Burt and Merluzzi 2014, Podolny 1994, Stuart 2000). Furthermore, the role of network structure on innovative contribution is strongly supported by scholars as well (Tsai and Ghoshal 1998, Tsai 2001, Dhanaraj and Parkhe 2006, Burt 1987, 2004). Confirming the mediating role of centrality links these two strands of studies. It signifies that actors' position within the structure of social network could explain how perceived status affects innovative contribution.

6.7.2 Mediation of Perceived Trustworthiness

The mediating role of perceived trustworthiness in the effect of status on innovation was also supported (Indirect Effect = 0.31, 95% CI [.16, .54]). The results indicate that perceived trustworthiness of actors could explain how actors' status influences their innovative contribution. To clarify, the findings demonstrate that high status individuals are more innovative because they are perceived as trustworthy, and it is the advantages stemming from trustworthiness that enables them achieve higher contribution to product innovation. The indirect effect of perceived trustworthiness was measured at 0.31.

This result can find solid theoretical justifications within literature. First, the signalling mechanism of status, as well as expectation states theory suggest that high status actors tend to be more trustworthy due to their expected quality (Correll et al. 2011, Berger et al. 1985). The premium ranking of high status actors within organisational social hierarchy, combined with expected quality and competence increases their reliability as trustworthy partners (Podolny
1993, 2005). Second, scholars suggest that trustworthy actors tend to be more successful in acquiring knowledge resources (Tsai and Ghoshal 1998, Li 2005), deemed crucial for the innovative process. All in all, the findings of this study bridge these two lines of research, by suggesting that perceived trustworthiness could explain the effect of actors’ status on their contribution to product innovation.

### 6.7.3 Mediation of Cognitive Similarity

The cognitive similarity comprised of shared goals and culture was supported as the mediator between status and innovation (Indirect Effect = 0.15, 95%CI [.06, .30]). The results signify that the extent to which actors share similar goals and culture with their organisation can explain the effect of status on innovation.

The mediational role of cognitive dimension can also be explained theoretically. Sociology literature highlights the positive effect of status in achieving collective goals (Guinote 2007, Bunderson and Reagans 2011). High status actors tend to be more aware of the collective cognitive values (Overbeck and Park 2006), more able to distinguish the goal-relevant activities from non-relevant ones (Smith et al. 2008), and capable of defining the collective cognitive values of the network (Rao et al. 2003, Simmons and Elkins 2004). Furthermore, scholars suggest shared goals and visions as important prerequisites to knowledge acquisition and innovation (Inkpen and Tsang 2005, Tsai and Ghoshal 1998, Li 2005). The findings connect these two bodies of literature, and denote that high status individuals tend to be stronger contributors of innovation, because they share the collective goals and culture of the organisation more than low status actors.
6.7.4 Multiple Mediation of Social Capital

The three simple mediation models suggested three alternative explanations for rationalising the effect of status on innovation. However, the multiple mediation model is aimed to offer a more comprehensive model of mediation. It suggests three mediating variables in order to examine the mediation effect of social capital dimensions in the effect of status on innovation.

The results supported that the combination of centrality, perceived trustworthiness and cognitive similarity act as the mediator between status and innovation (Total Indirect Effect = 0.56, 95%CI [.32, .85]). The recorded indirect effect of 0.56 was higher than the results of all simple mediations. The collection of three dimensions of social capital offered a rather strong explanation for the effect of status on innovation.

Another interesting finding was to realise that all three variables survived the multiple mediation analysis and remained as significant mediators. In other words, not only the mediation of the three dimensions of social capital as a whole was supported, but also mediation on all three pathways was significant. Nevertheless, they all reported a diminished mediating effect in the presence of other two variables. The reduced mediating effect was fully expected due to the unavoidable multicollinearity between the mediators, which causes a fraction of the mediating effect to be neutralised (Preacher and Hayes 2008).

It is important to mention that as it is expected in social science, this study does not offer a complete mediation (Hayes 2013). In other words, introducing social capital to the relationship between status and innovation can partly explain the effect of independent variable on the dependent variable, and the indirect effect does not fully cover the total effect of status on innovation. A complete mediation is so unattainable in social science studies that scholars advise never to claim complete mediation (Hayes 2013). The direct effect of status on innovation was
measured at 0.8011, while the total indirect effect was calculated at 0.5601. Although the mediation is not complete and does not cover the total effect, it is still very significant for a social science research.

To summarise, the results of the multiple mediation analysis signify that the relationship between actors’ perceived status and their innovative contribution could be explained through the simultaneous mediating role of three dimensions of social capital. In other words, the aggregate resources available through structural, relational and cognitive dimensions (Nahapiet and Ghoshal 1998) can rationalise how status influences innovative contribution.

This chapter was aimed to discuss the results in more detail and explain them in a more elaborate fashion. Next chapter will conclude this research by recapping the whole study, and discussing the theoretical and practical contributions of the findings.
7 Conclusions

The final chapter of this thesis aims to summarise the key findings and contributions of this study. This chapter revisits the primary research questions and objectives, and it discusses how those issues have been addressed within this research. It follows with a discussion on the potential theoretical and empirical contributions of the study. Finally, it concludes by addressing the limitation of the study and suggestions for future research.

7.1 Overview of Research Questions and Objectives

The prime objective of this study was to investigate the social construction of product innovation. The potential role of social capital as the immediate, and status as the distal antecedent of innovation was theorised. Drawing upon the knowledge-based view of innovation (Nonaka 1991, Nonaka and Takeuchi 1995, Szulanski 1996, Tsai and Ghoshal 1998), and the social network model of knowledge transfer (Gupta and Govindarajan 2000, Reagans and McEvily 2003, Inkpen and Tsang 2005), this study proposed that different rankings within the social hierarchy of a social network could ultimately affect the innovative contribution of the actors, through changing the aggregate resources that they attain from their social settings.

Accordingly, the following research questions were proposed to act as the guidelines of the research:

- How and to what extent does status affect social capital?
- How and to what extent does social capital affect innovation?
- How and to what extent does social capital mediate the effect of status on innovation?
In order to theorise the nature of the relationship between these constructs, and explain the social origins of innovation, the literature was thoroughly reviewed. The multidisciplinary nature of these constructs called for an extensive and laborious review of literature. The notion of status, its origins, characteristics and implications is predominantly discussed within sociology and social psychology literature (Weber 1948, 1978, Blau 1955, Bourdieu 1963, Podolny 2005, Sauder et al. 2012). Social capital is originally developed by sociologists (Coleman 1988, Bourdieu and Wacquant 1992, Putnam 1993, Nahapiet and Ghoshal 1997), and is utilised by network analysts in a variety of disciplines (Tsai and Ghoshal 1998, Burt 2005, Brass 2009). Finally, product innovation is a subject that is largely studied within business literature (Tsai 2001, Miller, Fern and Cardinal 2007). Finding common grounds across a variety of disciplines, and detecting theoretical linkages between similar concepts from one discipline to the other was one of the most challenging tasks of this study. The interdisciplinary nature of this research required a thorough literature review on the theories that are predominantly associated to sociology literature (i.e. status construction theory (Ridgeway 1997), Matthew Effect (Podolny 2005), expectation states theory (Berger et al. 1977), social identity theory (Tajfel 1978, Rao et al. 2003), rent seeking theory (Tullock 2001), isomorphism theory (DiMaggio and Powell 1983), and correspondence bias theory (Gilbert and Malone 1995), etc.), in order to identify the potential implications of those theories on product innovation in business environment.

Upon concluding the literature review, relevant hypotheses were proposed, suggesting social capital as the potential mediator variable to explain the effect of status on product innovation. The proposed model suggested that actors' contribution to product innovation could be traced back to their perceived status within social network. Furthermore, it suggested that social capital, as the aggregate resources available through structural, relational and cognitive
dimensions (Nahapiet and Ghoshal 1998), could offer an explanation on how status affects innovation.

The proposed hypotheses were tested upon collection of relevant data from an MNE. Data was gathered only from the employees of R&D units, who were directly involved within product innovation processes. The collected data was analysed and the hypotheses were supported. The mediation of social capital dimensions in the effect of status on product innovation was significant. The results were explained, and their relevance to the existing body of literature was discussed in the previous chapter. This chapter aims to conclude the study by elaborating on the potential contributions of the results on both theory and practice.

7.2 Research Contributions

7.2.1 Contributions to Theory

This study remains true to its promise of exploring social construction of product innovation. It contributes to the growing body of literature that views innovation as a socially built construct that is developed through active collaboration and socialisation between actors in social network settings (Szulanski 1996, Nonaka 1991, Tsai 2001). Introduction of status opens a new avenue towards a deeper understanding regarding the decisive role of social attributes in innovation. The following discussions identify the most significant theoretical contributions of this study.

7.2.1.1 New Perspective of Innovation

Product innovation is the dependent variable of this study, and understanding its social origins was the primary motive behind conducting this research. To my knowledge, the role of status as the social antecedent of innovation has not been addressed sufficiently in the innovation literature thus far, and the results of this
study provide the evidence to support this proposition. This study highlights the pivotal role of social judgements, perceptions and expectations in the prospect of innovation, and thereby challenges the mainstream studies that seek the origins of innovation solely within the patterns of knowledge exchange (Tsai and Ghoshal 1998, Tsai 2001, McFadyen and Canella Jr. 2004). In other words, it signifies that the search for social antecedents of innovation does not stop at social network level, and it could be traced even further back to the social hierarchies and perceived rankings of the actors in the social systems.

This view denotes that besides availability of external knowledge (Tsai 2001, Reagans and McEvily 2003, Gulati, Nohria, and Zaheer 2000) and possession of internal capabilities (West 2002, West and Farr 1990), there are more profound reasons behind successful or failed innovative contribution. The reasons that could be pursued back to the elusive social notion of status. This claim has found solid theoretical justification within status literature (Hollander 1961, Podolny 2005). Expectation states theory highlighted the fact that actors are treated differently according to their expected position in the social hierarchy (Correll and Ridgeway 2006, Berger et al. 1977, 1985). This study expands the theoretical implications of this theory, by suggesting it as the key toward understanding why some actors are privileged with excessive knowledge resources, while others are withheld from such opportunities, and as a result why some actors are more successful in terms of innovative contribution in comparison to the others.

Furthermore, this study contributes to the social psychology literature by offering an alternative explanation of individual innovation. While the social psychologists predominantly highlight the role of actors’ internal abilities as the determinant of individual innovation (West 1987, Damanpour 1991), the results of this study indicate that external social attributes of individuals can also influence their innovative contributions. To clarify, the majority of available studies on individual innovation suggest the ability of individuals to utilise their
personal skills such as intelligence, education or motivation as the antecedents of innovation (West 1987, Barron and Harrington 1981). However, this study discovers that apart from those personal capabilities, actors could also rely on their perceived status to access larger external resources from their social networks, and thereby facilitate the innovative process. In other words, the results emphasise that actors’ ability to utilise their position within social hierarchy of their organisation positively affects their innovative contribution.

7.2.1.2 Mediating Effect of Social Capital

This study does not only suggest status as the precursor of innovation, but it also offers an explanation on how status could influence innovation. One of the main contributions of this study is to examine the mediating role of social capital dimensions on the relationship between status and innovation. Three dimensions of social capital are pinpointed as the constructs that complete a pathway that tracks the social origins of innovation back to the perceived status. The results demonstrate that three dimensions of social capital collectively mediate the effect of status on innovation. In other words, the findings of this study confirm that actors’ perceived status positively affects their innovative contribution through the collection of 1) affecting actors’ network position (Podolny and Page 1998, Stuart 2000), 2) affecting actors’ perceived trustworthiness (Podolny 2005), and 3) affecting the level of actors’ cognitive similarity with the collective values of the organisation (Overbeck and Park 2006).

This study contributes to the current body of social capital literature by expanding its theoretical implications. It identifies social capital as the direct antecedent of innovation, as the direct consequence of status, and most importantly as the mediator in the effect of status on innovation. The findings also substantiate the current studies that examine the implications of social
capital dimensions separately (Tsai 2001, McFadyen and Cannella Jr. 2004, Li 2005, Levin and Cross 2004). However, this research advances those studies by finding evidence regarding the effects of three dimensions of social capital not only separately, but also collectively.

This research is amongst the first tier of innovation studies that employ multiple mediation analysis to explore and measure the antecedents of innovation. This model can offer a more realistic view of multifaceted social phenomena, and investigate the mediating effect of each variable simultaneous with other potential mediators; something that could not be achieved under simple mediation models (Preacher and Hayes 2008).

7.2.1.3 New Implications of Status

This study contributes to the status literature through the discovery of new implications, and expansion of its conceptual territory further into the business and social network literature.

**Status and Structural Dimension of Social Capital:** It contributes to the ongoing debate pertaining to the effects of status on network structure (Podolny 2005, Burt and Merluzzi 2014) by finding the evidence that supports perceived status as a direct antecedent of centrality. The dominant discourse on this stream of literature is heavily focused on ego networks. The current literature either addresses the impact of status on the process of partner selection and social tie formations (Stuart 2000, Stuart et al. 1999); or studies its role in brokerage (Burt and Merluzzi 2014, Burt 2004). This study, however, is a rare attempt that applies complete network approach to address this question. The results indicate that the effect of status on network structure could go beyond partner selection (Podolny and Page 1998) or brokerage (Burt 2005), and regulate the overall position of the actor within the network. The positive effect of status on distance-weighted betweenness centrality supports the idea that
high status actors are more likely to locate in the shortest paths of knowledge flow across whole network structure. This discovery indicates that high status actors are more likely to be exposed to the overall knowledge stock of their social networks, whereas existing ego network studies are focused on the availability of knowledge from adjacent actors (Burt 2004, 2005, Brass 2009).

**Status and Relational Dimension of Social Capital:** The findings expand the implications of the signalling mechanism of status (Podolny 1993, 2005, Correll et al. 2011). The perceived status was widely believed as the signal of quality (Podolny 2005). This study finds statistical evidence that supports perceived status as the antecedent of perceived trustworthiness. In other words, the results signify that high status actors are more likely to be perceived as trustworthy. Therefore, the results expand the competence-based theory of trustworthiness (Mayer, Davis and Schoorman 1995, Levin and Cross 2004) into a status-based perspective. In other words, the results demonstrate that high status actors are more likely to be perceived as trustworthy in comparison to the low status actors.

**Status and Cognitive Dimension of Social Capital:** The study advances the literature regarding the influence of status on the cognitive dimension of social capital. It theorised the role of status in the ability of actors to achieve the collective cognitive values of the organisation, based on related proposition regarding the role of power in accomplishing shared goals (Guinote 2007, Overbeck and Park 2006). The results confirmed that high status actors are more capable of completing the collective goals, and adapting to the shared cultural standpoint of their organisation.

### 7.2.2 Contributions to Practice

Besides theoretical contributions, this study can also provide practitioners with applicable recommendations. First, this study offers an insight to the social
origins of innovation in MNEs, and thereby enables businesses to evaluate the innovative performance of their employees realistically. The results demonstrate that the innovative contribution of individuals is a function of their perceived status amongst the network of the colleagues, and it must be expected that the high status actors achieve higher level of innovativeness in comparison to the low status individuals.

However, the executives are mainly interested in improving the collective innovation of their organisation. This study can offer solid recommendations to help them achieve this objective. Increasing the overall innovation requires enhancement of the innovative contribution of all members, including low status actors (Burt 2004). This study suggests collaboration between high and low status actors as the vital method of achieving this goal (Van der Vegt 2006 et al. 2006). However, such collaborations rarely occur organically within social network (Chung, Singh and Lee 2000, Podolny and Page 1998). Despite the willingness of the low status actors for being associated with their high status counterparts, they often fail the rigorous evaluations of the high status actors, and the potential ties often fall through (Stuart 2000). The fear of losing reputation deems to be the decisive factor that affects the decision of high status actor in avoiding a partnership with low status actors (Biteknite 2011). Thus, a laissez-faire managerial approach would not lead to a productive collaboration between actors of different status casts, and most likely balkanises the organisational network into the detached status-oriented clusters. A hands-on management method that finds proper stimuli and facilitates the formation of social ties between the actors with distinct status could improve the legitimacy of the low status actors, and give them suitable examples to benchmark and improve their performance namely innovative contribution.

Second, the relationship between status, network centrality, and innovation could offer managers a suitable platform to empower the actors, whose
innovative contributions are not satisfactory. The results demonstrate that actors, who suffer from low status, tend to end up as peripheral members of the organisational social network (Burt 1992, Jensen 2008). Establishing direct ties to the central actors increase the likelihood of actor being placed within the paths of knowledge flow (Freeman 1977, Borgatti 2005), and thereby improve their prospect of knowledge creation. Once again, observant managers must on the one hand identify the low status and marginal employees of the network, and on the other have an accurate understanding of the central individuals, and take practical measures to facilitate the formation of social ties between them. Accomplishing this task could have several benefits for the organisation as a whole. One, it can improve the knowledge acquisition of the otherwise isolated individuals and increase their chance of innovativeness (Burt 1987); two, it creates a more cohesive and dense knowledge exchange network, catalysing the flow of knowledge in a wider range of the network; three, since the central actors are often the occupants of the structural holes (Burt 2004, 2005, Brass 2009), these new ties could potentially diminish their monopolisation of power, and lead to a distributed power structure.

Third, the results signify that high status individuals are more likely to achieve the collective goals and culture. While this outcome could be partly associated to the dominant role of high status actors as the leaders or successful examples (Guinote 2007, Bunderson and Reagans 2011), it could also be affiliated with the extra attention and favouritism of the headquarters to the needs and requirements of high status actors during the decision-making process (Bettencourt et al. 2011). The following recommendation may seem farfetched and unlikely to be followed by the managers, however this research suggests that managers must show awareness towards the personal goals, norms and culture of all individuals, including the low status actors, and attempt to use that awareness in decision-making process, in order to define optimised collective
goals that are in accord to those of the majority of the actors. Solely considering the concerns of the high status and powerful actors within decision-making process may keep the major actors content, but it would ostracise and demoralise other employees, and most importantly diminishes the collective innovative performance.

7.3 Limitations

The first limitation of this study stemmed from the relational nature of its questionnaire. As opposed to the conventional data collection methods, a sociometric questionnaire asks respondents to speak their mind regarding other members of their organisation. In other words, they are asked to pass judgment on their colleagues (Wasserman and Faust 1994). Although, this may sound intriguing to some people, it often raises resistance and unwillingness towards such a method (Scott and Carrington 2011). Headquarters tend to create the first roadblock in the process. In this research, two MNEs have rejected my approach for conducting research. They specifically singled out the type of questions as the reason for their decision. They were particularly reluctant towards the questions regarding trust and perceived status, suggesting them as politically incorrect. Furthermore, despite the promise of anonymity, due to the nature of social network analysis, the respondents could not remain anonymous to the researcher (Prell 2011). In contrast to the conventional methods of data analysis, the data cannot be analysed in aggregate and the association of the responses to the actors must be clear to map the social network.

The second limitation of this study was the importance of sample size. The adjacency matrices of social network analysis create $N \times (N - 1)$ data points. However, it is necessary to have a large sample to conduct a quantitative study and ensure the robustness and significance of the mediational analysis. This limitation diminishes the opportunity of conducting this study on business unit
level of analysis, due to the fact that the number of innovative business units within the boundaries of a certain MNE tends to be finite, and it is highly unlikely to find a large sample that supports a quantitative study.

The final limitation of this study was the lack of straightforward and widely accepted measures of status and individual innovation. The literature was highly fragmented and scholars suggest various methods to measure these constructs. Hence, I had to rely on the measures that are most fitting to the purpose of the study, based on the solid theoretical justifications. Although it might have been a blessing in disguise, developing the metrics that measures status and individual innovation as objective as possible was very challenging.

### 7.4 Future Studies

Innovation studies have evolved greatly since the early 20th century. The egocentric approach of innovation, which resounded the concept of creativity, with heavy focus on psychological and cognitive capability of the actors, was the dominant discourse for the good part of the century (West 1987, Damanpour 1991). The growing attention to knowledge sharing and socialisation has shifted the paradigm into highlighting the role of social interactions and collaborative networks as the sources of knowledge creation (Nonaka 1991, Szulanski 1996). Nevertheless, the study of innovation antecedents remained rather stagnant over the last decade. The introduction of status as the social antecedent of innovation can reignite the interest of scholars to delve to the deeper origins of innovation, and explore how different social attributes could influence the knowledge creation process within organisations.

Power is one of the social attributes that exploring its impacts on innovation could lead to interesting results. Apart from the potential role of power in securing knowledge resources, it could generate the required impetus for the realisation of the innovative ideas. Although the influence of power on resource
allocation is widely studied (Guinote 2007, Lovaglia 1997), the attention to its putative role in the knowledge creation and innovation has been underwhelming.

While this research was focused on the inter-personal social network to measure the low-level social antecedents of innovation more accurately, a high-level replication of this study that theorises a relationship between firm status, social capital that is derived from strategic alliances, and organisational innovation could offer further empirical evidence in a different setting. Such a study could even substitute status with more fitting constructs such as corporate image or reputation, and investigate their role in the innovative performance of organisations in alliance networks.

Finally, this research aspires to open a gate towards more extensive research on potential mediators in the effect of status on innovation. It invites researchers to further investigate the social origins of innovation. For instance, actors’ external social ties could be another source of knowledge acquisition and innovation. The external ties were excluded from this study due to its focus on the intra-organisational social network. Despite the complicated nature of such a study, in terms of data collection and objectivity of the measures, expanding the network boundaries and integrating the external actors to the research could offer an interesting outlook for future studies.
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Appendix

Appendix I – Questionnaire

Welcome. Please take a few minutes to answer the following questions. The results will be used for an independent research and will be kept confidential. Thank you for your cooperation.

Section I. Status

Status is defined as:
The perceived ranking and position of each individual within the social hierarchy of your organisation, regardless of their formal position.

Please answer the following questions based on the above definition of status.

1. How influential are the following parameters in shaping peoples’ status within your organisation?

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<th>Parameter</th>
<th>No Influence</th>
<th>Little Influence</th>
<th>Moderate Influence</th>
<th>Influential</th>
<th>Very Influential</th>
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<td>Recommendation of Trusted Colleagues</td>
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<td>Reputation as Competent Employees</td>
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<td>Tenure Your Personal Feeling Others</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. How do you perceived the status of the following colleagues?

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<tr>
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<th>Very Low Status</th>
<th>Low Status</th>
<th>Average Status</th>
<th>High Status</th>
<th>Very High Status</th>
</tr>
</thead>
<tbody>
<tr>
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<td>○</td>
<td>●</td>
<td>●</td>
<td>○</td>
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</tr>
<tr>
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<td>●</td>
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<td>○</td>
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<tr>
<td>Actor 3</td>
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<td>●</td>
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</tr>
<tr>
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<td>●</td>
<td>●</td>
<td>○</td>
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<tr>
<td>Actor 120</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Actor 121</td>
<td>○</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
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</tbody>
</table>

3. How do you perceive the status of the following R&D units?

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<th>Average Status</th>
<th>High Status</th>
<th>Very High Status</th>
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</thead>
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<td>●</td>
<td>○</td>
<td>○</td>
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<tr>
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<td>○</td>
<td>●</td>
<td>●</td>
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<td>●</td>
<td>○</td>
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</tr>
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</table>
Section II. Social Capital

4. Please select the colleagues with whom you had any sort of interactions over the last year. (e.g. In social gatherings and events, informal discussions, advice and consultation, etc.)

- Actor 1
- Actor 2
- Actor 3
- Actor 4
- 
- 
- 
- Actor 120
- Actor 121

5. Which colleague would you be interested in building a social tie with?

- Actor 1
- Actor 2
- Actor 3
- Actor 4
- 
- 
- 
- Actor 120
- Actor 121

6. Please select the colleagues who you find trustworthy based on their benevolence and reliability. (Multiple Responses are Possible)

- Actor 1
- Actor 2
- Actor 3
- Actor 4
- 
- 
- 
- Actor 120
- Actor 121
7. How frequent do you interact with the following colleagues. (Please answer based on your interactions over the last year)

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<th>Sometimes</th>
<th>Quite Often</th>
<th>Very Often</th>
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</thead>
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<tr>
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<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
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<tr>
<td>Actor 3</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<td>○</td>
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<td>○</td>
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<td>Actor 121</td>
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<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

8. What is the level of similarity between your personal goals and objectives to the collective goals of your organisation?

- Very Different
- Different
- Moderately Similar
- Similar
- Very Similar

9. What is the level of similarity between your personal norms and working culture to the collective norms and working culture of your organisation?

- Very Different
- Different
- Moderately Similar
- Similar
- Very Similar

10. What is the level of similarity between the goals and objectives of your R&D unit to the collective goals of your organisation?

- Very Different
- Different
- Moderately Similar
- Similar
- Very Similar
11. What is the level of similarity between the norms and working culture of your R&D unit to collective norms and working culture of your organisation?

- [ ] Very Different
- [ ] Different
- [ ] Moderately Similar
- [ ] Similar
- [ ] Very Similar

12. Do you have any further comments regarding the status, social interactions or innovation within Solico group?
Appendix II- MRQAP Analysis

Besides mediational analysis, I have also conducted a supplementary analysis through the Multiple Regression Quadratic Assignment Procedure (MRQAP) in UCINET VI. MRQAP is a nonparametric statistical algorithm, regressing one dependent matrix on one or several independent matrices. The strength of algorithm is that it is robust against varying amounts of row and column autocorrelation in the dyadic data (Krackhardt 1988). Due to the fact that degree of structural autocorrelation in network data cannot be reliably estimated, MRQAP "provides a relatively unbiased test of the coefficients, whereas OLS (Ordinary Least Squares) can become severely positively biased" (Krackhardt 1988: 379). UCINET VI has "very strong permutation-based testing procedures, especially the QAP procedure" (Scott and Carrington 2011:586). Therefore it provides the best tool for MRQAP algorithm (Dekker et al. 2007). This test is often conducted on smaller sample sizes to assure the reliability of the results by controlling the potential autocorrelations between the dyadic predictor constructs (Krackhardt 1992). Although, the sample size of this research was large enough to raise the confidence, a supplementary MRQAP can remove any uncertainty regarding the robustness of the results. In this study status and social capital were the dyadic constructs with potential autocorrelation.

The dyadic data regarding status, social ties and trustworthiness were directly extracted from the questionnaires. Note that perceived status, centrality and perceived trustworthiness are the constructs that are measured based on dyadic relational data, collected from the viewpoint of the respondents about each other. The cognitive similarity, however, was not a dyadic construct. I used the method suggested by Tsai and Ghoshal (1998) to transform the data of the cognitive similarity into dyads, by measuring the cognitive difference between any pair of actors. Simply put, the data point of (A, B) would represent the difference between self-reported cognitive similarities of actor A and B.
Therefore, smaller values of cognitive difference represent greater cognitive similarity between the corresponding actors. Sample size of 121 has produced matrices of $121 \times 121$, leading to 14520 data points. Since, the MRQAP test does not allow multiple dependent variables, the test was conducted three times between the matrix of status and three matrices of the social capital dimensions.

The results support the significance of relationship between status and social capital. The adjusted $R^2$ value represents the extent to which status matrix predicts matrices of three dimensions of social capital. As it was expected, status matrix predicted the structural dimension of social capital more strongly ($R^2 = 0.795$) than the other two dimensions. Surprisingly the $R^2$ value for the cognitive dimension ($R^2 = 0.696$) was stronger than the relational dimension ($R^2 = 0.616$). However, status matrix significantly predicts all three matrices of social capital, which further corroborate the results of the mediation analysis.

### Results of MRQAP: The Effect of Perceived Status on Three Dimensions of Social Capital

<table>
<thead>
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<td></td>
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<td>Adjusted R$^2$</td>
<td>0.795</td>
<td>0.616</td>
<td>0.696</td>
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Number of Permutations = 4000
Number of Observations = 14520
**p<.01
Two important points must be noticed regarding the results. First, note that the status and social capital dimensions are all represented with their corresponding dyadic matrices, rather than their collective measures (i.e. perceived status, centrality, perceived trustworthiness, cognitive similarity). This can explain why the coefficient for the effect of status on structural dimension of social capital largely differs from the results of the mediational analysis. MRQAP uses the binary matrix of social ties because it represents all existing social ties between all actors of the network, while distance-weighted betweenness centrality is a product of this matrix that measures the overall position of the actors within the network. Second, the negative coefficient of cognitive dimension (−1.26568) is due to the reverse dyadic measure of its corresponding matrix. In other words, perceived status has a negative effect on the cognitive difference between actors.
Appendix III – Simple Mediation of Centrality (PROCESS in SPSS)

- Complete Results

************** PROCESS Procedure for SPSS Release 2.11 **************

Written by Andrew F. Hayes, Ph.D.  www.afhayes.com

Model = 4
Y = Innovation
X = Status
M = Centrality

Statistical Controls:
CONTROL= Education  Tenure  Age  UnitAge  UnitSize

Sample size
121

Outcome: Centrality

Model Summary

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Model

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**************************************************************************
Appendix

Outcome: Innovation

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Model

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*********************** TOTAL EFFECT MODEL ***********************

Outcome: Innovation

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Model

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*********************** TOTAL, DIRECT, AND INDIRECT EFFECTS ***********************

Total effect of X on Y

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Direct effect of X on Y

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Indirect effect of X on Y

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Normal theory tests for indirect effect

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************** ANALYSIS NOTES AND WARNINGS ***************

Number of bootstrap samples for bias corrected bootstrap confidence intervals: 5000

Level of confidence for all confidence intervals in output: 95.00

NOTE: Effect size measures for indirect effects not available for models with covariates

------ END MATRIX ------
Appendix IV- Simple Mediation of Perceived Trustworthiness

(PROCESS in SPSS) - Complete Results

*************** PROCESS Procedure for SPSS Release 2.11 ***************

Written by Andrew F. Hayes, Ph.D.  www.afhayes.com

Model = 4
Y = Innovation
X = Status
M = Trust
Statistical Controls:
CONTROL= Educatio Tenure  Age  UnitAge  UnitSize

Sample size
    121

Outcome: Trust

Model Summary
          R  R-sq  F    df1     df2    p
         .7071  .5000  19.0017  6.0000 114.0000  .0000

Model

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Outcome: Innovation
Appendix

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**Model Summary**

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**Outcome: Innovation**

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**TOTAL, DIRECT, AND INDIRECT EFFECTS**

**Total effect of X on Y**

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******************** ANALYSIS NOTES AND WARNINGS ***********************

Number of bootstrap samples for bias corrected bootstrap confidence intervals: 5000

Level of confidence for all confidence intervals in output: 95.00

NOTE: Effect size measures for indirect effects not available for models with covariates

------ END MATRIX ------
Appendix V – Simple Mediation of Cognitive Similarity (PROCESS in SPSS) - Complete Results

*************** PROCESS Procedure for SPSS Release 2.11 ***************

Written by Andrew F. Hayes, Ph.D.   www.afhayes.com


Model = 4
Y = Innovation
X = Status
M = Cognitive

Statistical Controls:
CONTROL= Education Tenure Age UnitAge UnitSize

Sample size
121

Outcome: Cognitive

Model Summary

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### Appendix

#### Outcome: Innovation

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*************** TOTAL EFFECT MODEL ***************

#### Outcome: Innovation

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*************** TOTAL, DIRECT, AND INDIRECT EFFECTS ***************

Total effect of X on Y

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Normal theory tests for indirect effect

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*************** ANALYSIS NOTES AND WARNINGS **********************

Number of bootstrap samples for bias corrected bootstrap confidence intervals: 5000

Level of confidence for all confidence intervals in output: 95.00

NOTE: Effect size measures for indirect effects not available for models with covariates

----- END MATRIX -----
Appendix VI – Multiple Mediation of Social Capital Dimensions (PROCESS in SPSS) - Complete Results

************************** PROCESS Procedure for SPSS Release 2.11 **************************

Written by Andrew F. Hayes, Ph.D.  www.afhayes.com

******************************************************************************

Model = 4
Y = Innovation
X = Status
M1 = Centrality
M2 = Trust
M3 = Cognitive

Statistical Controls:
CONTROL = Education Tenure Age UnitAge UnitSize

Sample size
121

******************************************************************************

Outcome: Centrality

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### Outcome: Innovation

### Model Summary

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**Model**

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**Outcome: Innovation**

**Model Summary**

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**Model**

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**Total effect of X on Y**

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**Direct effect of X on Y**

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<th>ULCI</th>
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Appendix

Indirect effect of X on Y

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Normal theory tests for specific indirect effects

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</table>

Specific indirect effect contrast definitions

(C1) Centrali minus Trust
(C2) Centrali minus Cognitive
(C3) Trust minus Cognitive

***************************** ANALYSIS NOTES AND WARNINGS *****************************

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

Level of confidence for all confidence intervals in output:
95.00

NOTE: Effect size measures for indirect effects not available for models with covariates

------ END MATRIX ------
Appendix VII – MRQAP Results

Perceived Status - Centrality

MULTIPLE REGRESSION QAP VIA DOUBLE DEKKER SEMI-PARTIALLING

# of permutations: 4000

MODEL FIT

<table>
<thead>
<tr>
<th></th>
<th>R-Square</th>
<th>Adj R-Sqr</th>
<th>P-Value</th>
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<th>Perms</th>
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REGRESSION COEFFICIENTS

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<th></th>
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<th>As Large</th>
<th>As Small</th>
<th>Std Err</th>
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Perceived Status – Perceived Trustworthiness

MULTIPLE REGRESSION QAP VIA DOUBLE DEKKER SEMI-PARTIALLING

# of permutations: 4000

MODEL FIT

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REGRESSION COEFFICIENTS

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**Perceived Status – Cognitive Similarity**

MULTIPLE REGRESSION QAP VIA DOUBLE DEKKER SEMI-PARTIALLING

# of permutations: 4000

**MODEL FIT**

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**REGRESSION COEFFICIENTS**

<table>
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Appendix VIII: Network Visualisations Using UCINET NetDraw

Network of Social Ties

Network of Perceived Trustworthiness
Network of High Perceived Status