



**AN INVESTIGATION OF THE NEGATIVES EFFECTS OF SOCIAL CAPITAL ON
INNOVATIVE PERFORMANCE OF FIRMS IN CLUSTER NETWORKS**

A Thesis submitted in fulfilment of the requirements of the Degree of Doctor of Philosophy

By

Theenida Buntornwon

**Brunel Business School
Brunel University**

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ABSTRACT

Firms are facing great challenges in the intensive, rapidly developing competitive market. Thus, firms have begun searching for new means to innovate in order to grow, compete, or simply survive. Using inter-firm relationships as a source of innovative ideas, firms gain access to valuable information, knowledge and resources that can be embedded for commercial gain.

Nonetheless, the potential positive effects of these relationships can become adverse when firms are too deeply embedded in a network. Most research to date focuses almost exclusively on the positive effects of social capital as the most powerful factor in fostering innovation without paying due attention to the negative effects. There is an urgent need to develop a more comprehensive and precise understanding of the dark side of social capital.

Therefore, the aim of this thesis is to investigate the negative effects of social capital on innovative performance in the context of cluster networks. With consideration of the socio-territorial context of clusters, the four dimensional social capital model (focusing on structural, relational, cognitive and proximity-related dimensions) will be used to offer an insight into the nature of such relationships and open the ‘black box’ of the dark side of social capital. Furthermore, this study also investigates the interrelationship between the four dimensions of social capital, and the extent to which proximity defines social capital.

The study was validated by the interviews of 23 firm owners from various industries that operate within cluster networks, and of two representatives of relevant institutions in Thailand. The outcomes of the study reveal that over-embeddedness in a cluster network can constrain a firm’s effective decision-making capacity and restrict its access to new information and knowledge. The cost of maintaining intra-cluster relationships is greater than the benefit, thus impeding the innovative performance of firms in a cluster. In contrast to the dominant view put forward in the literature surrounding social capital, the results of the study confirm an inverted u-shaped relationship between social capital and innovative performance.

The results of this study contribute to the ongoing debate surrounding the relationship between social capital and innovation, as well as exploring the as-yet under-investigated field of social capital. From a managerial perspective, though, the results of the study present the negative effects of social capital, the intention is to advocate for a shift from the blinkered ‘more-is-better’ approach towards a ‘too-much-can-hurt’ mentality. The results of the study offer practical value by providing guidance for practitioners and cluster policymakers on managing the negative effects of over-embeddedness in cluster networks.

DEDICATION

This thesis is dedicated to the memory of my mother. This thesis is as much yours as it is mine.

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Undertaking this PhD has been a life-changing experience for me. This thesis would not have been completed without the generous support and contribution of many people.

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DECLARATIONS

I, Theenida Buntornwon, declare that no portion of the work referred to in this thesis, entitled ‘An Investigation of the Negatives Effects of Social Capital on Innovative Performance of Firms in the Cluster Network’ has been submitted in support of an application for another degree, or qualification to any other university, or institute of learning.

This thesis conforms to British Standard BS 4821: 1990, the ‘British Standard Recommendations for the Presentation of Thesis and Dissertations’ and follows the Harvard referencing system.

Some of the material displayed herein has already been presented in the following conferences papers:

Buntornwon, T. and Scandeliuss, C. (2016) ‘An investigation of the negatives effects of social capital on clustering in the context of small and medium sized enterprises’, *CD-ROM/Online Proceedings of CSR, Sustainability, Ethics & Governance*, August 1-3, Cologne, Germany.

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Theenida Buntornwon
BA, MSc, MBA

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ABBREVIATIONS

CDA	Cluster Development Agent
CSC	Corporate Social Capital
DIP	Department of Industrial Promotion
ICT	Information and Communication Technology
OECD	Organisations for Economic Co-Operation and Development
SMEs	Small and Medium Sized Enterprises
TCC	Thai Chamber of Commerce

Chapter 1 INTRODUCTION

The purpose of this opening chapter is to present an overview of the study in order to contextualise the subsequent chapters. In Section 1.2 the research background and rationale are provided, and in Section 1.3 the rationale for the cluster as the context of the study is justified. The research aim, objectives and questions, which are derived from the gap identified in the existing literature, are outlined in Section 1.4. An overview of the methodology underpinning the research is presented in Section 1.5 and the theoretical and practical contributions of the study are provided in Section 1.6. Section 1.7 gives the structure of this thesis and a brief summary of each chapter. Lastly, Section 1.8 concludes this introductory chapter.

1.1 RESEARCH BACKGROUND AND RATIONALE

Innovation is widely recognised as a critical driving force of competitiveness, growth and long-term survival of businesses. The rapidly changing global economic market with its intense competition pressures firms to compete with innovative products and production methods. However, internal resources and capabilities alone are no longer sufficient to maximise innovation (Rutten and Boekema, 2007; Filieri and Alguezaui, 2014; Iturrioz et al., 2015; Pucci et al., 2017; Yoon et al., 2015). The degree of innovativeness and competitiveness of a firm is no longer the outcome of the individual firm in isolation. This is especially true for small and medium sized enterprises (SMEs) with limitations of size and internal economics of scale. Typically, the innovation process involves the contribution of several actors. Thus, the attention of innovation study has moved to the role of exogenous characteristics, predominantly the role of networks. How firms gain access to and exploit external information, knowledge and competencies from inter-firm network relationships are the new criteria of innovative performance (Ahuja, 2000; Glising et al., 2008; Owen-Smith and Powell, 2004; Phelps, 2010). This echoes social capital theory which highlights the notion of the ‘resource embedded in the network’, and how a ‘resource can be accessed or mobilised through ties in networks’ (Lin, 2002).

Social capital is recognised as the bedrock of innovation and has received much attention as a determinant of innovation in recent years. It is proven to be a powerful factor in explaining innovation, both conceptually and empirically, as it facilitates information and knowledge

access, transfer and sharing within networks (Adler and Kwon, 2002; Filieri et al., 2014; Ruiz-Ortega et al., 2016; Shu et al., 2012; Zheng, 2010).

Nevertheless, recently, some scholars argue another side of social capital, where over-embeddedness in a network can produce the opposite effect and impede innovation (Li et al., 2016; Molina-Morales and Martinez-Fernandez, 2009; Molina-Morales et al., 2011; Ozer and Zhang, 2014; Weber and Weber, 2011; Yu, 2013). Research to date has focused almost entirely on the positive effects, and overshadowed the negative effects (Carey et al., 2011; Galunic et al., 2012; Gedajlovic et al., 2013; Kwon and Adler, 2014; Li et al., 2013(b); Li et al., 2016; Pillai et al., 2015; Molina-Morales et al., 2011; Villena et al., 2011). Similar to capitals that are more tangible, i.e. human and financial capital, social capital also requires investment (Gargiulo and Benassi, 1999, 2000; Westlund and Bolton, 2003). Given that firms need to invest significant time, energy and resources to build and maintain social capital, it is imperative to consider the potential risk of negative consequences associated with social capital and revisit the more-is-better approach to social capital.

Therefore, the rationale for this research emerges from the limited number of studies that address the negative effects of social capital on innovative performance. While some studies propose the presence of negative outcomes, only a few (e.g. Li et al., 2013(b); Wang et al., 2018) empirically confirm the negative consequences of social capital. The studies that empirically investigate the relationships only use the negative effects of social capital as an explanation when the outcome is not positive, rather than as an investigating factor (Huber, 2009; Rutten et al., 2010).

Drawing from the three fields of study, social capital, innovation and cluster networks (the rationale and details of clusters are provided in the following section), the study aims to explore the negative effects of social capital on innovative performance. It illustrates how negative effects emerge and how they may impede the innovative performance of firms within clusters.

The results of the study are expected to contribute to the literature on social capital, innovation and clusters by extending the understanding and knowledge of the dark side of social capital in relation to innovation in cluster networks. The practical value of the study is that it is expected to increase awareness of the effect of over-embeddedness and offer guidance to practitioners and cluster policymakers on how to mitigate the negative effects of social capital.

1.2 RATIONALE FOR THE CHOICE OF CONTEXT

One concept of inter-firm networking is the cluster network. A cluster network is a geographically concentrated inter-organisational collaborative network of competition (Porter, 2000). It enables the participant firms to tackle the same challenges, take opportunities, and benefit from enhanced innovation, risk management and competitive advantage, which can help increase the likelihood of business growth and survival in a manner that would be impossible to achieve in isolation. Cluster networks are associated with regional development and innovation. They have been adopted in various countries as a national policy to boost the economic competitiveness of the country (OECD, 2000; World Bank, 2009).

The cluster network is chosen as the context of this study for several reasons. Firstly, as the aim of the study is to investigate the negative effects of social capital on innovative performance, the cluster is suitable to represent inter-firm relationships. Noordhoff et al. (2011) suggest that future study of the negative effect of social capital should be undertaken in existing networks of reciprocity in order to see a clear effect. Cluster firms are well recognised as having strong social relationships with other members and an unusual level of embeddedness in the networks, which means they fulfil the main criteria of the study (Felzensztein et al., 2014; Huber, 2009; Inkpen and Tsang, 2005; Lin, 2002; Molina-Morales and Martinez-Fernandez, 2010; Ruiz-Ortega et al., 2016).

Secondly, addressing the relationship between social capital and innovation in the context of clusters allows the gap in the study of the social capital-innovation relationship to be addressed. The concept of clusters evolved originally from the economic discipline of regional development (Staber, 2007). Subsequently, the majority of social capital studies of cluster networks have taken place at a regional level. While the debate about the counterproductive effects of social capital on innovation exists at a regional level (Cooke et al., 2005; Hauser et al., 2007; Schneider et al., 2000), it cannot be applied directly to the organisational level. Indeed, scholars argue that social capital should be investigated at the actor level, where the process of innovation actually takes place (Eklinder-Frick et al., 2014; Huber, 2009; Rutten and Boekema, 2007).

Thirdly, the context of the cluster network provides an opportunity to investigate the ‘spatial’ or ‘territory’ dimension of social capital (Martin, 1994; Presutti and Boari, 2008; Staber and Lorenzen, 2007). There is consensus agreement between scholars that spatiality should be

integrated into the understanding of relationships between actors. However, this area of study is still developing (Boschma and Frenken, 2010).

The reason for including clusters of various industries in the study is to increase the generalisability of the findings, as a substantial number of previous studies focus mostly on high-technology or knowledge-intensive industries, which limits their scope and restricts the generalisability of the outcomes (Ahuja, 2000; Capello, 1999; Casanueva et al., 2013; Chiu, 2009).

Similar to other countries, in Thailand clusters are adopted as a policy to boost the economy. The aim of the clusters is to increase competitiveness in the global market through the development of productivity and innovative capabilities. Thailand is taken as the context of this study because, firstly, the review of the extant literature illustrates that a large proportion of the investigation into social capital and innovation takes place in European countries (e.g. Spain, Italy, and the UK). This tendency underlines the need to broaden the geographical landscape of social capital, innovation and cluster research to other parts of the world. While the policy of clusters in Thailand is heavily influenced by Western clusters, the context of an emerging market provides a unique setting. According to Geldes et al. (2017) and Stam et al. (2014) the characteristics of emerging economic countries, such as the absence of reliable government and established rule of law, renders market transaction costly, and uncertainty forces firms to depend on personal relationships and being embedded in networks to grow and survive.

1.3 RESEARCH AIM, OBJECTIVES AND QUESTIONS

1.3.1 RESEARCH AIM

The gap in the existing research calls for empirical research that focuses predominantly on the dark side of social capital (Adler and Kwon, 2002; Gedajlovic et al., 2013; Li et al., 2013; Molina-Morales and Martinez-Fernandez, 2010; Villena et al., 2011). An inconclusive relationship between social capital and innovation, and limited study of the dark side of social capital, produce difficulties in cultivating maximum benefits from networks. By exploring the negative effects of social capital, it should be possible to bridge the gap in the existing research and contribute to a more balanced approach to social capital (Alguezaui and Filieri, 2010). Hence, the main research question of this study is stated as follows:

“How can social capital negatively affect the innovative performance of firms in cluster networks?”

This research question gives rise to the following key research aim:

“To investigate the relationship between social capital and the innovative performance of firms within cluster networks and identify the causes of the negative effects of social capital. This will enhance the understanding of over-embeddedness among cluster members and provide recommendations for policymakers on mitigating the effects of over-embeddedness in cluster networks.”

1.3.2 RESEARCH OBJECTIVES AND QUESTIONS

In order to address the main research question and research aim described in the previous section, the following research objectives and questions are formulated:

Research objectives	Research questions
RO1: To examine social capital in the context of cluster networks.	RQ1: What is the level of structural, relational, cognitive and proximal social capital in cluster networks? RQ2: How can proximity influence the other dimensions of social capital?
RO2: To investigate the interrelationship between the four dimensions of social capital.	RQ3: How do the four dimensions of social capital interrelate?
RO3: To identify the causes and mechanisms of the negative effects of social capital.	RQ4: How do the negative effects of social capital emerge, and what is the mechanism?
RO4: To investigate the relationship between social capital and the innovative performance of firms in cluster networks.	RQ5: What is the relationship between social capital and the innovative performance of firms in cluster networks?
RO5: To provide theoretical and practical implications of the key findings and provide recommendations for future research.	

Table 1-1: Research objectives and questions

Research objective 1: To examine social capital in the context of cluster networks.

Different networks have distinct characteristics of social capital. The context in which the actor is socially embedded and how the actor is embedded highly affect the ability to draw on social and economic resources (McKeever et al., 2016). Hence, in order to fully understand the relationship between social capital and innovation in the context of clusters, it is vital to examine social capital in the context of cluster networks.

Cluster networks, as the context of this study, have two main characteristics, geographical concentration and being simultaneously cooperative and competitive, which make intra-cluster relationships unique (Inkpen and Tsang, 2005; Porter, 1990). Apart from examining the level of social capital of firms in cluster networks, this study endeavours to investigate the effect of geographical proximity. The study of social capital often neglects the factor of context, or treats it as statistic noise, instead of recognising it as the foundation of the relationship (Huber, 2009). Thus, this study incorporates proximity as a dimension of social capital and investigates its role in defining social capital (Kwon and Adler, 2014). To achieve this objective, research question one and two are developed.

Research objective 2: To investigate the interrelationship between the four dimensions of social capital.

The study addresses other areas of social capital that do not receive much attention or empirical investigation that may contribute to a comprehensive understanding of the social capital-innovation relationship. These include the multidimensional interrelationships between the dimensions of social capital. Social capital is well acknowledged as having three dimensions, structural, relational and cognitive (Nahapiet and Ghoshal, 1998). Unfortunately, most studies that investigate the relationship of social capital and innovation neglect the multidimensional nature of social capital and limit the study to one or two perspectives (Lefebvre et al., 2016; Wang et al., 2018) ignoring the interrelationship between the dimensions (Castro and Roldan, 2013; Inkpen and Tsang, 2005; Lee, 2009; Lechner et al., 2010; Villena et al., 2011; Weber and Weber, 2001). This restricts the understanding of how each dimension of social capital affects innovative performance and how each dimension of social capital reinforces the others. The second objective and third research question aim to address this issue.

Research objective 3: *To identify the causes and mechanisms of the negative effects of social capital.*

Another gap in the study of the negative effects of social capital is a lack of understanding of the mechanism. From the review of the existing literature on social capital, a substantial number of works only employ negative effects of social capital to explain non-positive outcomes rather than use them as an investigating factor (Huber, 2009; Rutten et al., 2010). The third research objective therefore aims to investigate how the negative effects of social capital emerge, and by what mechanism.

Research objective 4: *To investigate the relationship between social capital and the innovative performance of firms in cluster networks.*

There is a possibility that both sides of the argument, positive and negative relationships between social capital and innovation, can be reconciled, if the relationship is in fact an inverted u-shaped relationship, and there is a turning point for the outcome of social capital (Li et al., 2013; Pillai et al., 2015). This research therefore investigates and delineates the conditions that turn social capital to over-embeddedness; from beneficial to harmful for performance.

Research objective 5: *To provide theoretical and practical implications of the key findings and provide recommendations for future research.*

When all four of the objectives identified above are met, the study should be able to achieve this final research objective.

1.4 METHODOLOGICAL BACKGROUND

In order to address the research aim, objectives and research questions, the study follows an interpretative research philosophy, which allows social capital to be understood as a process of social interaction between social actors (Borgatti and Foster, 2003; Lee and Jones, 2015). The conceptual model is developed deductively from the review of the extant literature, which is empirically validated through a qualitative approach. The research draws on rich empirical data collected from 25 face-to-face semi-structured interviews in Thailand, with 23 owners of cluster firms and 2 representatives of institutions that work closely with cluster development in Thailand, crossed check with the available public reports and research documents and the report of the government agency (the DIP).

The interviews are transcribed, analysed and coded deductively. NVivo 11 software is used to analyse the interviews. The analysis provides insight into how the negative effects emerge and how they can impede innovative performance in the context of clusters. The findings are discussed in comparison to the literature and the conceptual framework, and revised in alignment with the research aim, objectives and questions. A full explanation of the research methodology adopted and a justification of the choice of methodology can be found in Chapter 4.

1.5 SIGNIFICANCE AND CONTRIBUTION OF THE STUDY

This study contributes both theoretically and to the practitioner community.

On a theoretical level:

- The current research addresses a significant gap in the literature by extending the knowledge of social capital theory and corroborating empirical evidence to the debate about social capital and its relationship to innovation, particularly the dark side of social capital which is overshadowed by the overwhelming bright side.
- A conceptual model of four dimensions of social capital, structural, relational, cognitive and proximal, is proposed to identify the negative effects of social capital and its mechanism on innovative performance. Incorporating all four dimensions into one model offers an understanding of social capital and innovation from a structural perspective, with a relational view, inside a cognitive framework, including the role of proximity in defining social capital and innovation, and the interrelationship between the four dimensions of social capital.
- The negative effects of social capital are drawn from the integration of three fields of study, social capital, innovation and cluster networks. The research offers a precise understanding of the mechanisms of the negative effects on the innovative performance of firms within cluster networks, often neglected in the literature.

On a methodological level:

- The qualitative approach to investigating the relationship between social capital and innovation offers a new perspective on social capital, in which the relational content and what actually occurs between connections are revealed.
- The data collected, including the interviews with representatives from the relevant institutions, allow an overview of cluster networks, the over-embeddedness of cluster firms and the current implementation plan of over-embeddedness to be examined from close-outsider's perspective.
- On the grounds that the existing literature is largely developed in European countries, this research is unique in developing and investigating within the context of a non-European country. The outcomes of the study have the potential to validate the generalisability of existing Western-based theories.

The practical contribution:

- The study aims to increase awareness of the dark side of social capital, as it stipulates a clear understanding that the costs and potential negative effects of social capital must be weighed cautiously against its potential benefits.
- The results of the study generate guidance for practitioners and cluster policymakers on how the effects of over-embeddedness can be mitigated and managed.

1.6 THESIS SYNOPSIS

The structure of the thesis follows the suggestion of Philips and Pugh (2010) for the four components, background theory, focal theory, data theory and contribution. Firstly, the *background theory* emphasises establishing a comprehensive knowledge and critical evaluation of the area of theoretical and empirical weakness in the field of study (Chapter 1 and Chapter 2). Secondly, the *focal theory* is associated with the development of the conceptual model (Chapter 3), which provides great detail about how the research addresses the research aim, objectives and questions identified from the background theory. Thirdly, the *data theory* justifies the appropriateness and reliability of the methodological choices and data sources (Chapter 4). The analysis of the data (Chapter 5) is also a part of the data theory. Lastly, the novel *contribution* accentuates the development of the discipline being researched

(Chapter 6), and the significance and limitations of the study and the future direction of research are presented (Chapter 7). The thesis is structured over seven chapters as follows.

1) Background theory

Chapter 1: Introduction

The first chapter provides an overview of the background and the rationale of the study including the research aim, objectives and questions that underpin the thesis. The methodological background and contribution of thesis are indicated. This chapter closes with an itinerary of the following chapters.

Chapter 2: Literature review

This chapter presents a critical review of the existing research in three research domains, innovation, social capital theory and cluster networks. It explores the conceptual debates surrounding the relationship between social capital and innovation through the multidimensional framework of social capital that guides present research. Finally, the relationship is discussed in the context of cluster networks, thereby combining the three areas of study. This allows for identification of the gaps in the existing literature and postulating the development of a conceptual model in Chapter 3.

2) Focal theory

Chapter 3: Conceptual model

As reported in Chapter 2, one important issue is the inconclusive relationship between social capital and innovation arising from the limited attention given to the dark side of social capital. This chapter attempts to overcome this issue by drawing on the literature review to propose a conceptual model to investigate the negative effects of social capital on innovative performance in the context of cluster networks. It provides details of its evolution and discusses the theoretical concepts underpinning the construction of the conceptual model.

3) Data theory

Chapter 4: Methodology

This chapter describes the philosophical stance and the paradigms of the research methodology, justifying the choice of an interpretivist epistemology in accordance with the research aim, objectives and questions. It pinpoints the level of study of the network research and the approach taken to the research. The research design is described, including the step-by-step approach taken to the data collection and analysis. Lastly, the chapter reviews several issues that arise during the course of the research and the solutions adopted.

Chapter 5: Findings

This chapter presents the empirical data for the conceptual model presented in Chapter 3. In order to provide a contextual background to the study, an overview of clusters and the perception of social capital in Thailand are provided. The findings are presented in light of the conceptual model, the four dimensions of social capital, the mechanisms, and the relationship between the negative effects of social capital and innovative performance of firms in cluster networks. Lastly, the findings on the management of the negative effects of social capital are presented.

4) Contribution

Chapter 6: Discussion and reconceptualising the conceptual model

Built upon Chapter 5, this chapter compares and contrast the empirical findings and the conceptual model presented in Chapter 3. The novelty and salience of the findings are highlighted and explained in detail.

Chapter 7: Conclusions and recommendations

The final chapter of the thesis draws the conclusions of the research. This chapter begins by revisiting the ways in which the thesis meets the research aim, objectives and questions identified in the first chapter. The novel contributions of the research, both theoretical and practical, are presented. A step-by-step report for policy-makers managing the negative effects of social capital is provided. Finally, the thesis concludes with thoughts on the limitations and recommendations for future avenues of research.

1.7 CHAPTER SUMMARY

This introductory chapter provides an overview of the research background and rationale behind the decision for pursuing this topic. The research aim, objectives and questions that guide the thesis are provided. A brief description of the research methodology is presented. The significance and contribution made by the thesis to existing knowledge of social capital, innovation and cluster networks is given along with the contributions for practitioners and policymakers. This chapter represents the foundation of the thesis. A critical review of existing research, theories and relevant concepts is presented in Chapter 2.

Chapter 2 LITERATURE REVIEW OF SOCIAL CAPITAL, INNOVATION AND CLUSTER NETWORKS

2.1 INTRODUCTION

This chapter reviews the literature that underpins the research aim and objectives identified in the previous section. The review of the literature identifies and clarifies the research gaps that this research aims to address and establishes a theoretical foundation for the study. In relation to the research aim and objectives presented in Chapter 1, this chapter provides a review of the theoretical and empirical debates across the bodies of literature that pertain to the area of innovation, social capital and cluster networks.

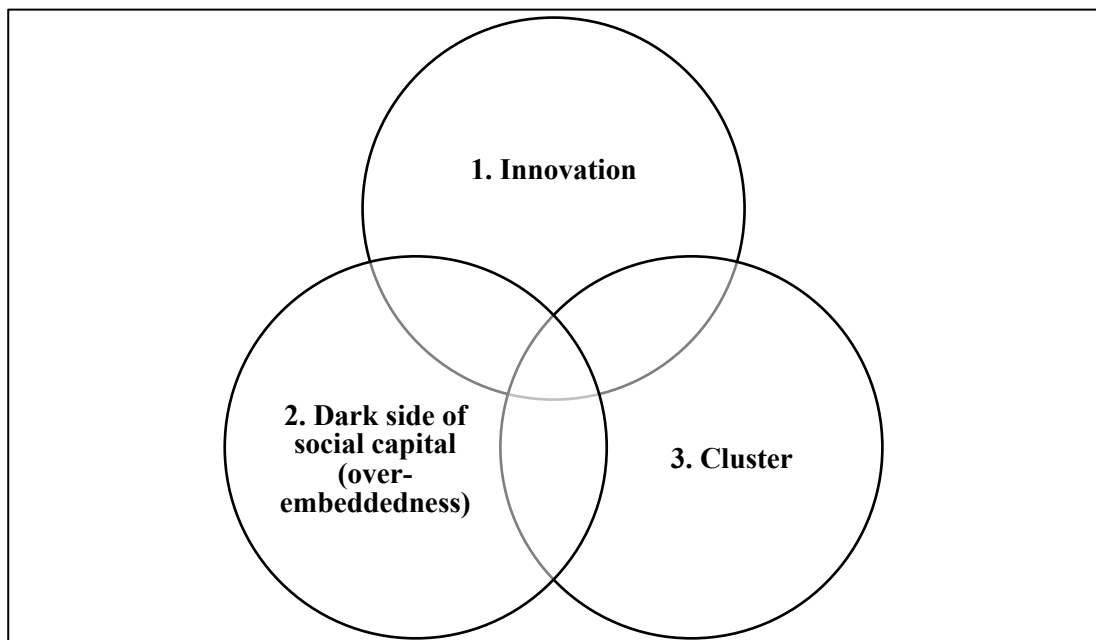


Figure 2-1: Three constructs underpinning the study

The chapter begins with a review of innovation as the performance indicator of the study. Section 2.2 shows how studies of innovation have evolved from the purely technological to networking models and discusses the definition and typology of innovation adopted in this study. Section 2.3 focuses on the extant literature on social capital, giving a definition and detailed explanation of Nahapiet and Ghoshal's (1998) three dimensions of social capital – structural, relational and cognitive – and the sub-dimensions in relation to existing studies on innovation performance. Section 2.4 concentrates on exploring the dark side of social capital. The relevant concepts of social liability and over-embeddedness are discussed, and a taxonomy of the negative effects is presented. The cluster, as the context of the study, is

reviewed in Section 2.5, which gives the definition and characteristics of a cluster, and the combination of the three constructs. The relationship between social capital and innovation in cluster networks is reviewed. In Section 2.6, a number of research gaps are drawn from the critical review of the three constructs, and lastly the summary of the chapter is presented in Section 2.7.

2.2 INNOVATION

Innovation is anglicised from the Latin word ‘innovare’ meaning alter, make new or renew. Innovation has always been recognised as an essential driving factor for the development of economics and society, although it was not until the twentieth century that it began to attract the attention of social scientists.

Schumpeter (1942) was among the first to pinpoint the exceptional role of innovation in economic evolution through ‘creative destruction theory’. In his book ‘*Capitalism, Socialism and Democracy*’ (1942) he explains creative destruction theory as:

“The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers’ good, the new methods of production or transportation, the new markets, the new forms of industrial organisation that capitalist enterprise creates” (Schumpeter, 1942, p.83).

Schumpeter (1942) perceives creative destruction as a necessary and natural way to give impetus to growth and long-term survival. Innovative firms shift the economic equilibrium through the creation of the ‘new’, i.e. the introduction of a new good or new quality, new methods of production, opening a new market, the conquest of a new source of supply or the new organisation of an industry, which necessarily entails the ‘destruction’ of the obsolete (Schumpeter, 1942). Hence, Schumpeter shifts the understanding of innovation from an exogenous factor that influences economics, to a driving force propelling economic dynamics. This subsequently becomes the central theme of modern innovation literature. Schumpeter’s theories remain the dominant discourse of innovation studies for a few decades, influencing the works of latter innovation scholars including Drucker (1985), Freeman (1979) and Perez (1983).

2.2.1 INNOVATION MODELS

This section presents an innovation model to reflect the way innovation has developed over time, from an emphasis on technology to an emphasis on networking.

1) Linear models

The first and second generation models are linear. The first generation is known as the technology push model. Innovative ideas are pulled from science and technology, e.g. from research and development centres or universities, manufactured into end products and pushed to the market. This is a linear sequence from the outcomes of research to the defining, designing and engineering of end products. This technology push often faces the criticism of the naïve expectation that technology and science can predict the needs of the market.

The technology push model was a dominant theory until the mid-1960s, when the market began to play a larger role in innovation. Innovative ideas began to be based directly on market need. Consequently, market need came to be considered before the development of innovative products. Marketing data began to be analysed and developed into a stream of new products prior to manufactures producing them for market (Landry et al., 2002).

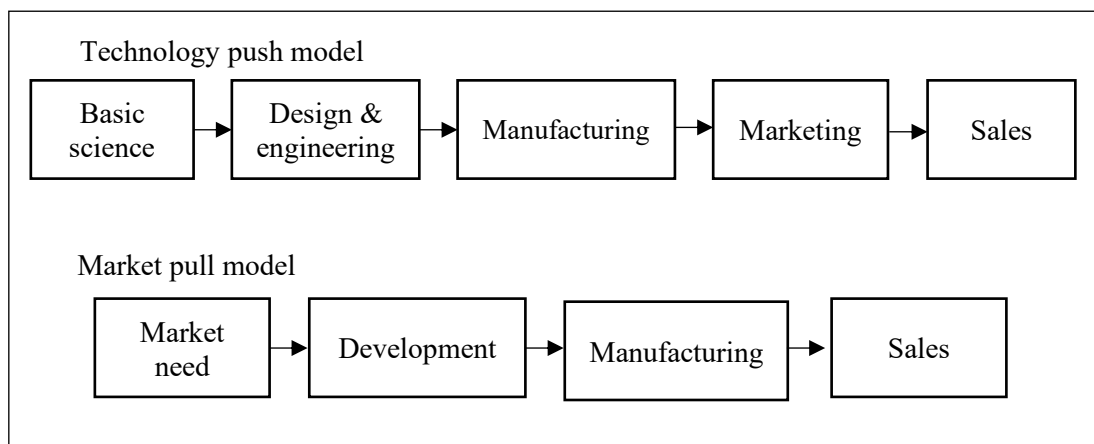


Figure 2-2: Technology push and market pull models

Source Rothwell (1994, pp.8-9)

Figure 2-2 shows the two models of linear sequences without feedback, which have the same three components, marketing, manufacturing and development. The key difference between them is the reshuffled sequence, shifting the focus from basic science and technology to the market as the initiator of ideas. Being more responsive to the needs and interests of the market reduces the risk of trial and error that is innate to the first generation of the innovation model (Rothwell, 1994).

2) The coupling model and interactive model of innovation

In the 1970s there was a financial crisis which led to high inflation and a demand saturated market. Consequently, firms were highly concerned with applying cost control and cost reduction strategies. Given that the two linear models had been criticised as over-simplified processes of innovation and as being insufficient in practice, it was realised that both technological capabilities and market needs were essential elements of successful innovation that should be integrated in order to reduce the incidence of failure and yield more commercially successful results (Rothwell, 1994).

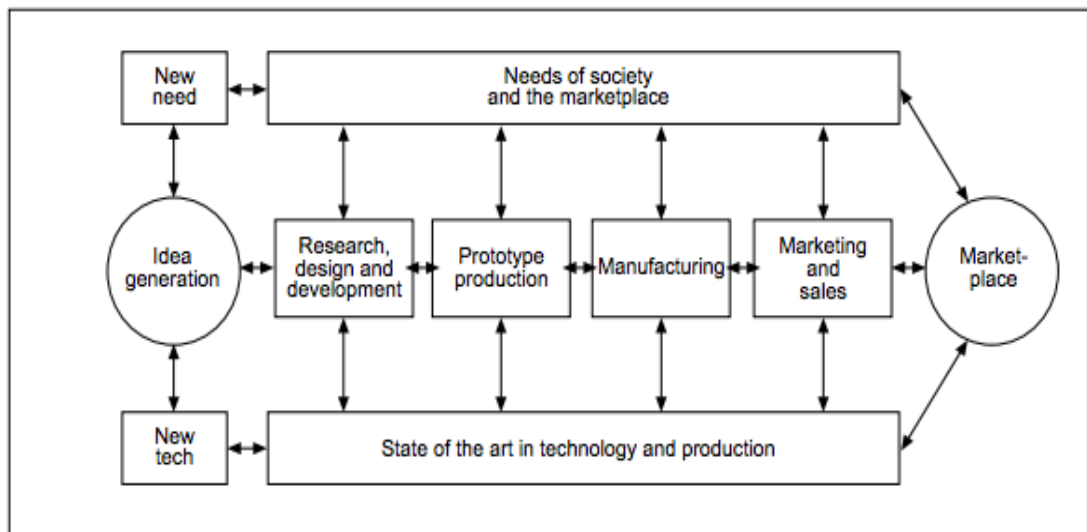


Figure 2-3: The coupling model of innovation

Source: Rothwell (1994, p.10)

Based on the integration of the two linear models, a third-generation model was created, called the coupling model. Figure 2-3 illustrates the components of the coupling model, which remain similar to the linear models, but with interaction between the functions. Any function, not just the marketing department or research and development centre, can generate innovative ideas. The coupling of knowledge with all functions fosters successful innovation ideas (Trott, 2017).

3) Integration and parallel development

Further advances in the complex and interactive nature of innovation have led to the emergence of the fourth generation model, integration and parallel development. In this model, innovation is a coordinated process across multiple actors, e.g. suppliers and customers, in parallel with development in-house. Coordination is the key feature of this fourth innovation model (Rothwell, 1994).

4) System of integration and networking

In the 1990s, a new perspective on innovation strengthened the view that the source of innovation is information and knowledge external to the firm. Hence, innovation came to be seen not simply as the result of one actor or organisational task. There is a need for sharing and exchanging information and knowledge between actors. Thus, innovation becomes a process system of integration and networking (Landry et al., 2002; Rothwell, 1994; Trott, 2017). Evidently, in the 1990s, there was a growth in the literature on innovation networking models, e.g. innovation milieu (Storper, 1997), cluster networks (Porters, 2000) and innovative systems (Cooke et al., 2000). Successful innovation is determined simultaneously, not just by technology and marketing capability, but also by network capacity (Landry et al., 2002).

5) Open innovation

Open innovation is based on the idea of an organisation's openness, where the innovation is no longer seen as the isolated efforts of a single organization. Chesbrough (2006) defines open innovation as "*the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively*" (Chesbrough, 2006, p.2). From the definition, there are two facets of open innovation, 'outside-in' and 'inside-out'. The outside-in aspect is where external ideas outside firms' boundaries are brought into the innovative process. The firm is open to shifting its strategy and uses a wide range of external actors to leverage internal capabilities. On the other hand, inside-out is where a firm's underused ideas and technologies are allowed to go outside the firm, to be incorporated in the innovation processes of others (Chesbrough, 2006).

	Innovation model	Characteristics	References
1 st - 2 nd	Linear	Simple linear sequential process; <i>technology push</i> is technology driven and emphasises R&D; the market is a recipient of the fruits of R&D. <i>Market pull</i> emphasises marketing; marketing is the source of directing R&D; R&D has a reactive role.	Rothwell's five generations of the innovation model (1994)

3 rd	Coupling/ interactive	Emphasis on integrating R&D and marketing; combination of push and pull.	
4 th	Integration and parallel development	Emphasis on linkages and alliances; coordination process.	
5 th	System of integration and networking	Emphasis on knowledge accumulation and external linkages; network process.	
6 th	Open innovation	Emphasis on further externalisation of the innovation process in terms of linkages with knowledge inputs and collaboration to exploit knowledge outputs.	Chesbrough's (2006) open innovation model

Table 2-1: Models of innovation

Source: Adapted from Trott (2017, p.27)

Over the last two decades, the literature on innovation has moved away from the early innovation models, where internal research and development activities preside over internally developed products. The emergence of the network model of innovation has had two consequences. Firstly, innovation is no longer perceived as purely the development of technological solutions, but as a process that involves social interaction. The success of innovation rests upon interaction and the exchange of knowledge, involving a large diversity of actors. This leads to the second effect, innovation is no longer able to be explained solely in terms of tangible forms of capital but combines tangible and intangible forms of capital (Landry et al., 2002).

2.2.2 INNOVATION TYPOLOGY

There are various classifications of types of innovation. According to Crossan and Apaydin (2010), classification can be based on the magnitude, type or scope of innovation.

Classification by the *magnitude* of innovation indicates the degree of novelty or newness of an innovation's outcome (Gopalakrishnan and Damanpour, 1997). Two types of innovation can be identified, radical innovation which is novel ways of combining elements that are a

major departure from a firm’s existing capabilities, products and practices, and incremental innovation which represents minor changes and continued modification of the firm’s current products, services, routines or operation. These changes do not cause the firm to depart from its current technological paradigm and mainly reinforce the existing capabilities of firms (Filiari and Alguezaui, 2014).

Magnitude of innovation	Definitions
Incremental innovation	<ul style="list-style-type: none"> • <i>“Continuous improvement initiatives that may be new to the firm”</i> (Crossan and Apaydin, 2010) • <i>“Minor and continuous improvement activities to existing products or practices reinforcing the existing capabilities of firms. It is new to the firm but not new to the industry”</i> (Gopalakrishnan and Demanpour, 1997; Reichsterin and Salter, 2006)
Radical innovation	<ul style="list-style-type: none"> • <i>“Innovations associated with newness to the market and/or industry”</i> • <i>“Associated with fundamental changes in the activities of a firm and represents a clear departure from existing products and practices”</i> (Gopalakrishnan and Damanpour, 1997)

Table 2-2: Magnitude of innovation

Another classification of innovation, similar to magnitude of innovation, is exploratory and exploitative innovation.

	Exploratory innovation	Exploitative innovation
Definition	Exploratory innovation makes an advance to new and different technological trajectories requiring recombination of diverse and fresh information	Exploitative innovation involves a search process which improves and deepens the current knowledge base without changing the essence of technological trajectory

Information needs	Diverse and novel information to value and actively explore	More reliable, specific and efficient information
Knowledge requirement	Departure from existing knowledge or developing new knowledge	Reinforcement, broadening, expansion or better understanding of existing knowledge and skills
Innovation outcome	Risky and uncertain, excessively unfamiliar and even useless insights generate inefficiencies in problem solving and difficulties in members coordinating	Certain and un-risky, familiar and known skills increase the efficiencies in problem solving and reduce the risks in innovation generation
Search	Constant, distant and extensive search for new opportunities and novel combinations	Local and in-depth search for existing rules, routines and norms

Table 2-3: Exploratory and exploitative innovation

Source: Yan and Guan (2018, p.246)

Incremental innovation is associated with exploitative innovation and competence-enhancing measures (Filiari and Alguezaui, 2014; March, 1991), whereas, radical innovation is commonly described as exploratory innovation, which signifies creating something completely new based on exploration and extensive research.

The knowledge requirements shown in Table 2-3 can be applied to the work of Polanyi (1996), who draws a distinction between two types of knowledge based on transferability, explicit and tacit knowledge. Explicit knowledge is knowledge that does not depart from existing knowledge and which can be easily articulated and communicated between individuals and organisations. In contrast, tacit knowledge is new knowledge which departs from existing knowledge and is more difficult and slower to transfer extensively from one party to another; it manifests only in its application and can only be exchanged through socialisation (Nonaka, 1994). Therefore, radical innovation and exploratory innovation are associated with tacit knowledge, whereas incremental innovation and exploitative innovation are associated with explicit knowledge (Pérez-Luño et al., 2011).

Initially, Schumpeter (1934) identifies two fundamental types of innovation, product and process. His view of innovation is primarily based on the manufacturing and development of

tangible goods, disregarding innovation in services (Lillis et al., 2015). One possible reason for this might be that the Schumpeterian view is in full accord with the facts and actualities of the business milieu at the time (the pre-WWII economy that was plagued by the great depression). The economy was greatly reliant on manufacturing, whereas the service sector was not prioritised (McCraw, 2009).

However, the emergence of the service sector over the last few decades has urged innovation scholars to broaden the concept of innovation to reflect the requirements of new business settings. The contemporary literature on innovation has been broadened to cover marketing and organisational innovation as well as to incorporate services into product innovation. For instance, the Organisation for Economic Co-operation and Development (OECD) in the Oslo manual 2005, classifies innovation into four types, product, process, marketing and organisational innovation (as shown in Table 2-4). This classification has not become outdated and remains the primary international guideline for defining and classifying types of innovation (Kafetzopoulos and Psomas, 2015; Gronum et al., 2012).

Type of innovation	Definition	Distinctive characteristics
Product innovation	The introduction of a good or service that is new or a service that is significantly improved with respect to its characteristics or intended uses	Significant changes in technical specifications, components, materials, incorporated software, user friendliness or other functional characteristics
Purpose: To develop the functional characteristics of products or services		
Process innovation	The implementation of a new or significantly improved method of production or delivery	Significant changes in techniques, equipment and/or software
Purpose: To reduce unit costs of production or delivery, increase quality or produce or deliver new or significantly improved products		
Marketing innovation	The implementation of a new marketing method involving significant changes	Significant changes in product design or packing, product placement, product promotion or pricing
Purpose: To better address customer needs, open new markets or newly position a firm's product on the market with the objective of increasing sales		

Organisational innovation	The implementation of a new organisational method	Significant improvement in the firm's business practices, workplace, organisation or external relations
Purpose: To reduce administrative or transaction costs, improve workplace satisfaction, gain access to non-tradable assets or reduce the cost of suppliers		

Table 2-4: Four types of innovation

Source: OECD (2005, pp.48-51)

In terms of scope of change, Gopalakrishnan and Damanpour, (1997) separate innovation into two types, technological and administrative. Technological innovation refers to the adoption of ideas that directly influence products, services or processes. Administrative innovation involves changes that affect the allocation of resources, policies, human resources or other factors directly related to the managerial aspects of the organisation. The scope classification is closely related to the four types of innovation. It provides a generic distinction between technical systems and social structures of an organisation, whereas the OECD classification encompasses specific innovation types which provide a wider range of possible innovation and can be more easily distinguished.

2.2.3 DEFINING INNOVATION IN THIS STUDY

Organisational level innovation can either approach innovation as an outcome or a process. Innovation as an outcome highlights 'what kind' of innovation (based on the typology discussed), and innovation as a process answers the question 'how' i.e. the generation and adoption of innovation (Crossan and Apaydin, 2010; Gopalakrishnan and Damanpour, 1997).

This study perceives innovation as an outcome and treats it as the dependent variable. There is no universal definition of innovation, but this study does not aim to create a new definition, instead it uses the well-recognised existing definition which offers a way forward in the identification of innovation (Baregheh et al., 2009). The definition adopted in this study follows that of the OECD (2005), which treats innovation as an outcome and includes a broad range of types of innovation:

“Innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations” (OECD, 2005, p.46).

The recent evolution of the innovation model underscores the imperative of using sources that are external to the firm, especially knowledge. There is, undeniably, a close link between innovation and knowledge. Zheng (2010) separates the keywords in this closely tied area of study and investigates them independently. Consequently, the literature on knowledge is incorporated in order to throw light on the relationship between social capital and innovation. Table 2-5 shows the key terminology from the review of innovation-knowledge studies.

Terminology	Definitions	References
Knowledge acquisition	The process by which organisations obtain knowledge – takes place through both the internal and external relationships of firms (Molina-Morales et al., 2014)	Yli-Renko et al. (2001); Presutti et al. (2007); Parra-Requena et al. (2010); Laursen et al. (2012); Garcia-Villaverde et al. (2017)
Knowledge transfer	The process through which one network member is affected by the experience of another (Inkpen and Tsang, 2005)	Filieri et al. (2014); Inkpen and Tsang (2005); Maurer et al. (2011); Van Wijk et al. (2008); Weber and Weber (2007)
Knowledge creation	Knowledge resides within, and is created by, individuals. The know-how and information that individuals gain over time forms their knowledge stock. The current knowledge stock shapes the scope and direction of the search for new knowledge (Nonaka, 1990)	Nahapiet and Ghoshal (1998); McFadyen and Cannella (2004); Smith et al. (2005)

Table 2-5: Other relevant terminology

Having established the definition of innovation and other key terminology and given that this thesis aims to examine how social capital negatively influences innovation, the following section covers the literature on social capital.

2.3 SOCIAL CAPITAL

‘It is not what you know, it’s who you know’

'Who you know' is a valuable asset and constitutes a valuable resource (Nahapiet and Ghoshal, 1988). The social capital metaphor is that people who do better are somehow better connected (Burt, 2000). According to Putnam (2000, p.23), social capital has "*forceful, even quantifiable effects on many aspects of our lives*" and is more than just "*warm, cuddly feelings or frissons of community*". Social capital effects include lower crime rates (Putnam, 2000), better educational achievement (Coleman, 1988), less corruption, more effective government (Putnam, 2000), enhanced economic achievement through increased trust, lower transaction costs (Fukuyama, 1995) and improved innovation performance (Molina-Morales and Martinez-Fernandez, 2010; Shu et al., 2012). All of these results are summed up by Field (2009) in two words - "*relationships matter*".

2.3.1 DEFINITION AND HISTORY OF SOCIAL CAPITAL

The phrase 'social capital' was first used by Hanifan in 1916 (Field, 2009; Ostrom and Ahn, 2003; Putnam, 2000). Hanifan predicted that school performance could be enhanced by "*those intangible substances that count for most in the daily lives of people; namely good will fellowship, sympathy, and social intercourse among the individuals and families who make up a social unit*". This concept defined the meaning of social capital, but it was not until decades later that social capital would again be cast into the spotlight, when Bourdieu (1983) transformed Hanifan's intangible idea into an active discussion recognisable to practitioners and analysts today (Field, 2009).

While scholars agree on the significance of social relations as actual or potential resources that can optimise productivity, consensus on a universal definition of social capital remains absent. This arises from the fact that the concept has been studied in a wide variety of disciplines, including economics, political science, sociology and management. There is considerable variation according to the individual authors' conceptualisation of social capital, and whether they choose to focus on the substance, sources or effects of social capital and the level of analysis (i.e. institutional, organisational or individual) (Alder and Kwon, 2002). The challenge of unifying definitions from many disciplines and perspectives has so far proved insurmountable.

One thing that many authors agree on is that the principle authors of social capital are Bourdieu (1986) and Coleman (1988) (Field, 2009; Farr, 2004; Portes and Vickstrom, 2011). Sociologists studying class inequalities, such as Bourdieu (1986) define social capital as the

aggregate of the actual and potential resources linked to the network of relationships. Their idea of social capital is deeply influenced by Marxist ideology as a way of maintaining and reproducing the privileged class. Social capital allows actors to claim access to resources possessed by their associates, thus their resources are produced via their links to individuals or groups (Field, 2009; Lin, 2002; Porters, 1998; Westlund and Bolton, 2003).

Coleman (1988) reinforces the functionalist view of social capital, which is conditioned by social structure and rational choice theory, which suggests that an actor's behaviour is determined by a utility-maximising pursuit of self-interest. Therefore, in his view, social capital is used by actors to achieve particular outcomes which would otherwise be impossible (Tzanakis, 2013). Coleman expands social capital to include several sub-constructs such as trust, norms, obligation and reciprocity as ways of sustaining social capital (Lin, 2001).

There is similarity between Coleman and Bourdieu's definitions of social capital in terms of the resources inherent in networks and relationships. Their studies have greatly influenced later authors and the contemporary discussion in the field of social capital. Table 2-6 shows the contemporary definitions of social capital in organisational studies.

Author (year)	Interpretation/definition
Baker (1990)	A resource that actors derive from specific social structures and then use to pursue their interests; it is created by changes in the relationships among actors
Burt (1992)	Social capital is at once the resources that contacts hold and the structure of contacts in a network; the first term describes whom you reach, the second describes how you reach them
Fukuyama (1995)	Social capital is the component of human capital that allows members of a given society to trust one another and cooperate in the formation of new groups and associations
Nahapiet and Ghoshal (1998)	The sum of the actual and potential resources embedded within, available through and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both a network and the assets that may be mobilised through that network

Portes (1998)	Social capital is the ability to command scarce resources by virtue of membership of networks or broader social structures
Woolcock (1998)	Social capital is the nature and extent of a community's personal and institutional relationships
Adler and Kwon (2002)	Social capital is the goodwill available to individuals or groups. Its source lies in the structure and content of the actor's social relations. Its effects flow from the information, influence and solidarity it makes available to the actor
Lin (2002)	Social capital is defined as the resources embedded in one's social networks, resource that can be accessed or mobilised through ties in the networks
Woolcock and Narayan (2000)	Social capital refers to the norms and networks that enable people to act collectively

Table 2-6: Contemporary definitions of social capital in organisational studies

Table 2-6 reveals, firstly, the difference in terms of the level studied, i.e. whether the definition investigates the relationship an actor maintains with another actor (e.g. Burt, 1992) or with a collectivity, i.e. a group or organisation, (e.g. Woolcock and Narayan, 2000), or both types of relationship (e.g. Adler and Kwon, 2002; Nahapiet and Ghoshal, 1998). At the individual level, social capital is defined as the resources embedded in an actor's relationships with other actors. Whereas, at collective level, social capital is defined as the value of a group or organisation in terms of the relationships formed by its members for the purpose of engaging in collective action (Dakhli and De Clercq, 2004).

Secondly, there is a difference in terms of substance and sources of social capital. For instance, Fukuyama (1995) is well known for his integration of social capital and trust. Woolcock and Narayan (2000) underscore the importance of norms as the substance of social capital that enables collective action. Conversely, some scholars argue that norms, trust, institutions or the value of collective properties are not the definition of social capital itself, but external factors which can influence, or be an effect of, social capital (Lin, 2008; Huber, 2009; Tura and Harmaakorpi, 2005).

Burt (1992) focuses on the structure of the network as a source of social capital. Alder and Kwon (2002) extend the source of social capital to include the content of relationships.

Nahapiet and Ghoshal's (1998) three dimensions of social capital incorporate both the structure and content of networks and relationships as sources of social capital.

Thirdly, there is a striking uniformity in defining social capital as based on the resources inherent in relationships and networks. The definitions of Baker (1990), Burt (1992), Nahapiet and Ghoshal (1998), Adler and Kwon (2002) and Lin (2002) denote social capital as including resources such as information, knowledge and support available through, and derived from, relationships. The systematic study of Payne et al. (2011) over two decades, reveals that the definitions of Adler and Kwon (2002) and Nahapiet and Ghoshal (1998) are most cited in organisational studies.

Therefore, it is vital to define the level of the study, the source, and the substance and functionality of social capital. For the purpose of this research, the definition of social capital is adapted from Lin (2002): "*resource embedded in the network among members of the cluster*". This definition is believed to be less caught up in tautological criticisms of social capital, distinguishing between the sources i.e. structure and content of relationships, and the consequences of social capital (Adler and Kwon, 2002; Nahapiet and Ghoshal, 1998). It allows for an actor-based conception, which lacks geographical economics (Tura and Harmaakopi, 2005). It does not restrict social capital to cohesive networks or strong ties, instead it is open on the question of which structures or relationships in the network influence the transmission of resources (Huber, 2009).

2.3.2 THREE DIMENSIONS OF SOCIAL CAPITAL

Nahapiet and Ghoshal (1998) introduce the three dimensions of social capital in response to early confusion about the dispersed subdivisions of social capital by scholars (i.e. Bourdieu, 1985; Burt, 1992; Granovetter, 1985; Putnam, 1995). The ambition of the three dimensions model is to untangle social capital, and allow the widest latitude of social capital to be studied (Zheng, 2010). There are various models of social capital. This research draws on Nahapiet and Ghoshal's (1998) three dimensions of social capital as a theoretical lens, which sees social capital as a focal construct (Maurer and Ebers, 2006; Zheng, 2010). The three dimensions of social capital are the structural, relational and cognitive dimensions. Relying on one or two dimensions of social capital unequivocally narrows the scope of the study. Considering the wider range of facets of social capital provides great analytical power on social capital and innovative performance relationships (Echebarria and Barrutia, 2013; Presutti et al., 2007; Zheng, 2010). Finally, the study of Nahapiet and Ghoshal (1998) allows room for the

possibility that social capital can nourish as well as constrain organisational performance (Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998; Weber and Weber, 2011). The model shows promise and is adopted by various scholars (e.g. Silkoset, 2013; Villena et al., 2011; Wang et al., 2018), both conceptually and empirically, to understand how social capital can negatively affect the performance of business. The following section introduces the three dimensions of social capital and their sub-dimensions and discusses their relation to the innovative performance of firms.

2.3.2.1 STRUCTURAL DIMENSION

The structural dimension is the “*overall pattern of connections between actors*” (Nahapiet and Ghoshal, 1998, p.224). It is often summarised as ‘who you know and how you reach them’ (Burt, 2000). This dimension is developed from structural embeddedness, which captures the properties of networks and the social system as a whole (Granovetter, 1992). The study of the structural dimension largely overlaps with network studies, given that it is measured in a similar manner and concerns the configuration of social structures (Burt, 2000; Villena et al., 2013). Thus, scholars adopt a network perspective to examine structural social capital via strength of ties, density and centrality (Burt et al., 2000; Filieri and Alguezaui, 2014; Nahapiet and Ghoshal, 1998; Yli-Renko et al., 2001; Zheng, 2010). This dimension of social capital is commonly concerned with position to access external knowledge and the opportunities for, and ease of, information exchange (Burt, 1992, 2000; Nahapiet and Ghoshal, 1998).

- ***Strength of ties***

Granovetter (1973) posits the idea of strength of ties, where weak and strong ties are differentiated based on the criteria of amount of time, emotional intensity, intimacy and reciprocity. Strong ties are characterised by frequent interaction and close relationships, in comparison to weak ties. Strong ties are advantaged in exploiting complex and tacit knowledge, as strong links between actors enable knowledge exchange and transfer more easily than with weak ties (Rost, 2011; Wu, 2008). However, weak ties provide access to heterogenous sources of knowledge and information that connect various and distant actors (Rowley et al., 2000).

The strength of ties is closely related to the debate about network closure and structural holes. Burt’s (1992) structural holes represent a lack of ties among actors. Actors or firms obtain strategic advantage by forging ties that otherwise would not exist. Social capital is an outcome

of diversity of information and brokerage of opportunities created by a lack of connection between separate parties (Adler and Kwon, 2002; Borgatti and Foster, 2003; Gargiulo and Benassi, 2000). In contrast, Coleman’s (1990) network closure argues that there is a benefit from cohesive networks where actors are directly connected by close relationships, trust, norms and reciprocity that enable cooperation among network members (Obstfeld, 2005).

Following the same argument, the functionality of social capital can enhance value creation either by acting as sociological glue that ‘bonds’ actors together or ‘bridges’ unconnected actors (Putnam, 2000; Woolcock, 2001). Alder and Kwon (2002) describe this as internal and external sources of social capital.

These three concepts show different but related aspects of social capital, the source, the functionality of social capital and the characteristics of the actors and relationships. Strong ties are associated with bonding social capital and closure of networks, and vice versa.

Bonding social capital	Bridging social capital
Tends to reinforce exclusive identities and maintain homogeneity (Putnam, 2002)	Tends to bring people together across diverse social divisions (Putnam, 2002)
Strong ties	Weak ties
Follow the principle of homophily, binding people with others similar to themselves (Lin, 2002)	Bring people together from different social and cultural backgrounds (Lin, 2002)
Closure	Structural holes
Social capital is created by a network of strongly interconnected elements (Lin, 2008)	Social capital is created by a network in which people can broker connections between otherwise disconnected segments (Lin, 2008)

Table 2-7: Comparing concepts relating to the social capital and network ties

Scholars habitually favour the idea of weak ties which provide access to larger and more diverse resources without the cost of maintenance associated with strong ties (Bradley et al., 2012; Burt, 1997; Elkinder-Frick et al., 2012; Pirolo and Presutti, 2010; Stam et al., 2014; Villena et al., 2015). Nonetheless, strong ties are recognised as being advantageous for exploiting complex and tacit knowledge as cohesive and collaborative networks ease knowledge exchange and transfer (Kale et al., 2000; Rost, 2011). However, the longitudinal

studies of Capaldo (2007) and Maurer and Ebers (2006) reveal that, over time, strong ties fail to provide the information and knowledge that firms require, and consequently reduce innovative capability and innovation performance. This is explained in the form of an inverted u-shaped relationship (Ruiz-Ortega et al., 2016).

If both the arguments for weak and strong ties are valid, which ties should be complemented might depend on the conditions. Scholars advocate that, in fact, the configuration of social capital should be adjusted based on task contingency, since they serve different purposes (Burt, 1998; Exposito-Langa and Molina-Morales, 2010; Maurer and Ebers, 2006; Mizruchi et al., 2011; Molina-Morales et al., 2011). For instance, Hansen (1999) along with Uzzi (1997) base their classification on the certainty of the task; tasks with high uncertainty benefit from network closure. However, Casnaueva et al. (2013) base their recommendation on the types of knowledge which firms desire to acquire and propose that weak ties are best for explicit knowledge transfer, while strong ties are more appropriate for tacit knowledge. Similarly, Lin (2008) underlines how firms that have expressive goals or non-instrumental purposes should aim to maintain bonding social capital, whereas firms with instrumental purposes should reach out to heterophilous networks i.e. those that bridge social capital, that can provide access to additional resources and depend less on strongly shared values within the network (Lin, 2008; Putnam, 2000).

Instead of treating these two concepts as opposite, some of academic scholars show the complementary between the two (Phelps, 2010). Mixing strong and weak ties to balance the risks and benefits can optimise social capital credentials (Adler and Kwon, 2002; Ahuja, 2000; Edelman et al., 2014; Obstfeld, 2005; Zheng, 2010).

- ***Density***

Network density is closely related to the size of the network. While size presents the maximal potential for interaction, density defines the degree to which firms in a network are connected to each other. It is the connection between members in the entire network (Burt, 1992).

The effect of network density is based on dense and sparse networks, related to network closure and structural holes as discussed in the previous section. A dense network has Coleman's (1988, 1990) closure, and features a highly connected web of actors. A dense network, where every member connects to every other, fosters trust, norms of reciprocity and a shared identity which promotes cooperative behaviour. Consequently, it promotes information sharing and lowers transaction costs. Unsurprisingly, density is used as an

indicator of how quickly information and knowledge can be disseminated within a network (Alguezaui and Filieri, 2010; Karamanos, 2016; Phelps, 2010; Stuck et al., 2016). Gebreeyesus and Mohnen (2013) indicate that firms in dense networks are more likely to engage in innovative activities.

On the other hand, a sparse network relates to Burt's (1992) structural holes theory, which implies that firms can broker opportunities in the absence of connections among network members. A sparse network allows the members to connect with disparate actors who have different, non-redundant information and knowledge, hence increasing their knowledge base (Burt, 1992; McEvily and Zaheer, 1999). Though, this does not guarantee understanding of the knowledge and resources acquired (Alguezaui and Filieri, 2010).

From a structuralist perspective, a dense network does not necessarily provide the most favourable environment for innovation and social connection (Granovetter, 1983). When a network becomes too dense, it can hinder innovation performance. A high level of density and a tight cognitive framework can be robust building blocks that restrain firms' capabilities to explore new knowledge and ideas or exploit novel recombination (Gilsing et al., 2008; Koka and Prescott, 2002; Lazer and Friedman, 2007; Molina-Morales and Exposito-Langa, 2012; Obsfeld, 2005; Todo et al., 2016). This can create 'not invented here' syndrome, where firms are reluctant to seek novel or potentially contradictory knowledge and information, restricting the opportunities to collaborate with other communities outside the network (Alguezaui and Filieri, 2010; Beugelsdijk and Smulders, 2004; McFadyen and Cannella, 2004; Perry-Smith, 2006; Staber, 2007). Furthermore, over time, a dense network inhibits the existence and utilisation of diverse knowledge and information available in the network (Gilsing et al., 2008) as firms cannot learn substantially from other firms that already share the same information and knowledge (Todo et al., 2016).

However, a few researchers disagree. Phelps (2010) contends that these arguments are only valid if the diversity in the network is static, and the only way to inject novelty into a network is to add external ties. This presumes that access to diverse information is determined solely by the connective structure of ties among network members. He proposes that a dense network with specialisation actually generates more, rather than less, diversity. This is in agreement with Gebreeyesus and Mohnen (2013) who do not find any negative effects of dense networks and see them as providing greater access to diverse and valuable information.

- **Centrality**

Network centrality refers to the extent to which the actor or organisation occupies a strategic position within a network by virtue of being at the convergence of multiple ties (Ferriani and MacMillan, 2017; Scott, 2013). According to network studies, central firms avail themselves of two functions of ties, firstly a channel of communication that provides access to the information and knowledge repositories of direct and indirect ties, and secondly a filter for the passing of information and knowledge to others in the network (Paruchuri, 2010). Thus, centrality can play a crucial role in determining a firm’s innovative performance (Casanueva et al., 2013; Hoang and Antoncic, 2003). There are several measurements that indicate centrality in a network.

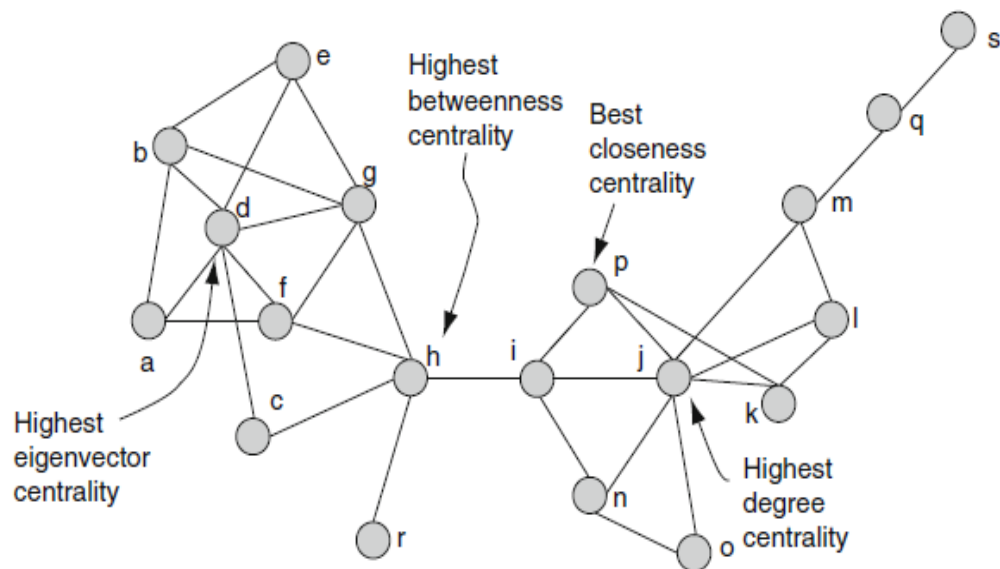


Figure 2-4: Various measures of centrality applied to an example network

Source: Litterio et al. (2017, p.352)

Degree centrality is the simplest measurement of centrality. It is measured by the number of actors that the focal actor is connected to; regardless of how well those partners are connected (Powell et al., 1994; Scott, 2013). Central firms are highly visible and tend to be perceived as important in the network (Borgatti et al., 2013). A high degree centrality gives firms an advantage from the greater probability of accessing, receiving and transmitting information, knowledge and other resources. In the figure above, “j” is recognised to have the highest degree centrality, with connections to 7 actors.

Betweenness centrality is calculated by the shortest (geodesic) path between the focal actor and the other actors (i.e. both direct and indirect ties) (Borgatti et al., 2013; Scott, 2013). Betweenness centrality refers to the measurement of the degree of influence the focal firm has over the knowledge and information flow in a network as it serves as a broker to other firms in the network (Gilsing et al., 2008). In other words, the firm that has betweenness centrality is the firm that acts as a bridging point between nodes. In the figure, “h” has the highest betweenness centrality, bridging between 3 separated clusters, “a, b, c, d, e, f, g”, individual “r” and “i, j, k, l, m, n, o, p, q, s”.

Eigenvector centrality is based on the value of adjacent actors (weighted by each adjacent actor) to which a focal actor is connected (Borgatti, 2003; Koka and Prescott, 2002). It values the quality of the connection (of both direct and indirect ties). Connections with well-connected actors count more to this centrality than connections to those with a lower degree of connectivity. The highest eigenvector centrality in the diagram is achieved by “d”, as it is highly well-connected to other actors. A firm that achieves eigenvector centrality benefits from a high level of early recognition of novel information and knowledge. However, eigenvector centrality is not applicable to ego-networks, as its estimation requires information about the whole structure of the network (Everett and Borgatti, 2005).

Closeness centrality, as the name suggests, refers to the focal actor’s closeness to other actors in the network. It accounts for both direct and indirect ties (Borgatti et al., 2013; Wasserman and Faust, 1994). It considers how long it would take to spread information through the network, in other words it probes the capacity of the focal actor to affect all others in the network. A firm with high closeness centrality is highly integrated with others and benefits from quick interactions, where the flow of information, knowledge and resources takes place. However, this centrality shares the same restriction as eigenvector centrality for ego-network analysis (Everett and Borgatti, 2005).

The review of the literature shows different adoption of measures of centrality which leads to inconsistent findings about the relationship between the centrality and innovation efficiency of firms at inter-firm level. This research adopts degree centrality and betweenness centrality as they are recognised as most relevant in assessment of innovative performance in analysis at ego-network level (Casanueva et al., 2013; Li et al., 2013).

Scholars argue the benefit of being a ‘pipeline’ or ‘conduit’ of information flow in the network (Bell, 2005; Casanueva et al., 2013; Del-Corte-Lora et al., 2015; Whittington et al., 2009). This places the central actor in a strategic position that has the advantage of wider access,

greater volume of knowledge and diversity of information and resources in comparison to firms in peripheral positions (Tsai, 2000). Given the importance of information and knowledge on the innovation of a firm, some scholars prioritise centrality as a crucial prerequisite for success (Gulati, 1999; Power et al., 1996). The more central a position the firm holds, the more innovative the firm can be (Ahuja, 2000; Bell, 2005; Casanueva et al., 2013; Chiu, 2009; Del-Corte-Lora et al., 2015; Koka and Prescott, 2008; Powell et al., 1996; Tsai, 2001; Whittington et al., 2009). Nevertheless, a few scholars criticise the lack of cognitive consideration in these studies, where the centrality of the position can be overwhelming because of the overload of information and the cost of maintaining the position (Gilsing et al., 2008; Lechner et al., 2010; Paruchuri, 2010).

2.3.2.2 RELATIONAL DIMENSION

The relational dimension of social capital develops from relational embeddedness which refers to the relationships between actors that have developed through a history of interaction (Granovetter, 1973). Nahapiet and Ghoshal (1998) define the relational dimension of social capital as the quality and dynamics of relationships and categorise the sub-constructs of the relational dimension as trust, norms of reciprocity, obligation and expectation. However, this study includes only trust and norms of reciprocity, as obligation and expectation are encompassed by norms of reciprocity. Trust and norms of reciprocity are recognised as the central components of this dimension and the most significant influencers of innovation (Sanchez-Franco and Roldan, 2015; Zheng, 2010).

- **Trust**

Trust is itself a field of study. Social capital scholars interpret trust differently, saying that trust equals social capital (Fukuyama, 1995), is a form of social capital (Coleman, 1998), or is a source of social capital (Alder and Kwon, 2002; Putnam, 1993). The multidimensional interpretation sees trust as a source of social capital (Nahapiet and Ghoshal, 1998) and adopts the definition of Misztal (1996), who defines trust as the belief that the result of another actor's intended action will be appropriate from an actor's perspective. The premise of trust in relation to innovation, is that firms habitually require resources that belong to others and trust facilitates an environment of knowledge exchange and sharing, and thus innovative performance (Coleman, 1990; Landry et al., 2002; Meeus et al., 2001; Moran, 2005; Tsai and Ghoshal, 1998; Wu, 2008). When two firms trust and are trusted, the risk that one party will opportunistically exploit to other is reduced, and therefore firms can be confident in giving and receiving accurate information and knowledge without fear of being cheated, misled or

taken advantage of. Consequently, this reduces the need for monitoring, lowers transaction costs and increases the willingness to engage in social exchange and cooperative action (Dakhli and De Clercq, 2004; Fukuyama, 1995; Levin and Cross, 2004; Li et al., 2014; Molina-Morales et al., 2010; Nahapiet and Ghoshal, 1998; Wu, 2008).

Nevertheless, other authors question the adverse effect of trust on performance. For instance, both Villena et al.'s (2016; 2011) study of trust in the buyer and supplier relationships on strategic performance and operational performance and Molina-Morales et al.'s (2011) study of the innovative performance of cluster firms, indicate that firms relish the positive characteristics of trust but, once it is beyond an optimal threshold, trust can have undesired effects on firms' performances, such as opportunistic behaviour and free riding (Villena et al., 2011; 2016). They sum up by saying, "*trust is good, but too much trust is not good*". While these studies provide insight and rich knowledge and show the dark side of inter-organisational trust through an inverted u-shaped relationship, they pay limited attention to empirically examining mediation or the explanation of such relationships (Lefebvre et al., 2016).

- ***Norms of reciprocity***

Norms are sets of behavioural guidance which offer organised and interpretable information cues, for individuals or organisation working with others, about what is considered appropriate and what should be avoided (Coleman, 1990; Yu et al., 2013) - simply 'what most people do'. Norms help individuals anticipate how others will react to their attitudes and behaviour and help them adjust their behaviour to meet social expectations. When norms exist and are effective, desirable behaviour increases and undesirable behaviour is reduced. They constitute a powerful, through sometimes fragile, form of social capital that makes people act in the interests of the collective as well as constraining some actions (Coleman, 1990).

Norms do not receive adequate empirical investigation in comparison to other sub-constructs of social capital. This is because the terminologies and measurements deployed make it challenging to compare findings or find common ground for deeper inquiry (Zheng, 2010). In empirical studies of the relationship between norms and innovation, the definitions and measurements of norms often branch out from the root of the concept. Instead of perceiving norms as solidarity, group cohesion or civic behaviour, scholars invent 'innovation norms' to examine behaviours such as having an open attitude to new ideas or risking change (O'Reilly, 1989; Russell and Russell, 1992; Smith et al., 2005). Innovative norms highlight the shared expectation of behavioural patterns toward innovation which is sometime difficult to

distinguish from shared cognition (O'Reilly's, 1989). Inkpen and Tsang (2005) conceptually recognise norms as part of the cognitive dimension of social capital. Thus, there is an urgent need to distinguish between norms and the cognitive dimension, through empirical investigation (Zheng, 2010).

The dark side of norms has been only vaguely discussed. Studies that adopt a definition of norms closer to Coleman (1990), where norms represent obligations and expectations between actors (Yu et al., 2013; Wang et al., 2018), revealing the negative side of norms. According to Ayers et al., (2001) too strong intra-firm norms may contribute to groupthink and possibly impede innovation. Likewise, Villena et al. (2011) find that norms, as part of relational social capital and not directly investigated as individual sub-constructs, might have an inverted u-shaped relationship with buyers' strategic and operational performance, where norms impose unnecessary obligation. Similarly, Molina-Morales and Martinez-Fernandez (2009) suggest that strong norms can place a burden of obligation and have an inverted u-shaped relationship with innovation creation, but this is not empirically tested. Wang et al. (2018), who only directly investigate norms as a separate sub-construct of social capital, find that norms can impede effective decision-making and harm firm performance.

2.3.2.3 COGNITIVE DIMENSION

Cognitive social capital posits shared representations, interpretations and systems of meaning among parties that have the ability to enable or restrict social exchange (Nahapiet and Ghoshal, 1998). While structural and relational embeddedness explains how and why social actors benefit from given positions and connections in a network, the cognitive dimension raises the question of why social actors choose to act the way they do and the implications of their aggregate action. A lack of shared cognition can pose challenges in capturing, articulating, understanding and contextualising ideas between actors (Wu and Pullman, 2015).

Previous researchers have largely concentrated on either the structural or relational dimensions, or the combination of the two, leaving out the cognitive dimension (Lee, 2009; Muniady et al., 2015), especially in relation to innovation study. Zheng (2010) suggests that this might be because, firstly, the literature underpinning shared cognition concerns organisational behaviour and social psychology, whereas innovation studies concern technology management, strategic management and sociology. Disciplinary and paradigmatic dissimilarities may prevent them from using each other's knowledge base effectively.

Secondly, the definition of shared cognition suffers from being ambiguous and scattered, and places challenges in the way of identifying studies and comparing results.

Most empirical studies describe this dimension in terms of shared goals or visions and shared culture (Inkpen and Tsang, 2005; Masiello et al., 2013; Tsai and Ghoshal, 1998; Zheng, 2010). However, as cultural embeddedness and cognitive embeddedness are closely linked and difficult to separate (Dimaggio, 1990; Ratajczak-Mrozek, 2017; Wu and Pullman, 2015), this study incorporates only shared vision, which is recognised to be the most important indicator explaining the behaviour of society (Merton, 1968).

- ***Shared vision***

Shared vision is a mechanism that embodies the collective goals and aspirations of the members of a network (Inkpen and Tsang, 2005). Shared vision serves as a mechanism that assists firms to integrate or combine resources (Exposito-Langa et al., 2015; Molina-Morales and Martinez-Fernandez, 2010; Tsai and Ghoshal, 1998). When firms share a vision, it creates a hospitable social context, thereby reducing the risk of miscommunication (Lechner et al., 2010). A common understanding of what innovation is and how to carry it out can be expected to lead to an improvement in innovative performance (Krause et al., 2007; Molina-Morales et al., 2010).

Lechner et al. (2010) and Villena et al. (2011) empirically examine the possibility of an inverted u-shaped relationship between the three dimensions of social capital and firm performance. Both studies demonstrate the inverted u-shaped effect of structural and relational dimensions, although shared vision escapes the dilemma. Villena et al. (2011) explain that this might be because their study sample did not experience high levels of shared vision and therefore did not reach the threshold level. However, in the study of Lechner et al. (2010), shared vision appears to have a positive linear relationship as it facilitates effective communication and tacit knowledge transfer, and even counters the negative effect of other social capital dimensions. In relation to innovation performance, Zheng (2010) conceptually suggests that shared vision is much more enduring and consistent than the other two dimensions of social capital and less likely to be trapped in an inverted u-shaped relationship. All the scholars in these studies call for future research to confirm their assumptions.

Author	Innovation	Social capital		Relationship	Research context	Data
		Dimension	Sub-construct			
Smith et al. (2005)	The rate of new product production	Structural	Tie strength	Positive	High technology firms	15 knowledge workers and all top managers in each firm
		Relational	Trust			
Capaldo (2007)	Innovation capability	Structural	Tie strength	Negative	Design-intensive furnishing firms in Italy	Multiple case studies
			Strong ties	Positive		
			Strong ties with weak ties			
Chen and Huang (2007)	Knowledge management	Relational	Trust	Positive	Firms in top 5,000 Taiwanese firms	Survey involving 157 firms
Chen et al. (2008)	Creativity	Structural	Network ties	Positive	Firm headquarters in Germany	Survey involving 280 top managers
		Relational	Trust			
		Cognitive	Shared goals			
Noordhoff et al. (2011)	Joint innovation	Structural	Tie strength	Inverted u-shaped	Manufacturing firms in Netherlands	Survey involving 157 firms
Pérez-Luño et al. (2011)	Radical innovation	Relational	Trust Degree of commitment Shared goals and interests Shared vision	Positive	Manufacturing and service firms in Spain	Questionnaire involving 143 R&D managers and marketing managers

Shu et al. (2012)	Product and process innovation	Structural	Managerial ties	Positive	Firms in China	Survey involving 270 senior managers
Li et al. (2013b)	New business development	Structural	Tie strength	Negative	Start-up firms in high-tech industry in China	Survey involving 158 entrepreneurs
		Relational	Trust	Positive		
		Cognitive	Shared cognition	Negative		
Li et al. (2016)	Exploratory innovation	Structural	Frequency and intensity of interaction	Inverted u-shaped	Firms in high-tech industries in China	Survey involving 276 managers
		Relational	Close personal interaction Trust	Negative effect		
		Cognitive	Reciprocity Shared culture Shared goals Shared vision	Negative effect		
Ruiz-Ortega et al. (2016)	Product innovation	Structural	Network configuration	Positive	Firms in footwear industry in Spain	Questionnaire involving 224 managers
		Relational	Trust			
		Cognitive	Shared goals Shared culture			
Gao et al. (2017)	Product innovation	Structural	Managerial ties	Inverted u-shaped	Firms in information and communication, manufacturing, energy	Structured interviews involving 207 managers

					and chemical industries in China	
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Table 2-8: Summary of previous studies on social capital and innovation performance at an inter-firm level of analysis

Table 2-8 summarises previous empirical studies of social capital-innovation relationships at an inter-firm level of analysis. The table summarises the research method, including the research context and the method of data collection and serves to illustrate the relationships in terms of structural, relational and cognitive social capital and innovation. The relationship between social capital and innovation is inconclusive (i.e. positive, negative, and inverted u-shaped relationships). It is observable that most of the studies focus on the positive effects of social capital. There is generally a lack of a conceptual model that considers negative outcomes of social capital. Furthermore, the review of the three dimensions of social capital underlines the multidimensional nature of social capital, however, only a few of the studies incorporate all three dimensions of social capital.

2.3.2.4 INTERRELATIONS BETWEEN THE THREE DIMENSIONS OF SOCIAL CAPITAL

Nahapiet and Ghoshal (1998) individually scrutinise the impact of each dimension of social capital, however, the overlap and certain commonalities that exist between the dimensions is apparent. One of the authors (Tsai and Ghoshal, 1998) empirically demonstrates that the three dimensions of social capital, structural, relational and cognitive, reinforce the creation of each other, iteratively. The interrelationships between the multiple dimensions of social capital are generally recognised, but most empirical studies neglect to investigate these interrelationships (Castro and Roldan, 2013; Lee, 2009; Weber and Weber, 2001). Studying the dimensions of social capital individually risks missing the precise effect of social capital (Camps and Marques, 2014; Hsu and Hung, 2013; Lefebvre et al., 2016; Silkoset, 2013; Villena et al., 2011).

Authors	Research method and context of study	Social capital	Dependent variables	Results
Tsai and Ghoshal (1998)	A Survey of 15 business units with directors or senior managers	SSC: social interaction ties RSC: trust and trustworthiness CSC: shared vision	Resource exchange and combination	SSC→CSC (Not significant) SSC→RSC (+) CSC→RSC (+)
Van den Hooff and Huysman (2009)	An online survey of 541 employees in six different organisations	SCC: connections between actors RSC: trust, norms and sanctions, obligations and expectations, identity and identification CSC: shared language, codes and narrative	Knowledge sharing	SSC→CSC (+) SSC→RSC (+) CSC→RCS (+)
Wang and Chiang (2009)	A survey of 202 users in the largest online auction website in Taiwan	SCC: social interaction RSC: trust CSC: shared vision	Auction continuance intention	SSC→CSC (+) SSC→RSC (Not significant) CSC→RSC (+)
Zheng (2010)	A literature review of social capital and innovation	SCC: network size, structural holes, centrality, tie strength RSC: trust, norms CSC: shared vision	Innovation	SSC→RSC RSC↔CSC
Carey et al. (2011)	A survey of 613 buyer-supplier relationships	SSC: social interaction RSC: close interaction, mutual trust, mutual respect, mutual friendship, high levels of reciprocity	Buyer innovation improvement and cost improvement	SSC→RSC (+) CSC→RSC (+)

		CSC: business value, shared ambitions and vision, best interest of the relationship		
Van den Hooff and de Winter (2011)	28 interviews and 236 participants in an online survey from IT departments and business organisations	SCC: the overall pattern of connections between actors RSC: trust and trustworthiness, norms, obligation and expectations, identity and identification CSC: shared language and codes, shared narrative	Knowledge sharing	SSC→CSC (+) SSC→RSC (+) CSC→RSC (+)
Li et al. (2013c)	A questionnaire of 158 entrepreneurs who are network members of high-tech industries in China	SSC: Tie strength RSC: Trust CSC: Shared language and interest, shared value	Decision making constraint and new business development	CSC→SSC (+) CSC→RSC (+)
Camps and Marques (2014)	An interview of 10 managerial team in a manufacturing firm	SSC: network ties and network configuration RSC: trust, norms, obligation, identification CSC: shared vision, shared codes and language, shared narratives	Innovation enablers	SSC→CSC SSC→RSC RSC→CSC
Li et al. (2014)	A questionnaire of 272 manufacturing firms in China.	SSC: social interaction RSC: trust CSC: shared vision	Information sharing	SSC→CSC (+) RSC→CSC (+) SSC↔RSC (Inconclusive)

Muniady et al. (2015)	417 Structured interviews with micro-entrepreneurs in Malaysia	SCC: network ties and density RSC: quality of relationships and trust CSC: shared meaning, values and norms	Micro-enterprise performance	CSC→SSC (+) RSC→SSC (Not significant)
Lefebvre et al. (2016)	A survey of 150 members of a formal learning network in Europe.	SSC: social interaction RSC: trust CSC: shared vision and shared language	Knowledge sharing	SSC→CSC (+) SSC→RSC (Not significant) CSC→RSC (+)

Table 2-9: Summary of previous studies on the interrelationship between the three dimensions of social capital

In Table 2-9, three types of interrelationship between the dimensions of social capital are identified. Firstly, structural social capital is an antecedent of the relational and cognitive dimensions (Lefebvre et al., 2016; Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998; Wang and Chiang, 2009). Secondly, there is a relationship between the cognitive and relational dimensions (Li et al., 2013b; Li et al., 2014; Tsai and Ghoshal, 1998; Zheng, 2010). Lastly cognitive social capital is a prerequisite of structural social capital (Li et al., 2013b; Muniady et al., 2015). However, contradicting these studies, Wu (2008) contends that the interrelationship between the three dimensions is not significant.

The majority of the studies are in consensus, treating structural social capital as an antecedent to relational and cognitive social capital. When two actors are in a close relationship and have frequent interaction, they are more likely to cultivate trusting relationships and norms of reciprocity (Camps and Marques, 2014; Carey et al., 2011; Li et al., 2013(b); Van den Hooff and de Winter, 2011; Van den Hooff and Huysman, 2009; Tsai and Ghoshal, 1998). Nevertheless, Lefebvre et al. (2016) and Wang and Chiang (2009) contend that this only applies when a certain level of sense of community and/or shared vision is established, as social interaction alone is not sufficient to initiate trusting relationships. The shared values and collective actions alleviate the possibility of misunderstanding and conflict and therefore stimulate a harmonious environment that underpins trust and norms of reciprocity (Li et al., 2013b; Tsai and Ghoshal, 1998).

Through frequent social interaction, actors share their interests, cultures, values and practices, which shapes a common set of goals and a mutual understanding between them (Camps and Marques, 2014; Lefebvre et al., 2016, Li et al., 2014; Van den Hooff and de Winter, 2011; Van den Hoff and Huysman, 2009). However, Tsai and Ghoshal (1998) find an insignificant relationship between social interaction and shared vision. Their argument refers back to Coleman (1990) who underlines that actors do not need to have interpersonal relationships in order to establish shared visions or values.

Secondly, relational social capital influences cognitive social capital and vice versa, or they may simultaneously reinforce each other. Only the studies of Li et al. (2014) and Muniady et al. (2015) examine the influence of relational social capital on cognitive social capital, although they reveal different outcomes. On one hand, Li et al. (2014) find a positive relationship. When actors are in trusting relationship, mutual goals and collective action are easier to establish, and the possibility for opportunistic behaviour and the pursuit of self-interests are erased. On the other hand, Muniady et al. (2015) find an insignificant relationship

but do not explain their findings in detail. Regarding the effect of cognitive social capital on relational social capital, shared values, goals, languages and narratives are recognised as preconditions for the development of mutual trust and norms of reciprocity. There is consensus that actors can envisage collective goals and erase other actor's pursuit of self-interests when a certain level of cognitive social capital is present (Carey et al., 2011; Lefebvre et al., 2016; Li et al., 2013(b); Tsai and Ghoshal, 1998; Van den Hooff and de Winter, 2011). There is an assumption that these two dimensions have a reciprocal relationship (Zheng et al., 2010), but empirical study provides no conclusive result (Li et al. 2014).

Lastly, only the studies of Li et al. (2013b) and Muniady et al. (2015) treat cognitive social capital as a prerequisite of structural social capital. This implies that actors initiate relationships and prefer to have social interaction with other actors who have mutual understanding and similar interests and visions (Li et al., 2013(b); Muniady et al., 2015). This is in agreement with Nahapiet and Ghoshal (1998) who propose the possibility of the cognitive dimension being both a medium and product of social interaction with others. Even so, these findings show mixed results about how the three dimensions are interrelated, but nevertheless show the noteworthy nature of the interrelationship.

2.4 THE DARK SIDE OF SOCIAL CAPITAL

Social capital is a coin with two sides. Table 2-8 shows that the bright side of social capital has been strongly emphasised by previous studies and can overshadow the dark side of social capital (Adler and Kwon, 2002; Alguezaui and Fillieri, 2010; Carey et al., 2011; Galunic et al., 2012; Gedajlovic et al., 2013; Inkpen and Tsang, 2016; Li et al., 2013; Li et al., 2016; Molina-Morales and Martinez-Fernandez, 2010; Molina-Morales et al., 2011; Noordhoff et al., 2011; Villena et al., 2011). To better understand the influence of social capital on innovation requires discussion of the alternative argument that addresses the negative effects of social capital (Cuevas-Rodríguez et al., 2014). Based on the inverted u-shaped relationship addressed in the previous section, this section critically reviews the negative effects of excessive social capital.

2.4.1 RELEVANT THEORETICAL CONCEPTS

Studies of the negative effect of social capital do not always label it as ‘the negative effect’ or the ‘dark side’ of social capital. The terms ‘social liability’ and ‘over-embeddedness’ are frequently used, interchangeably, for the negative effects of social capital in research.

- **SOCIAL LIABILITY**

The term ‘social liability’ comes from the study of corporate social capital (CSC) (Gabbay and Leenders, 2001; Gargiulo and Benassi, 1999). The concept of CSC is different from social capital, in that CSC concentrates on the formal ties of corporate actors (e.g. firms and their members), and the investigation of CSC is solely focused on the structure of the network and explaining how it is connected to organisational outcomes. The social structure is recognised as being CSC when it assists in attaining corporate goals. However, the social structure is seen as social liability when it prohibits or obstructs the achievement of goals (Gabbay and Leenders, 2001). The idea of social liability is worth mentioning, as it was among the first to challenge the bright side of social bonds and investigate the conditions in which social bonds hinder organisational outcomes. This signifies the possibility of the non-linear relationship between social capital and performance found empirically in many existing studies (e.g. Li et al., 2013; Pillai et al., 2017; Villena et al., 2011; Wang et al., 2018).

Gargiulo and Benassi (1999) describe how strong, cohesive networks and exclusive ties to a limited number of contacts are conditions that can turn social capital into social liability. The rationale is that the instrumental value of social capital rests on the ability to adapt in accordance with a changing task environment. However, strong social bonds impose a restriction on change of the composition of the network and the initiation of new relationships, as it is encumbered by the demand placed upon the embedded relationships. This is closely related to Burt’s (1992) argument of structural holes.

- **OVER-EMBEDDEDNESS**

The concept of embeddedness arises from the assumption that individuals’ behaviours and economic institutions cannot be understood separately from social relationships, therefore a pure market approach cannot fully rationalise economic action or outcomes (Adler and Kwon, 2002; Granovetter, 1992; Polanyi, 1994). Embeddedness is often used in the study of economic concepts, e.g. cluster networks, and shares a strong link with social capital (Jack and Anderson, 2002; Moran, 2005; Rutten and Boekema, 2007).

The core idea of embeddedness is that social relationships can shape economic actions whereby embedded relationships create (or impede) opportunities, and the position and type

of ties define accessibility (Granovetter, 1985; Uzzi, 1996). Uzzi (1997) underlines three conditions for embeddedness to become a liability: firstly, when there is an unforeseen exit of a core network player; secondly, when institutional forces rationalise the market; and thirdly, when a firm is over-embedded. The first two conditions concern external and uncontrollable conditions, whereas the last concerns an internal factor, where firms are too embedded in a relationship or network.

Similar to excessive social capital, over-embeddedness is also assumed to produce a non-linear relationship. The study of Uzzi (1996) reveals the positive effects of embeddedness decrease at a threshold, as the cost of maintenance and feelings of obligation continue to increase. Consequently, the effect of embeddedness reverses. Likewise, Hagedoorn and Frankort (2008) find a parallel between inter-firm partnership embeddedness and new information gain. At a certain threshold, social embeddedness reaches a maximum value for a new partnership and new information gain falls. Masciarelli et al. (2009) investigate over-embeddedness (combined with structural social capital) at regional level and find a large number of firms are unsuccessful in internationalising markets by having excessive local or regional linkages.

Even so, there is a criticism that social capital is more applicable to the study of business-to-business relationships than the notion of embeddedness. However, in study of the dark side of social capital, over-embeddedness is consistently and interchangeably used. For instance, Adler and Kwon (2002) describe over-embeddedness as one of social capital's risks (the other two being the cost of establishing and maintaining ties and the trade-off between information and power benefits), which hampers the free-flow of novel ideas and innovations that generate externality. Empirically, Presutti et al. (2007) use over-embeddedness to explain the negative impacts of relational and cognitive social capital in relation to knowledge acquisition, as Presutti and Boari (2008) do for knowledge transfer. Molina-Morales et al. (2011) describe an inverted u-shaped relationship between social capital and firm performance as a result of being over-embedded in networks, where social capital turns into a liability and ossifies firms' ability to adapt to the changing environment. Eklinder-Frick et al. (2014) use over-embeddedness to explain the excessive bonding of social capital in cluster networks, and how it harms the innovative environment of cluster firms.

As suggested by Ratajczak-Mrozek (2017, p.88), when discussing embeddedness and relationships, "*it should be borne in mind that sometimes a different concept used in the literature refers to the same phenomena in the real world*". Therefore, although social liability

and over-embeddedness emerge from different disciplines and domains of research, they both refer to the same phenomenon and are used interchangeably when investigating excessive social linkages.

2.4.2 THE NEGATIVE EFFECTS OF SOCIAL CAPITAL

The majority studies that underscore the negative effects of social capital do so as an afterthought when the positive relationship between social capital and outcomes is not found, rather than investigate them directly (Kwon and Adler, 2014) (excepting a few studies e.g. Exposito-Langa and Molina-Morales, 2010; Li et al., 2013; Noordhoff et al., 2011; Wang et al., 2018).

The mechanism of social capital has been criticised for being treated as a ‘black box’ without investigating the specific social mechanisms at play. This leads to confusion about whether social capital is a cause or a consequence of social interaction, and an unjustified focus on the positive effects of social capital (Gamsey and Heffeman, 2005; Huber, 2009; Martin and Sunley, 2003).

The taxonomy presented in Table 2-10 identifies the negative effects of social capital from the literature on innovation, social capital and cluster networks. In the first column, the innovation category includes studies that investigate the relationship between social capital and innovative performance at inter-firm level, but not cluster networks. The various definitions of social capital require particular attention to selecting the studies to be incorporated in the taxonomy. The study selects Maurer and Ebers (2006), Noordhoff et al. (2011) and Li et al. (2016), all of whom perceive social capital as embedded ties rather than structural holes and explore the relationship through Nahapiet and Ghoshal’s (1998) three dimensions of social capital.

In the second column, the negative effects of social capital are drawn from studies that highlight the negative effects of social capital on firm performance and the literature on over-embeddedness and social liability, in order to include the widest range of negative effects (Gargiulo and Bernassi, 1999; Gargiulo and Bernassi, 2000; Uzzi, 1997). Lastly, the third column includes studies of social capital and over-embeddedness in cluster networks, some of which also investigate their relationship to innovation performance (i.e. Molina-Morales and Martinez-Fernandez, 2009).

	Innovation	Negative effects															Cluster					
References																						
Negative effects	Maurer and Ebers (2006)	Noordhoff et al. (2011)	Li et al. (2016)	Grabher (1993)	Portes (1993)	Uzzi (1997)	Gargiulo and Benassi (1999)	Gargiulo and Benassi (2000)	Adler and Kwon (2002)	Edelman et al. (2004)	Lechner et al. (2010)	Villena et al. (2011)	Andersen (2013)	Li et al. (2013c)	Pillai et al. (2017)	Wang et al. (2018)	Hagedoorn and Frankort (2008)	Molina-Morales and Martinez-Fernandez (2009)	Exposito-Langa and Molina-Morales (2010)	Li et al. (2013b)	Eklinder-Frick et al. (2014)	Total count
Cost of maintenance /unnecessary obligation						•	•	•	•	•	•	•	•	•			•	•				11
Inertia	•	○				•	•	•	•			•			•		•	○			•	11
Cognitive lock-in and groupthink	•		•	•				•		•	•				•		•					8
Decision making constraints	•								•	•	○	•	•	•	•	•						8
Dependence-oriented/ inward-looking cultures and exclusion of others			•		•	•			•						•		•			•		7
Redundancy		•				•				•			•		•			•				6
Opportunism		•				•						○					•	•				5
Impeding of novelty knowledge		•						•	•			•			•							5
Loss of objective			•			•				•							•					4
Loss of objectivity		○										○			•							3
Isomorphism			•			•											•					3
Unawareness of necessity to change								•				•						○				3
Opportunity cost							•	•														2
Blurring of firms' boundaries															•							1
Dilution of the dialectic process															•							1
Non-relational escalation of commitment															•							1

● = Negative effect identified from the study ○ = Suggestion for future research

Table 2-10: Taxonomy of studies of innovation, negative effects of social capital and cluster networks

Table 2-10 demonstrates that each study in the taxonomy identifies only a few negative effects, except Pillai et al.'s (2017) systematic review of the negative effects of social capital

and Hagedoorn and Frankort's (2008) literature review on over-embeddedness. This reflects the limited number of negative effects studied. Table 2-11 provides a description of each negative effect incorporated in the taxonomy (Table 2-10).

Negative effect	Description	References
Blurring of firms' boundaries	When resource allocation decisions are influenced by entities outside the firm, its boundaries become blurred	Pillai et al. (2017)
Cognitive lock-in Groupthink	Cognitive lock-in refers to a common worldview or mind-set A mode of thinking actors engages in when they are deeply involved in a cohesive in-group in which actors striving for unanimity override their motivation to realistically appraise alternative courses of action (Janis, 1972)	Grabher (1993) De Clercq et al. (2009); Pillai et al. (2017); Villena et al. (2011)
Cost of maintenance Unnecessary obligation	Similar to other capital, social capital requires maintenance in terms of committed resources (e.g. time, energy) Committing resources and constraining choices beyond what would be optimal	Gargiulo and Benassi (1999); Inkpen and Tsang (2016); Molina-Morales and Martinez-Fernandez (2009); Portes (1998); Westlund and Bolton (2003); Woolcock and Narayan (2000) Edelman et al. (2004); Hagedoorn and Frankfort (2008); Molina-Morales and Martinez-Fernandez (2009); Pillai et al. (2017); Villena et al. (2011)
Dilution of the dialectic process	When actors over-identify with their network partners, social capital	Pillai et al. (2017)

Exclusion of outsiders	hampers synthesis by impeding the generation of antitheses Restriction of excess from outsiders	Edelman et al. (2004); Portes (1998); Uzzi (1997)
Decision making constraints	Restriction on decision-making freedom	Andersen (2013); Li et al. (2013); Jansen et al. (2011; 2013); McFadyen and Cannella (2004); Portes (1998); Villena et al. (2011); Wang et al. (2018)
Inertia/postponement of structural adjustments	A persistent organisational resistance to changing inter-organisational network ties	Gargiulo and Benassi (2000); Hite and Hesterly (2001); Maurer and Ebers (2006); Pillai et al. (2017); Villena et al. (2011)
Isomorphism	A constraining process in which organisations in a population resemble one another when facing the same environmental conditions; institutional isomorphism is where organisations are motivated to adopt prevailing practices to demonstrate social fitness	Capaldo (2007); Eklinder-Frick et al. (2011); Tan et al. (2013)
Impeding of novelty knowledge	Access to new information to innovate is limited	Koka and Prescott (2002); Pillai et al. (2017)
Loss of objective	Original goals are derailed from self-interest	Hagedoorn and Frankfort (2008); Uzzi (1997)
Loss of objectivity	Results from linking business and social relationships and results in the exclusion of potentially beneficial new actors and ideas	Locke (1999)
Non-relational escalation of commitment	The tendency to adhere to a particular course of action even in the face of negative information concerning the viability of that course of action	Pillai et al. (2017)

Opportunity cost	As social actors have limited time and energy, actors ultimately face a trade-off of how much attention they can allocate to each contact	Gargiulo and Benassi (1999; 2000)
Redundancy	A degree of overlap in the knowledge base between two or more social actors	Alder and Kwon (2002); Burt (1992); Edelman et al. (2004); Koka and Prescott, (2002); Noordhoff et al. (2011); Presutti et al. (2007); Pillai et al. (2017); Villena et al. (2011)
Risk of opportunism	Self-interest seeking with guile	Hagedoorn and Frankort (2008); Molina-Morales and Martinez-Fernandez (2009); Noordhoff et al. (2011) Portes (1993); Silkoset (2013); Villena et al. (2016); Uzzi (1997)
Unawareness of necessity to change/ difficulty adapting to change	When firms are unaware and fail to adapt to a changing environment	Gargiulo and Benassi (1999); Villena et al., (2011)

Table 2-11: Description of the negative effects of social capital

Despite the significance of the negative effects presented, not all are integrated in the proposed conceptual model. The negative effects are selected based on their significance and repetition in accordance with the taxonomy (Table 2-10). Further detailed discussion on how social capital causes these negative effects and its relation to innovative performance is given in Chapter 3.

2.4.3 MANAGING THE NEGATIVE EFFECTS OF SOCIAL CAPITAL

Some scholars in this field have suggested how to overcome the negative effects of social capital and over-embeddedness. The mainstream suggestion goes straight to the root of the problem of the balance of strong and weak ties by utilising both bridging and bonding (strong

and weak ties) (Capaldo, 2007; Edelman et al., 2014; Fleming et al., 2007; Gargoyle and Bengasi, 2000; Uzzi and Spiro, 2005) or creating heterogeneous alliance portfolios (Ahuja, 2000; Obstfeld, 2005) to reap the benefits of both weak and strong ties. However, Cuevas-Rodriguez et al. (2014) point out the difficulty of achieving an effective balance between them. Likewise, Staber (2003) points out that this suggestion is not very practical as it does not provide a clear explanation of how to achieve and maintain balance.

Scholars who base their view on task contingencies propose using ties based on the task requirement (Gargoyle and Benassi, 2000; Mizruchi et al., 2011; Molina-Morales et al., 2011; Exposito-Langa and Molina-Morales, 2010; Molina-Morales and Exposito-Langa, 2013). However, the cost of maintaining strong ties is great and might not allow firms to develop weak ties (Li et al., 2013; Molina-Morales and Martinez-Fernandez, 2009). Other scholars raise concern about the cost of finding valuable relationships outside the network (Todo et al., 2016) or that a great diversity of weak ties may create difficulty in developing shared norms, which can keep firms apart and not fully integrated into the relationship (Eklinder-Frick et al., 2011). This underlines the lack of clear practical guidance available in the literature on how to manage the negative effects of social capital.

2.5 CLUSTERS AS RESEARCH CONTEXT

The review of the innovation model shows that innovation is difficult to achieve in isolation. Internal resources and capabilities alone are not sufficient to maximise innovation outcomes in an era of pervasive globalisation. Inter-firm networks are recognised as sources of innovation (Filiari and Algezau, 2014; Iturrioz et al., 2015; Pucci et al., 2017; Yoon et al., 2015). Cluster networks are seen as the ideal inter-firm networks for generating innovation. Evidently, clusters are considered the basis of local and national politics in many countries, and by the institutions of the global economy (e.g. OECD and World Bank) as major tools for innovation and regional development.

A cluster network is defined as “*a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities*” (Porter, 2000, p.54).

The definition of a cluster highlights two key characteristics, geographical concentration and interconnection with other stakeholders. Firstly, the idea of geographical orientation is closely related to the fundamental premise of Marshall’s agglomeration economics, which is also

fundamental to other similar geographical models¹. Close geographical proximity to other firms in the same industry offers positive externalities via: 1) the development and access of a pool of specialised labour that is highly skilled for the specific needs of an industry; 2) non-traded input specific to an industry i.e. firms can experience economies of scale in developing and using common technologies or particular capital infrastructure; and 3) the knowledge spill over effect from the flow of information and ideas (Marshall, 1925). Nevertheless, a quantified scale of appropriate geographical proximity has never been identified. It can range from a single city, to a country or even a network of neighbouring countries. While this allows a generic and non-restive application, the flexibility and unclear territory seems to be problematic in recognising what constitutes a cluster network (Martin and Sunley, 2003).

Secondly, a cluster is an inter-organisational collaborative network of a concentration of competition. It exists as an outcome of links between firms in the cluster, both horizontal (e.g. a particular sector) and vertical (e.g. suppliers and a range of related public institutions such as government institutions, industrial associations or universities), that have related or complementary activities (Porter, 1990; OECD, 2000). Consequently, it usually consists of firms doing more-or-less the same thing or a division of labour that competes but simultaneously cooperates (Inkpen and Tsang, 2005). Co-location also intensifies interactions and facilitates cooperative and collaborate behaviour (Felzensztein et al., 2014). Hence, there is an unusual level of connection in a cluster network which distinguishes a cluster from other traditional economic agglomeration models (Molina-Morales, 2005).

2.5.1 SOCIAL CAPITAL AND INNOVATION IN THE CONTEXT OF CLUSTERS

The previous section demonstrates that the concept of a cluster network evolves primarily from the economic discipline of regional development (Staber, 2007). Subsequently, the majority of social capital studies of cluster networks take place at regional level, where they serve as an intangible factor explaining the positive effects of, for example, economic performance (Knack and Keefer, 1997), innovativeness (Dominics et al., 2013) or innovative capability (Tura and Harmaakorp, 2005). However, the debate about the counterproductive effects of social capital on innovation also exists at a regional level (Cooke et al., 2005; Hauser et al., 2007; Schneider et al., 2000).

¹For instance, the territorial innovative model (TMT) which includes sub-topics such as innovative milieu, technological districts and science parks. However, these concepts are exclusive to highly technological firms and districts.

Nevertheless, social capital at regional level cannot be applied directly at organisational level, as there are several conceptual shortcomings. Firstly, social capital at regional level is considered a property of collectivism in the region. Firms in a cluster are equally advantaged by the presence of external economics and opportunities, regardless of their contribution or social capital. However, at organisational level, the accessibility of resources is not a public asset, it is private and based on social capital (Belso-Martinez and Molina-Morales, 2013; Boschma and Wal, 2007; Chiu, 2009; Gebreeyesus and Mohnen, 2013; Giuliani, 2007; Giuliani and Bell, 2005; Molina-Morales et al., 2014).

Secondly, while recent arguments underscore that innovation is an outcome of social interaction which is actor-oriented, studies at regional level habitually overlook the importance of lower-level actors and fail to provide comprehensive understanding (Belso-Martinez and Molina-Morales, 2013; Gebreeyesus and Mohnen, 2013). Moreover, the study of the socio-cultural aspects of social capital is best understood from individual actors' points of view (Eklinder-Frick et al., 2014; Huber, 2009; Rutten and Boekema, 2007).

Table 2-12 shows the relationship between social capital and firm innovation in the context of clusters of firms. Similarly to other inter-firm contexts, there is an inconsistent relationship. Those studies that demonstrate negative effects or an inverted u-shaped relationship suggest that an excess of social capital can produce adverse effects on cluster firms' innovation performance (Maurer and Ebers, 2006; Presutti et al., 2007; Molina-Morales and Martinez-Fernandez, 2009; Molina-Morales et al., 2011; Ozer and Zhang, 2014; Ruiz-Ortega et al., 2016; Yu, 2013). Felzensztein et al. (2014) and Ruiz-Ortega et al. (2016) indicate that firms in cluster networks tend to report greater levels of the activities that reinforce social capital than non-cluster firms. According to Molina-Morales (2005) and Western et al. (2005), clusters can be characterised as cohesive, dense, with strong ties, and having interactions governed by norms of reciprocity, trust and shared cognition. Social capital is often perceived as a social glue that holds cluster members together and creates coordination (Staber, 2007; Porter, 1998). Consequently, there is an unusual level of embeddedness in cluster networks (Huber, 2009; Inkpen and Tsang, 2005; Lin, 2002; Molina-Morales and Martinez-Fernandez, 2010; Ruiz-Ortega et al., 2016). While these characteristics may provide advantages, they may also trap firms in their own networks (Molina-Morales and Martínez-Fernández, 2009). The advantages that stem from cluster dynamics are not permanent. In fact, the failure of clusters seems to be caused by factors that were advantages in the past but no longer provide the same benefits while the cost remains the same (Elola et al., 2012; Martin and Sunley, 2006).

Author	Innovation	Social capital		Relationship	Research context	Data	Spatial consideration
		Dimension	Sub-construct				
Bell (2005)	Product innovation	Structural	Centrality	Positive	Investment Funds Institute of Canada members	Survey involving 77 executives	Geographical proximity
Presutti et al. (2007)	Knowledge acquisition	Structural	Network ties	Positive	High-tech start-up cluster firms in Italy	Survey involving 107 entrepreneurs	Not examined
		Relational	Relationship quality	Negative			
		Cognitive	Social interaction				
Chiu (2009)	Product and process innovation	Structural	Centrality	Positive	Optoelectronics cluster firms in southern Taiwan	Questionnaire involving 18 general managers or R&D managers	Not examined
Molina-Morales and Martinez-Fernandez (2009)	Product and process innovation	Structural	Social interaction	Inverted u-shaped	Manufacturing e.g. food, textile, furniture, ceramic, leather, chemical products, machinery and paper firms in Spain	Questionnaire involving 154 managers	Geographical and technological proximity
		Relational	Trust	Inverted u-shaped			

Molina-Morales and Martinez-Fernandez (2010)	Product and process innovation	Structural	Social interaction	Positive	Manufacturing e.g. ceramic tiles, shows, furniture, toys, textiles district firm and non-member in Spain	Questionnaire involving 220 managers	Geographical proximity
		Relational	Trust				
		Cognitive	Shared vision				
Molina-Morales et al. (2011)	Product, process and organisational innovation	Relational	Trust	Inverted u-shaped	Manufacturing e.g. food, textile, furniture, ceramic, leather, chemical products, machinery and paper firms in Spain	Questionnaire involving 156 managers	Not examined
Gebreeyesus and Mohnen (2013)	Product and process innovation	Structural	Network ties	Positive	SMEs in a footwear cluster network	Survey involving 153 owners or managers of SMEs	Not examined
Cuevas-Rodriguez et al. (2014)	Product innovation	Relational	Trust Cooperation Degree of commitment Shared goals, interest and vision	Positive	Manufacturing and services firms in a cluster network	Survey involving 142 managers	Not examined

Ozer and Zhang (2015)	Product innovation	Structural	Network ties	Positive (exploitative innovation)	Manufacturing and technology firms in a cluster network in China	Surveys involving 143 senior or mid-level managers	Not examined
				Negative (exploratory innovation)			

Table 2-12: Summary of previous studies of social capital and innovative performance in the context of cluster networks

2.5.2 PROXIMITY DIMENSION

Scholars from socioeconomic disciplines suggest the existence of ‘territorial’ or ‘spatial’ dimensions in social networks (Martin, 1994; Staber and Lorenzen, 2007). For instance, Presutti and Boari (2008) highlight that space and social capital are reciprocal. Despite the internet era, humans are ‘spatially sticky’, i.e. connected to the specific places where they live or work (Rutten et al., 2010).

However, as shown in Table 2-12 only a few studies incorporate spatial consideration into the study of social capital and innovation in cluster networks, even though geographical concentration is one of the main characteristics of cluster networks and recognised as shaping structural social capital (Molina-Morales and Martinez-Fernandez, 2010). The theoretical discussion of Rutten et al. (2010) on the proximity dimension of social capital shows that all three dimensions of social capital are, in fact, spatially sticky. Huber and Fitjar (2016) agree that spatiality should be integrated into the understanding of relationships between actors. However, this area of study is still much underdeveloped (Boschma and Frenken, 2010). The proximity dimension is largely neglected and considered a set of theoretically vague residuals or statistical noise, instead of the groundwork for more sophisticated multivariate and multilevel theorising on the implications of the creation, development and consequences of social capital (Molina-Morales et al., 2013; Staber, 2007; Whittington et al., 2009), which might justify the inconsistency in the study of social capital (Staber, 2007).

Conversely, in the literature on proximity, there is another type of proximity which is influenced by close geographical proximity and affects relationships or network formation (Boschma, 2005; Knobben and Oerlemans, 2006). The following section introduces the concept of proximity, which is employed as a proximity dimension in the next chapter.

2.5.2.1 PROXIMITY

Proximity is the degree of homophily or closeness between actors (Boschma, 2005). The underlying idea of proximity’s effect on network or relationship formation is that individuals and organisations prefer to establish relationships with similar individuals and organisations (Boschma and Frenken, 2010; Boschma, 2005). There are various classifications of proximity (e.g. Knobben and Oerlemans (2006) classify seven dimensions). This research adopts Boschma’s (2005) classification, as do most contributors (e.g. Broekel and Boschma, 2012; Davids and Frenken, 2018; Fitjar et al., 2016; Glades et al., 2015; 2017; Lazzertti and Capone,

2016) which limits proximity to five dimensions, geographical, technological, social, organisational and institutional. Due to the complementary and substitute effects between dimensions of proximity, it is vital to include all five dimensions of proximity to avoid missing the precise effect (Fitjar et al., 2016; Huber, 2012). All five dimensions are believed to contribute to innovation (Boschma, 2005).

- Geographical proximity

Geographical proximity refers to the spatial distance between social actors (Boschma, 2005). Table 2-12 shows that geographical proximity is the most studied proximity in terms of social capital and innovation relationships in cluster networks. Geographical proximity is believed to facilitate the opportunity for frequent, face-to-face, personal interactions and cooperative behaviour, and subsequently shape the strength of ties and network density (Molina-Morales et al., 2013; Rutten et al., 2010) and foster an environment of knowledge exchange and transfer (Broekel and Boschma, 2011; Laursen et al., 2012).

Nevertheless, there is an argument that co-location alone does not always have the effect of knowledge acquisition, knowledge diffusion, innovative performance (Capone and Lazzarotti, 2018; Gebreyesus and Mohnen, 2013; Knobens and Oerlemans, 2012) or social relationships (Ben Letaifa and Rabeau, 2013; Rallet and Torre, 2005). This inconclusive finding on the effect of geographical proximity advocates a comprehensive understanding of other proximities (Boschma, 2005; Molina-Morales et al., 2014). While the role of geographical proximity on social relationships and innovation is uncertain, it is universally agreed that it has a role in building other forms of proximity (Boschma, 2005; Fitjar et al. 2016; Molina-Morales et al., 2014; Presutti et al. 2013).

- Cognitive or technological proximity

Some definitions and understandings of cognitive proximity overlap with cognitive social capital. For instance, Wuyts et al. (2005 p.278) define cognitive proximity as “*similarity in the way actors perceive, interpret, understand and evaluate the world*”. Empirical studies that adopt this definition (e.g. Molina-Morales et al., 2014). use the same measurements as for the cognitive dimension of social capital (i.e. shared goals and shared culture). In order to avoid confusion, cognitive proximity in this study is called ‘technological proximity’, as in the study of Knobens and Oerlemans (2006), and technological proximity is defined as the extent which two actors or organisations share experience and a knowledge base (Boschma, 2005). This postulates a clearer distinction between cognitive social capital and technological proximity. While cognitive social capital concentrates on ‘how’ actors interact, this dimension of

proximity focuses on ‘what’ they exchange, and the potential value of these exchanges based on the knowledge already possessed by a firm (Boschma, 2005; Knobens and Oerlemans, 2006). Since this dimension is directly associated with knowledge, it is sometimes recognised as being more important than geographical proximity in encouraging innovation (Geldes et al., 2017, 2015 Marrocu et al., 2011; Mattes, 2012).

Similarity in knowledge possessed is recognised as a prerequisite for exploring and exploiting novelty knowledge and opportunities. Collaboration, cooperation and collective learning are easier to achieve if the members of the network have close technological proximity (Faerman et al., 2011; Geldes et al., 2017) as this enables them to understand each other, using ‘a common interpretative scheme’ (Markusen, 1996). This can refer to the idea of ‘absorptive capacity’ which is understood as “*the ability to recognise the value of new external knowledge, assimilate it and apply it to commercial ends*” (Cohen and Levinthal, 1990, p.128). Firms with close technological proximity are able to communicate, understand, process and incorporate novel knowledge more easily and efficiently (Balland et al., 2016; Cantu, 2010; Hervás-Oliver et al., 2012; Huber, 2012; Lazzaretto and Capone, 2016; Nooteboom et al., 2007).

- Social proximity

Social proximity is defined as “*socially embedded relations between agents at the micro-level*” (Boschma, 2005, p.66). This dimension considers the relational side of proximity, and is rooted in the embeddedness literature (Granovetter, 1985). It is closely related to the idea of strength of ties. According to Boschma (2005) close social proximity stimulates the exchange of tacit knowledge and interactive learning due to socially embedded relationships.

- Organisational proximity

The definition of organisational proximity suffers from concept ambiguity. Originally, Boschma (2005) defined it as the extent to which two organisations are under common hierarchal control and the degree of autonomy that can be exerted in organisational arrangements, within or between operations, e.g. whether they belong to the same organisational entity such as subsidiaries or joint ventures (Balland, 2012 supported by Davids and Frenken, 2018). Boschma’s (2005) definition focuses on the intra-organisational, whereas Broekel and Boschma (2012) define organisational proximity as the degree to which organisations have similar routines and incentive mechanisms e.g. organisational structure, culture, performance measurements system etc. Close organisational proximity allows an executable capability for repeated interaction and collaboration (Knobens and Oerlemans,

2006). Hence, scholars often adopt the number of research collaborations (Oerlemans and Meenus, 2005) or prior experiences with partners (D'Este et al., 2006) as measurements.

- Institutional proximity

While, social proximity is defined in terms of socially embedded relations between agents at the micro level, institutional proximity is associated with institutions at the macro level. Institutional proximity is understood to be “*the set of common habits, routines, established practices, rules or laws that regulate the relations and interactions between individuals and groups*” (Boschma, 2005, p.68). It focuses on whether firms are exposed to the same institutional contexts, both informal institutions (e.g. sharing common norms, social values and routines) and formal institutions (e.g. legislative conditions, business practices, labour relations, accounting rules, training systems (Knoben and Oerlemans, 2006) and laws (Balland et al., 2013; Boschma, 2005; Geldes et al., 2015: 2017)). Close institutional proximity provides a stable condition for interactive learning and knowledge transfer to take place effectively and thus innovative performance (Boshma, 2005; Molina-Morales et al., 2015).

According to Rodriguez-Pose and Crescenzi (2008, p.54) “*innovation can be regarded as a territorially embedded process and cannot be fully understood independently of the social and institutional conditions of every space*”. This study aims to incorporate proximity both geographical and non-geographical (expect social proximity which overlaps with embeddedness) as the proximity dimension of social capital in order to understand its effect on social capital and innovative performance.

2.6 GAPS IN THE LITERATURE

The review of the literature shows that social capital is widely recognised as a multidimensional concept (Nahapiet and Ghoshal, 1998). Only a few studies incorporate all three dimensions of social capital and innovation performance at the inter-firm level (e.g. Lefebvre et al., 2016; Li et al., 2013(b); Li et al., 2014; Li et al., 2016; Presutti et al., 2007; Ruiz-Ortega et al., 2016; Tsai and Ghoshal, 1998; Zheng, 2010). The majority of studies are inclined towards a structuralist perspective, in which relational and cognitive social capital receive less attention (e.g. Burt, 1992; Bell, 2005; Ozer and Zhang, 2014; Shu et al., 2012; Tan et al., 2015; Yu, 2013). When social capital is grouped as a single index, the explanatory power is lost and this can hinder the reaching of a satisfactory or definitive conclusion (Echebarria and Barrutia, 2013; Franke, 2005; Garcia-Villaverde et al., 2018; Inkpen and

Tsang, 2016; Lechner et al., 2010; Li et al., 2016; Zheng, 2010). As each dimension of social capital plays a different role in explaining social capital, and may produce a different effect, disregarding any dimension could lead to an incomplete or biased understanding of social capital (Beugelsdijk and Van Schaik, 2005; Hauser et al., 2007; Lee and Jones, 2015).

Furthermore, some studies do not empirically investigate the sub-dimensions of social capital (e.g. Li et al., 2016) or investigate only a few sub-dimensions (e.g. Bell, 2005) only centrality (Ozer and Zhang, 2014) or only network ties (Shu et al., 2012). Lefebvre et al. (2016) and Wang et al. (2018) suggest that empirical investigations should be broadened to the sub-dimensions of social capital.

While the number of studies that incorporate all three dimensions of social capital is limited, there are even fewer studies that investigate the interrelations between the three dimensions of social capital (Castro and Roldan, 2013; Inkpen and Tsang, 2005; Lee, 2009; Lechner et al., 2010; Villena et al., 2011; Weber and Weber, 2001), even though the original conceptual framework suggests they are highly interrelated (Nahapiet and Ghoshal, 1998). Section 2.3.2.4 reviews the studies that respond to the call on this issue, although the findings conflict and the interrelationships remain unclear.

The review of the relationship between social capital and innovative performance shows mixed findings, with positive, negative and inverted u-shaped relationships (as shown in Table 2-8). The majority of the studies focus on the positive outcomes of social capital. However, the emerging findings of inverted u-shaped relationships between social capital and innovation indicate that social capital is a necessary condition for innovation, although, once social capital becomes excessive, it can produce adverse effects and impede innovation (Li et al., 2016; Molina-Morales and Martinez-Fernandez, 2009; Molina-Morales et al., 2011; Ozer and Zhang, 2014; Weber and Weber, 2011; Yu, 2013). Subsequently, there is a need to be acutely aware of both the positive and negative aspects of social capital prior to using social capital, and to work actively to avoid its potentially deleterious effects (Edelman et al., 2004). Nevertheless, the negative effects of social capital are overshadowed by the overwhelmingly positive effects of social capital. There is, generally, a lack of studies that investigate the dark side of social capital (Carey et al., 2011; Galunic et al., 2012; Gedajlovic et al., 2013; Kwon and Adler (2014); Li et al., 2013(b); Li et al., 2016; Villena et al., 2011; Molina-Morales et al., 2011).

There is an increasing amount of study of the dark side of social capital (e.g. Li et al., 2013; Pillai et al., 2017; Wang et al., 2018). While these studies provide fruitful knowledge and open a new arena of research, when closely examining these studies, the negative effect is largely employed to explain non-positive outcomes rather than used as an investigating factor. Huber (2009) and Rutten et al. (2010) criticise social capital's scholars for often providing limited explanation of the interplay mechanisms of social capital and the outcomes of the study, consequently restricting the understanding of what is going on inside the 'black box'. Only a few of the studies directly investigate the mechanism of the negative effects, and they are often restricted to one or two negative effects (e.g. Noordhoff et al., 2011; Wang et al., 2018). Furthermore, even though, the multidimensional nature of social capital is well recognised, not all studies incorporate multiple dimensions of social capital (e.g. De Clercq et al., 2009; Exposito-Langa and Molina-Morales, 2010; Molina-Morales and Martinez-Fernandez, 2009). Consequently, to fill the gaps, this research investigates the under-researched causes and mechanisms of the negative effect of social capital. Understanding of the causes of the negative effects can provide better understanding and management of those effects (Belso-Martinez and Molina-Morales, 2013).

In cluster studies, excessive social capital or over-embeddedness is already recognised as one of the causes of cluster decline (Alberti, 2006; Poudier and St John, 1996; Uzzi, 1997). As clusters evolve from economic, geographical and regional studies, the studies often appear at regional level which does not directly transfer to an organisational level of study (Pillai et al., 2017). The study of social capital and innovation at the organisational level is most suitable at an actor-based level, where innovation takes place (Belso-Martinez and Molina-Morales, 2013; Gebreeyesus and Mohen, 2013). However, Table 2-12 shows that there is limited number of studies at the actor-based level and the studies undertaken that address this level largely use the same sample and context of study, which might restrict the generalisability of the findings.

Along with an unusual level of embeddedness, geographical concentration is another prominent characteristic of cluster network. According to Rutten et al. (2010), geographical proximity influences the three dimensions of social capital. As discussed in Section 2.5.2, proximity is an essential factor that underlies the unique contextual environment and network characteristics of clusters. However, most studies do not incorporate spatial proximity (Table 2-12) and neglect the understanding of geographical proximity as a social phenomenon that extends from a purely physical phenomenon (Giuliani, 2007, 2008).

Section 2.5.2.1 on proximity indicates there are other dimensions of proximity apart from geographical proximity which are recognised as important prerequisites to agents becoming connected and sharing or exchanging knowledge, which enhances innovative performance (Balland, 2012; Boschma, 2005; Lazzeretti and Capone, 2016; Molina-Morales et al., 2015). However, the idea of a ‘paradox of proximity’ (i.e. a high level of proximity producing an adverse effect) brings into doubt the role of proximity (Boschma and Frenken, 2010; Capone and Lazzeretti, 2018; Fitjar et al., 2015) and empirical study remains scarce (Huber, 2012).

Hence, there is still limited knowledge on how proximity influences social capital or how geographical orientation and social structure mutually determine organisational outcomes in cluster networks (Whittington et al., 2009). The role of proximity remains an area for research in social capital study (Kwon and Adler, 2014; Di Vincenzo et al., 2014).

Table 2-13, below, summarises the research gaps in the normative literature on the social capital and innovation performance of clusters.

Research gap	References
a) Negative effects of social capital	
There is a need for further research into the negative consequence associated with social capital	Galunic et al. (2012); Gedajlovic et al. (2013); Kwon and Adler (2014); Li et al. (2013); Li et al. (2016)
A challenge for future research is to identify the ‘degree’ to which the dark side is prominent and the turning point of social capital’s effect	Li et al. (2013); Pillai et al. (2017)
b) Gaps in the conceptual model framework of social capital	
Scholars often treat social capital as a black box without explaining the respective mechanisms in play	Camps and Marques (2014); Huber (2009); Rutten et al. (2010)
There is a lack of a framework that incorporates multidimensional social capital and the interrelation of the multiple dimensions of social capital	Echebarria and Barrutia (2013); Lefebvre et al. (2016); Li et al. (2016); Ruiz-Ortega et al. (2016); Castro and Roldan et al. (2013); Villena et al. (2011); Wang et al. (2018)
c) Cluster networks	

There is lack of the study of the negative effects of over-embeddedness in cluster networks	Huber (2009); Molina-Morales and Martinez-Fernandez (2010); Noordhoff et al. (2011)
A significant proportion of empirical studies fail to emphasise the importance of the spatial or territorial dimensions of social capital Empirical study is needed of the role of proximity in defining social capital	Huber and Fitjar (2016); Rutten et al. (2010) Di Vincenzo et al. (2014); Kwon and Adler (2014)
There is a need to clarify the role of proximity on innovative performance and why certain types of proximity can be beneficial or harmful to innovative performance	Boschma and Frenken (2010); Fitjar et al. (2016)

Table 2-13: Research gaps

From these research gaps, there is an indisputable need to investigate the negative effects of social capital. Therefore, this study draws on the literature of social capital, innovation and cluster networks to elucidate the negative effects of social capital on innovative performance of firms in cluster networks, by investigating the negative effects of social capital identified in Table 2-10, and examining the influence of the three dimensions and the proximity dimension, on innovative performance of firms in cluster networks.

This research addresses the above gaps and contributes to the knowledge of the academic community and practitioners by re-examining the more-is-better approach, which has dominated research into social capital and innovation to date and exploring the alternative argument of social capital (Cuevas-Rodríguez et al., 2014).

2.7 CHAPTER SUMMARY

This chapter presents a critical review of the literature pertinent to the research areas of interest and offers a deep and detailed treatment of the theoretical foundation of this study. The review of the literature is a fundamental step in the process of conducting the research.

The chapter firstly discusses innovation as the performance indicator of the study. It underlines why networks play a large role in contributing to the innovative performance of firms and

clarifies the definition used in the investigation. Then, social capital is introduced and emphasised, particularly Nahapiet and Ghoshal's (1998) three dimensions of social capital as a theoretical lens through which to study the relationship between social capital and innovation. The review of existing studies presents inconclusive findings on the relationship between social capital and innovation as well as the lack of study of the negative effects of social capital. Lastly, the unique characteristics of cluster networks, which is the context of the study, are introduced and explored in relation to social capital and innovation. The existing studies of the three constructs, innovation, social capital and cluster networks, demonstrate the need for further investigation into the relationship between social capital and innovation in cluster networks. The following chapter develops the conceptual model that addresses the gap between these three constructs.

Chapter 3 DEVELOPMENT OF THE CONCEPTUAL MODEL

3.1 INTRODUCTION

The review of the literature in the previous chapter demonstrates inconsistency in the relationship between social capital and innovative performance, where social capital can both stimulate and impede innovation. While study of the positive effects of social capital is well acknowledged, the dark side of social capital receives far less attention. This underlines a dearth of theoretical models and frameworks that explore the deleterious side of social capital and an important need to investigate the negative effects of social capital on cluster firms' innovative performance.

Miles and Huberman (1994, p.13) describe a conceptual model as “*a visual or written outcome that explains either graphically or in narrative form, the main objects that need to be studied, the key factors, concepts or variables and the presumed relationships among them*”. Therefore, drawing on the literature, both the empirical findings and the theoretical perspective proposed in this chapter aim to establish a conceptual model that addresses the negative consequences of social capital on innovative performance. The central premise of this conceptual model places emphasis on the negative consequences of social capital on cluster firms' innovative performance which deviates from the study of the purely positive effects. The conceptual model seeks to offer a better understanding of how social capital can impede cluster firms' innovative performance in order to manage and/or mitigate the negative effects.

This chapter consists of an overview and justification of the three dimensions of social capital and proximity as theoretical groundings of the conceptual model, which is presented in Section 3.2. It addresses why it is appropriated to combine two conceptual frameworks with four dimensions of social capital to study the negative effects of social capital on innovative performance in cluster networks. In Section 3.3, the presumed relationships between the four dimensions of social capital, the negative effects of innovation and the interrelationship between the dimensions are provided. Section 3.4 addresses the mechanism of the negative effects, and how the negative effects identified can impede the innovative performance of cluster firms. A summary of the contribution of the conceptual model is provided in Section 3.5 and the conclusion of the chapter is presented in Section 3.6.

3.2 CONCEPTUAL MODEL

The proposed model aims to address the causes, mechanisms and negative effects of social capital on innovative performance in cluster networks. The modelling of this research addresses the lack of a conceptual model in order to investigate the negative effects of social capital.

The proposed model links three constructs within the context of cluster networks, thereby aiding investigation into the effects of social capital within cluster networks, enhancing the understanding of the mechanisms by which proximities influence social capital, and generating consistent findings.

The existing literature suffers from ambiguity, as studies only incorporate a limited number of social capital-related aspects while missing out other dimensions, failing to accurately detail interrelating factors. The proposed conceptual model investigates social capital as an antecedent to negative effects through four dimensions of social capital where social capital theory reconciles with proximity.

This draws on the original dimensions of social capital set out by Nahapiet and Ghoshal (1998), in addition to the proximity dimension. As the existing literature indicates, establishing multiple dimensions of social capital (i.e. structural, relational and cognitive) provides a more accurate depiction of the potency of the relationship and can lead to the development of richer and more accurate theory (Ruiz-Ortega et al., 2016). Several scholars adopt this as the theoretical lens through which to investigate the negative effects of social capital (e.g. Lechner et al., 2010; Villena et al., 2011; Wang et al., 2018).

The additional proximity dimension is included in response to the labelling of this element as lacking the characteristics of network studies (Boschma and Frenken, 2010; Huber and Fitjar, 2016; Rutten et al., 2010). As discussed in Section 2.5.2, social capital is not independent from its context (Tura and Harmaakorpi, 2005), which scholars from socioeconomic disciplines suggest involves the existing territorial or proximity dimensions of social networks (Staber and Lorenzen, 2007). A cluster is a collection of organisations aligned in terms of geographical location and social structure. By incorporating the proximity dimension from the literature that discusses proximity, the characteristics of cluster networks derived from geographical concentration (which also affect other forms of proximity) are revealed. The concept of proximity is used to explain how both geographical and non-geographical elements influence

the network formation/relationship building process (Lazzeretti and Capone, 2016) and serve to contextualise the investigation into how context influences social capital. Although, both social capital and proximity have been examined in the context of clusters, often separately however, the majority of studies focus either on the relationship between social capital and innovation, or the relationship between proximity and innovation. However, proximity alone without consideration of social structure cannot explain innovation performance and social capital cannot be separated from the spatial context (Whittington et al., 2009; Rutten et al., 2010). Therefore, the proposed conceptual model adds the proximity dimension to the existing three dimensions of social capital in order to address this gap. The definition of social capital adopted in this research concerns the way organisations access the resources derived from relationships (Huber, 2009; Lin, 2002). In other words, proximity can be considered a social capital dimension, as it influences the formation of relationships and therefore access to actual and potential resources.

Developed from the literature covered in Section 2.4.2, identification of the negative effects of social capital is indispensable for objectively understanding the mechanisms by which these effects manifest, thereby enabling firms to overcome effects that impede innovation. These negative effects are drawn from the literature regarding the three aforementioned constructs. Consequently, a comprehensive taxonomy of the negative effects of social capital is developed in the manner referred to in Table 2-10 (Section 2.4.2).

Therefore, bringing together these dimensions under one conceptual model fits logical conventions. The model is segmented to meet the aims and objectives of the research and allows the research to probe further into social capital, with consideration of the contextual traits of clusters that lead to over-embeddedness and restricted innovative performance.

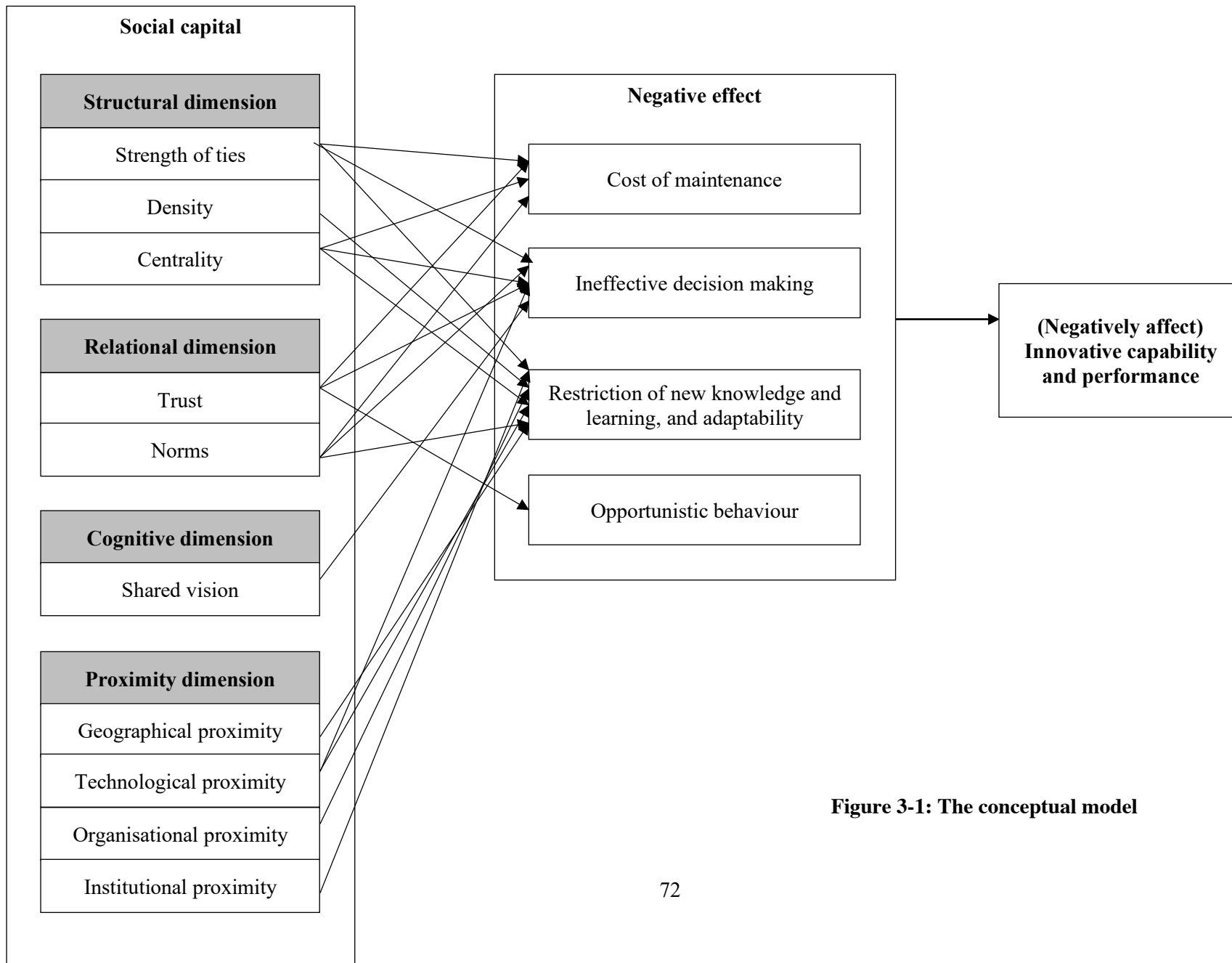


Figure 3-1: The conceptual model

The proposed model incorporates four dimensions of social capital and the negative effects of social capital on innovative performance. Despite the lack of straightforward empirical research in this area of study, delving into the previous literature provides a theoretical perspective that validates the relationship.

Figure 3-1 depicts an overview of the proposed conceptual model, which consists of two main parts (from left to right):

- The four dimensions of social capital are adopted to investigate the network characteristics that can cause negative effects. The three dimensions of social capital set out by Nahapiet and Ghoshal (1998) are adopted, along with the concept of proximity (Boshma, 2005) as a proximity dimension. The proximity dimension reflects the context of clusters, which can influence firms' levels of social capital and innovative performance, leading to a comprehensive understanding of the antecedents and processes by which negative effects are manifest when over-embeddedness occurs. The four dimensions of social capital are used to delineate the social capital of firms within cluster networks in relation to negative effects that can impede innovative performance.
- The second portion of the model emphasises how the negative effects, drawn from the taxonomy (Table 2-10) impact the innovative performance of cluster firms. This allows the mechanism of negative effects to be examined. Identifying the adverse effects should increase awareness of the dark side of social capital, helping relevant institutions and regional policy makers better manage negative effects.

This conceptual model attempts to provide a holistic understanding of the negative effects of social capital on innovation, as well as paving the way for the empirical study in a later chapter.

3.3 NEGATIVE EFFECTS OF THE FOUR DIMENSIONS OF SOCIAL CAPITAL

This section describes the first portion of the conceptual model. The presumed relationships between cluster firms' four dimensions of social capital and the negative effects are presented. The section begins with the proximity dimension, which is assumed to influence the other three dimensions, followed by the structural, relational and cognitive dimensions, respectively, and the interrelationships between the four dimensions.

3.3.1 NEGATIVE EFFECT OF THE PROXIMITY DIMENSION

The proximity dimension, additional to Nahapiet and Ghoshal's (1998) original three dimensions of social capital, reflects the geographical concentration of cluster networks. Geographical proximity can affect the formation of organisational relationships and innovation (Boschma, 2005). Study of economic geographies highlights that geographical proximity should not be understood as a purely physical phenomenon but as a social phenomenon (Giuliani, 2007, 2008; Sayer, 2000). Simultaneously, network study recognises the spatial dimension, where social networks can be influenced by geographical distance (Huber, 2009; Rutten et al., 2010). The overlap between these two notions underlines the need to investigate the role of geographical proximity on the social network.

The review of the literature shows that geographical proximity is a given condition, making proximity more than just a geographical feature (Cantu, 2010). Boschma (2005) indicates that geographical proximity can encourage other non-spatial proximities such as technological, social, organisational and institutional proximity. These proximities are also recognised to boost network formation and may explain innovative capability and performance better than geographical proximity itself (Jespersen et al., 2017; Huber and Fitjar, 2016; Letaifa and Rabeau, 2013; Mattes, 2012; Molina-Morales et al., 2014). Therefore, the spatial dimension of social networks is added to investigate the effect of geographical proximity and non-spatial proximity on social capital.

Recent research on the paradox of proximity questions the undesirable side of the influence of proximity on innovation (Boschma and Frenken, 2010; Capone and Lazzeretti, 2018; Fitjar et al., 2015). Subsequently, the conceptual model employs geographical, technological, organisational and institutional proximity as sub-constructs of the spatial dimension in order to investigate the role of proximity on social capital as well as its potential negative effects on innovation in cluster firms. Social proximity is not included in the model as it overlaps with strength of ties in the structural dimension (Balland et al., 2015; Boschma, 2005; Fitjar et al., 2016). Figure 3-2, below, illustrates the relationship between the spatial dimension and negative effects.

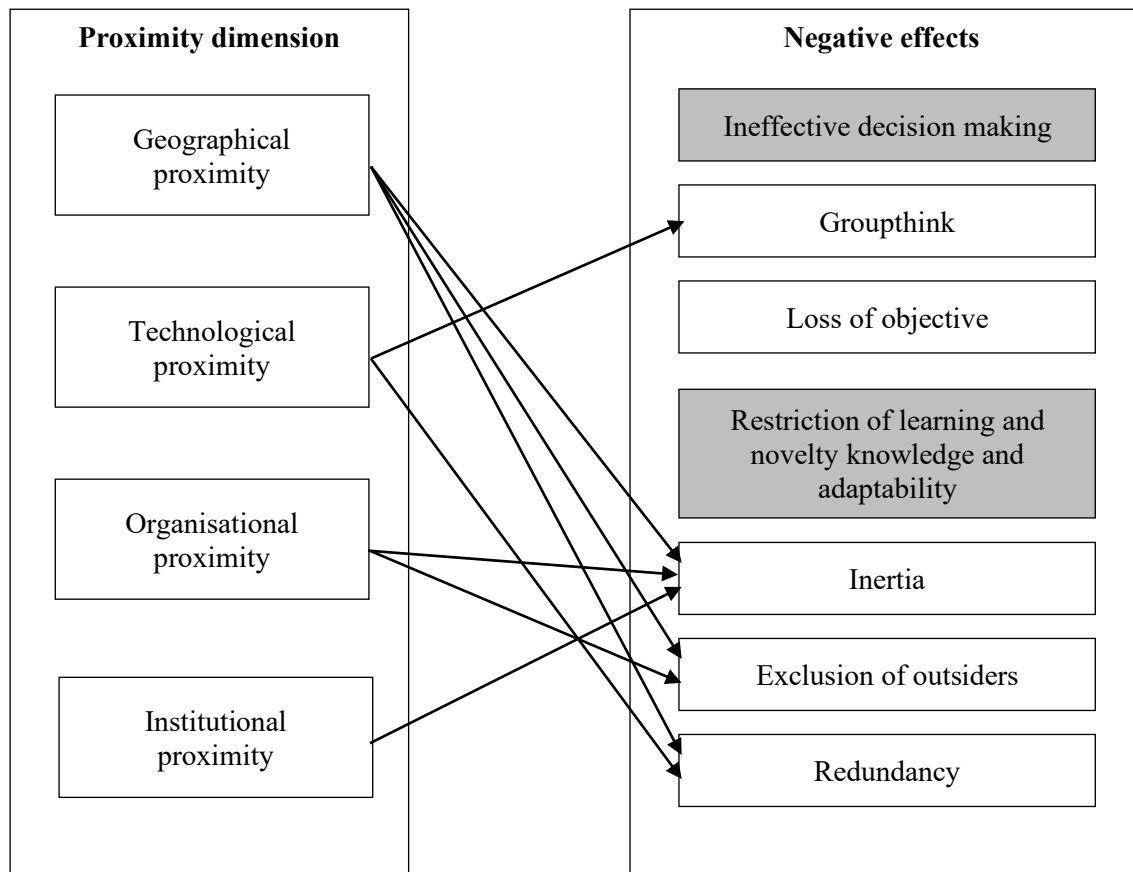


Figure 3-2: The negative effects of the spatial dimension on social capital

3.3.1.1 GEOGRAPHICAL PROXIMITY

Geographical proximity concerns the physical distance between members of a cluster network (Boschma, 2005). Co-location of cluster members is a unique characteristic of cluster networks, where members are advantaged by positive externalities and opportunities for network or relationship formation (Inkpen and Tsang, 2005). The short physical distance provides opportunities for frequent, face-to-face interactions which are the foundation of intimate and dense relationships (Balland, 2012; Hervas-Pliver et al., 2018; Lazzeretti and Capone, 2016) along with an environment of trust and norms of reciprocity (Todo et al., 2016). Co-located firms are recognised as having the advantage of diffusion of knowledge and knowledge transfer through cluster networks (Broekel and Boschma, 2011).

The advantages that come from positive externalities and strong links between members are assumed to encourage a tendency to ignore others that are more geographically distant and prioritise relationships in close locations (Boschma, 2005). This generates an inward-looking culture or spatial lock-in effect which jeopardises cluster firms from accessing potential new contacts. Consequently, cluster firms have adaptability and opportunity threats (Boschma, 2005; Giuliani and Bell, 2005). This can mean that non-cluster firms might gain more

advantage as they are free from this restricted adaptability (Molina-Morales et al., 2014). This also produces side effects such as knowledge redundancy, especially when there is no injection of novel information or knowledge from outside the boundary of the cluster members. Knowledge circulates strongly and quickly within clusters, because of co-location, strong links and dense networks, but more easily becomes redundant. Consequently, this reduces the positive effect on innovation to the point where it barely provides more advantage than for non-cluster firms (Ruiz-Ortega et al., 2016). Therefore, in agreement with previous studies, geographical proximity can impede the innovation performance of firms in cluster networks (Capone and Lazzeretti, 2018; Gebreyesus and Mohnen, 2013; Knoblen and Oerlemans, 2012).

3.3.1.2 TECHNOLOGICAL PROXIMITY

Technological proximity refers to the extent which two actors share experience and a knowledge base (Boschma, 2005). Technological proximity sometime equals the diversity of the actors in a network (Faerman et al., 2011; Vlasisavljevic et al., 2016). Broekel and Boschma (2012) argue that innovation requires an optimal level of technological proximity. According to their absorptive capability, firms must occupy certain levels of technological proximity in order to communicate, understand, explore and exploit novel information and create an end product (Cohen and Levinthal, 1990). Yet, this should leave enough room for new information and knowledge to be exchanged between actors, and not expose them to redundancy (Cantu, 2010; Hervas-Oliver et al., 2012; Huber, 2012; Lazzeretti and Capone, 2016).

The criteria of commonality and complementary between cluster members and their co-location, makes cluster firms more likely to be similar to one another and be characterised by homogenous knowledge (Boschma, 2005). This implies a low level of diversity in the network, and homogenous knowledge means firms might already have the same knowledge, so being in the cluster might not provide new information (Todo et al., 2016). Innovation is inhibited since the possibilities of new combinations of existing knowledge may be exhausted (Vlasisavljevic et al., 2016; Yu, 2013). Furthermore, firms may suffer from groupthink as they may prefer to connect with people who share similar knowledge and restrict the consideration of alternative courses (De Clercq et al., 2009). Thus, cluster firms can be trapped in a dilemma, where technological proximity is a prerequisite for knowledge transfer, especially tacit knowledge, but it can reduce the diversity of the actors' knowledge and promote groupthink and redundancy (Cantu, 2010; Hervas-Oliver et al., 2012; Huber, 2012; Lazzeretti and Capone, 2016; Nooteboom, 2000).

3.3.1.3 ORGANISATIONAL PROXIMITY

Organisational proximity and institutional proximity are the least studied of the five dimensions of proximity, as they suffer from being ambiguous, especially organisational proximity (Huber, 2012; Knobens and Oerlemans, 2006). Some scholars interpret organisational proximity as similarity of autonomy and control between firms² (Balland, 2012; Boschma, 2005), but this study interprets organisational proximity as the degree to which cluster firms have similar routines and incentive mechanisms (e.g. organisational structures, performance measurement systems etc.) (Broekel and Boschma, 2012; Knobens and Oerlemans, 2006) by examining the number of past collaborations and previous experiences of (business) interaction. This is in the same vein as other scholars in the context of cluster networks (D'Este et al., 2006; Geldes et al., 2017; Oerlemans and Meenus, 2005). This measurement demonstrates how similar business routines and incentive mechanisms encourage repeat business, informal interaction and collaboration (Jespersen et al., 2017; Lazzeretti and Capone, 2016). Firms prefer to form relationships and be close to specific actors that have close organisational proximity to ensure the success of collaboration and interaction (Geldes et al., 2017). The empirical study of Le Duc and Lindeque (2018) shows that in a cluster network, a low level of organisational proximity is found to drive collaboration and positive knowledge flow more than a higher level. High organisational proximity may evolve into inward-looking relationships and restrictions on the flexibility of network ties, and undermine learning and innovation (Boschma, 2005).

3.3.1.4 INSTITUTIONAL PROXIMITY

North (1990) defines the role of the institution as the 'rule of the game' in society which shapes human behaviour and the development of network infrastructure (Nooteboom, 2000; North, 1990). Institutional proximity includes both 'informal' or 'soft' factors such as norms, obligations and expectations, and 'formal' or 'hard' factors such as rules, regulations and laws that firms need to comply with (Balland et al., 2013; Boschma, 2005; Geldes et al., 2015, 2017). However, in order to avoid the overlap with norms in the relational dimensions, this study only adopts formal institutional factors to determine institutional proximity. Institutional proximity provides a stable environment for interactive learning to take place effectively, although it may become a constraining factor that hampers collective learning and novel ideas, thus negatively affecting innovative performance. It is found to foster inertia which restricts the flexibility of linkages (Boschma, 2005; Molina-Morales et al., 2015). To accommodate an

² Cluster firms do not belong to the same organisational entity i.e. they are not merged, subsidiaries or joint ventures. The level of autonomy and control is much looser, and thus this interpretation is not suitable for study in the context of cluster networks (Davids and Frenken, 2018).

environment that best fosters innovation, institutional proximity requires a balanced mix of stability, openness and flexibility. Institutions that fail to balance these factors can see negative effects on innovation (Boschma, 2005).

3.3.1.5 THE INFLUENCE OF THE SPATIAL DIMENSION ON THE STRUCTURAL, RELATIONAL AND COGNITIVE DIMENSIONS OF SOCIAL CAPITAL

The core idea of proximity is that individuals and organisation prefer to establish relationships with individuals or organisations that are co-located and share similar characteristics (Boschma and Fernken, 2010; Boschma, 2005). Consequently, proximity is recognised as shaping the structure of the network by increasing the frequency of interactions and intensity of the relationships (Broekel and Boschma, 2012; Davids and Frenken, 2018; Fitjat et al., 2016; Glades et al., 2015, 2017; Lazzertti and Capone, 2016). However, the literature pays less attention to the possible effects of proximity on relational and cognitive social capital. This section therefore elaborates on how each sub-construct of the proximity dimension, geographical, technological, organisational and institutional proximity, influences the structural, relational and cognitive dimensions of social capital. Figure 3-3, below, illustrates the influence of the proximity dimension on the three dimensions of social capital.

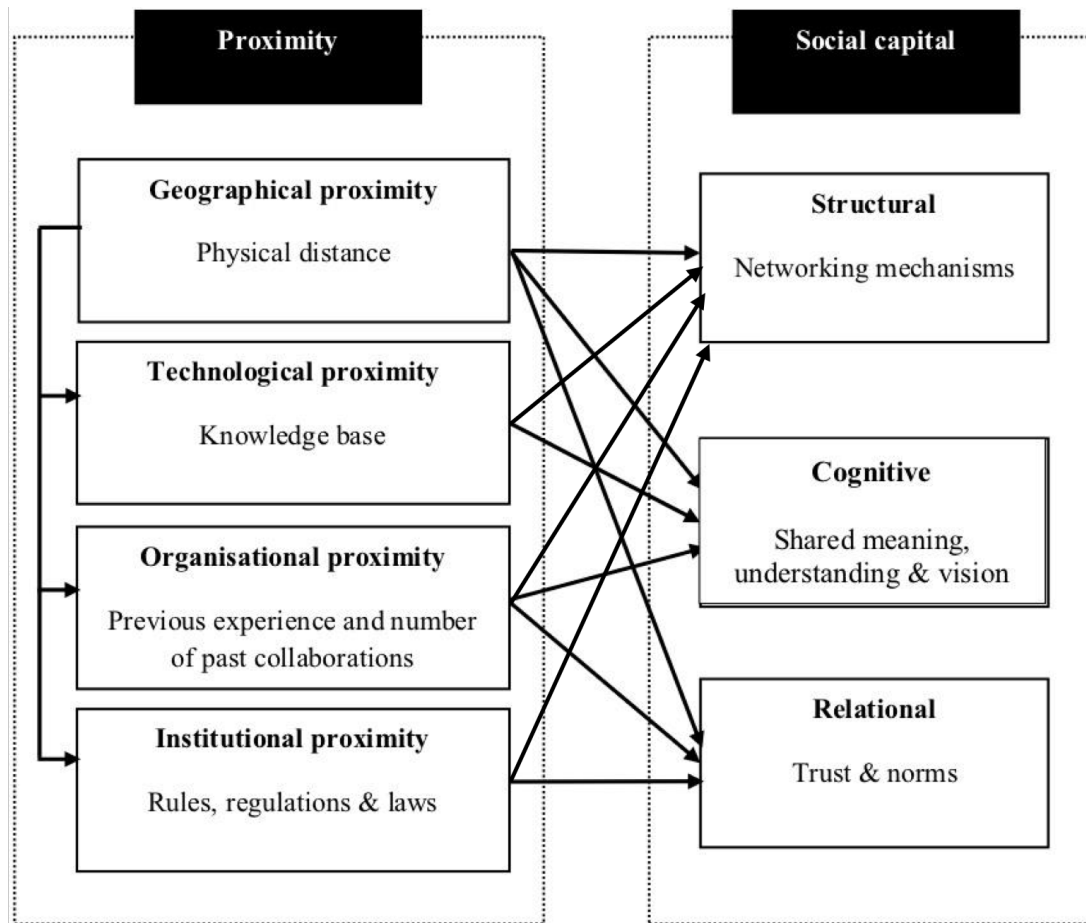


Figure 3-3: The proposed relationship between proximity and social capital

Geographical proximity is assumed to influence all three dimensions of social capital (Presutti and Boari, 2008; Rutten et al., 2010). Whereby close geographical distance provides opportunities for frequent face-to-face interactions which enrich deep personal relationships (Inkpen and Tsang, 2005) and thus influence the structural characteristics of social capital (Molina-Morales et al., 2013). It also has a positive impact on the creation of trusting relationships and norms of reciprocity (Boschma, 2005; Rutten et al., 2010; Todo et al., 2016). Similarly, Ruiz-Ortega et al. (2016) investigate the relationship between the cognitive dimension and proximity and find that geographical proximity plays a key role in producing a shared set of aims and relatively homogenous cultures and values among the actors. This might be because they give salience to similar things or they are exposed to the same opportunities and threats. Their similar knowledge base enables cluster firms to have a common understanding and interpretive scheme (Markusen, 1996). Cluster firms are able to communicate, understand, process and incorporate novel knowledge more easily and efficiently (Cantu, 2010; Hervas-Oliver et al., 2012; Huber, 2012; Lazzaretti and Capone, 2016; Nooteboom et al., 2007). Therefore, it is easier to develop similar values and visions. Similarly, with organisational proximity the similar routines and incentive mechanisms can

foster common understanding and shared interpretation. Firms with close institutional proximity share, and comply with, the same rules, regulations and laws, which reduces opportunistic behaviour and uncertainty in the network, facilitating trusting relationships (Boshma, 2005; Molina-Morales et al., 2015).

3.3.2 NEGATIVE EFFECTS OF THE STRUCTURAL DIMENSION

The structural dimension of social capital captures the overall pattern and structure of the relationships among network actors (Nahapiet and Ghoshal, 1998). The structure of the connection can present both opportunities and constraints for social actors. This dimension is studied via centrality, density and strength of ties (Burt, 1992; Pittaway et al., 2004; Yu et al., 2013). While this dimension is the most studied, the findings are contingent upon the type of network studied (Inkpen and Tsang, 2005).

Firms join cluster networks to advance their innovation performance by being in cohesive networks and establishing relationships with other organisations to access information and knowledge. Therefore, the characteristics of structural social capital in cluster networks are often associated with strong ties, cohesive networks and high levels of density (Inkpen and Tsang, 2005; Molina-Morales, 2005; Western et al., 2005). The following sub-sections explore in detail how these characters can negatively affect the innovative performance of cluster firms.

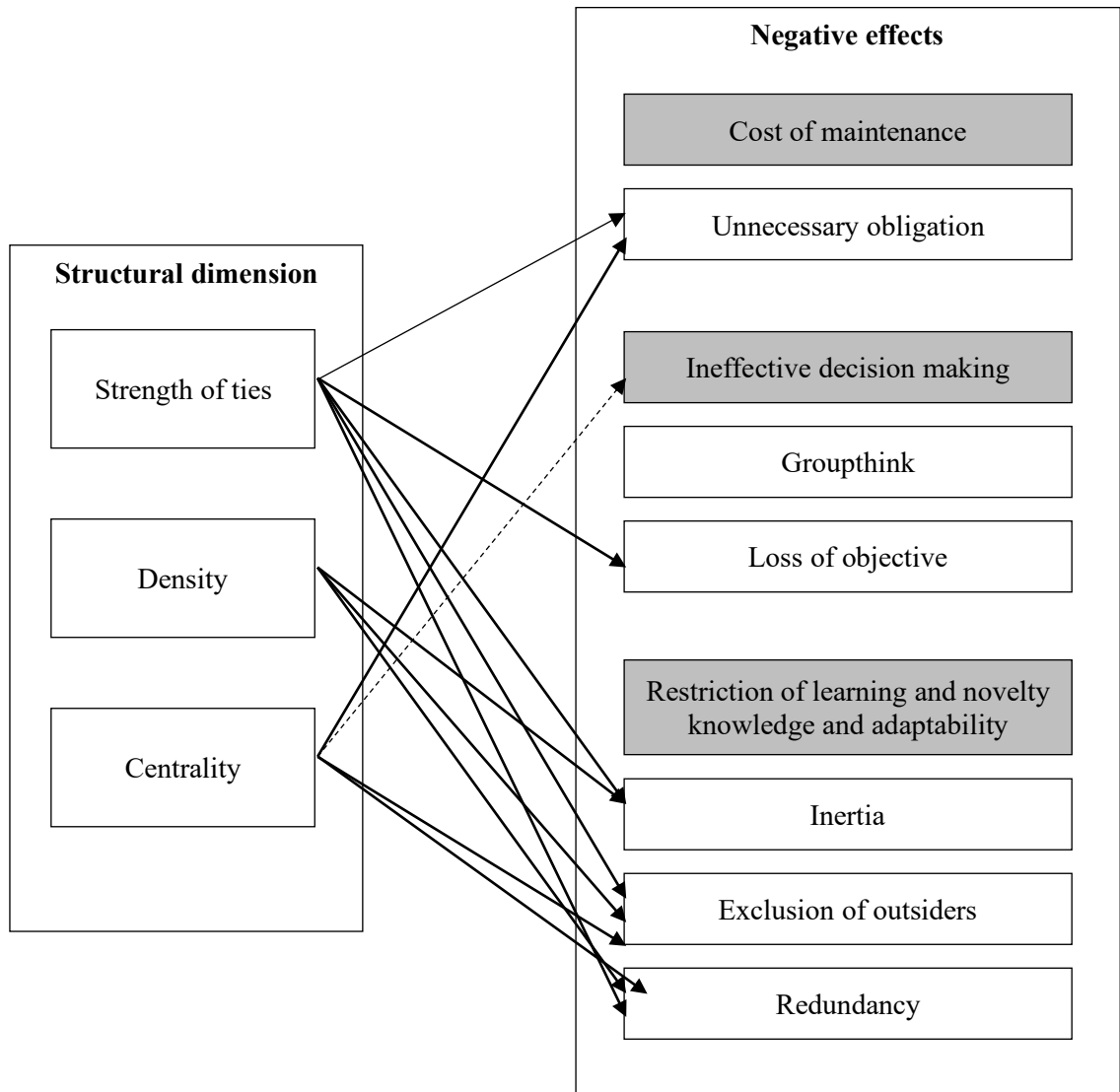


Figure 3-4: The negative effects of the structural dimension of social capital

3.3.2.1 STRENGTH OF TIES

The strength of ties is a combination of the amount of time spent, the emotional intensity, the intimacy, and the reciprocal nature of relationships (Granovetter, 1973). However, in empirical studies, only frequency of interaction and intensity of relationships are measured to determine the strength of network ties (e.g. Rindfleish and Moorman, 2001; Garcia-Villaverde et al., 2018; Stam et al., 2014). Strong ties are characterised by high frequency interactions and intense relationships, whereas weak ties are the opposite. The literature highlights that weak and strong ties serve different purposes and should therefore be chosen in accordance with strategic purpose (Mizruchi et al., 2011; Molina-Morales et al., 2011) or combined to maximise the benefit of network ties (Edelman et al., 2014; Rost, 2011; Zheng, 2010). However, there is a criticism that there is lack of guidance on how to accomplish this (Cuevas-Rodriguez et al., 2014).

Ties in cluster networks tend to be characterised as strong (Felzensztein et al., 2014; Molina-Morales and Martinez-Fernandez, 2009; Ruiz-Ortega et al., 2016). As previously described (in Section 3.3.1.1), close geographical proximity between cluster firms fosters strong ties with frequent interaction and the development of intimate personal relationships (Filiari et al., 2014; Molina-Morales and Expósito-Langa, 2013). Particularly in emerging countries, such as Thailand, the tendency for the absence of reliable government and established laws makes firms less likely to depend on government institutions and more likely to rely on personal relationships to procure resources and protect themselves from arbitrary extortion or expropriation. They are more likely to rely on existing relationships rather than seek new information or knowledge (Stam et al., 2014).

While strong ties provide collaborative and cooperative networks which assist with knowledge transfer and exchange, overreliance on strong ties can threaten innovation, rather than enhance it, because, firstly, the cost of strong ties is at the expense of weak ties (Li et al., 2013; Molina-Morales and Martinez-Fernandez, 2009). As firms have limited amounts of time, energy and resources to invest in maintaining relationships, they can only afford to invest in certain ones (Duysters and Lokshin, 2011).

Secondly, intense relationships can come with pressure to reciprocate and create unnecessary obligations to maintain the relationship (Li et al., 2013). This feeling of social obligation can become so strong that it derails original goals (Lechner et al., 2010), puts restrictions on the adjustment of existing relationships (Gulati et al., 2002) and excludes outsiders (Pirolo and Presutti, 2010). The last two can limit participating firms' mobility and reduce their ability to change and adapt (Ozer and Zhang, 2014; Portes and Landolt, 1996; Portes, 1998; Woolcock, 2002) isolating them from markets and the wider industry and confining them to a set of closed networks (Capaldo, 2007; Pirolo and Presutti, 2010).

Thirdly, while strong ties assist with transfer of knowledge and knowledge exchange, a point can be reached where the incremental value of additional information starts to decrease, and information exchange becomes redundant (Molina-Morales and Martinez-Fernandez, 2009; Villena et al., 2011), reducing the ability to acquire diverse resources and information (Gargiulo and Benassi, 2000; Uzzi, 1997). This overload of information can lead to ineffective decision-making (Li et al., 2013).

These negative effects are likely to offset the positive effect of strong ties and inhibit cluster firms' innovation. Therefore, this supports the inverted-u shaped relationship between strong ties and innovation (Lowik et al., 2012; Molina-Morales and Martinez-Fernandez, 2009; Pirolo and Presuitt, 2010; Ruiz-Ortega et al., 2016). Strong ties have a high cost of maintenance and can lead to ineffective decision making. Over time, they can impose knowledge redundancy which impedes learning and novel knowledge, placing restrictions on change (inertia and exclusion of outsiders) thus inhibiting innovation in cluster firms.

3.3.2.2 *DENSITY*

The density of a network is defined by the degree of mutual connection between members in clusters (McEvily and Zaheer, 1999). Dense networks feature highly connected webs of actors. Close geographical proximity of clusters facilitates the development of dense and cohesive network structures through the frequent interaction between clustered firms (Molina-Morales et al., 2012; Rutten et al., 2010). Therefore, clustering is often a feature of dense networks, where most cluster firms are directly or indirectly connected to each other and this tends to be alleviated over time (Inkpen and Tsang, 2005; Musteen et al., 2014).

Cohesive or tight networks risk developing over-embeddedness, with cluster firms developing robust building blocks that create 'not invented here' syndrome and forming cliques. Firms usually emphasise their close contacts, leading to a situation of blindness or myopia, as they pay little attention to agents outside the network (Beugelsdijk and Smulders, 2004; Inkpen and Tsang, 2005; McFadyen and Cannella, 2004; Molina-Morales and Exposito-Langa, 2012; Todo et al., 2016) and this restrains firms' capabilities to explore new knowledge and ideas or exploit novel recombination (Alguezaui and Filieri, 2010; Staber, 2007; Todo et al., 2016).

If social capital is perceived as being collective, resources are available to all members within the network via social links (Tan et al., 2013). Therefore, actors tend to possess similar information channels, information and knowledge (Koka and Prescott, 2002) and become trapped in a cycle of redundancy (Berliant and Fujita, 2011; Gilsing et al., 2008; Tan et al., 2015; Todo et al., 2016; Rowley et al., 2000). Therefore, a high level of density inhibits innovative performance (Molina-Morales and Exposito-Langa, 2012).

3.3.2.3 *CENTRALITY*

Given the various measurements of centrality, this study adopts degree centrality and betweenness centrality to scrutinise focal firms' positions in networks and the knowledge exchange process. These two measurements are recognised as the most relevant for assessing

innovative performance at the analysis of ego-network level (Casanueva et al., 2013; Li et al., 2013) and allow the examination of both direct and indirect ties (Scott, 2013). The terminology of ‘core’ and ‘peripheral’ positions is used widely for determining centrality in cluster studies (e.g. Del-Corte-Lora et al., 2015). Firms at the core of a cluster are those with high centrality and a high number of connections to other members (i.e. degree centrality) and are able to reach a high number of other members (i.e. betweenness centrality), whereas firms at the periphery have loose connections to the cluster but are more open to extra-cluster resources (Giuliani and Bell, 2005).

Argument about access to information and knowledge is prominent in the literature on the positive effects of centrality on the innovative performance of cluster firms (Bell, 2005; Casanueva et al., 2013; Del-Corte-Lora et al., 2015; Whittington et al., 2009). However, there are scholars that stress the potentially negative effects of occupying a core position in a network (Dong and Yang, 2016; Eklinder-Frick et al., 2014; Ferriani and MacMillan, 2017; Karamanous, 2016). Firstly, this strategic position comes with a constant cost of maintenance. The highly visibility and well-recognised firms at the core of a network are obligated to help others and carry an unnecessary obligation of maintaining relationships (Ferriani and MacMillan, 2017; Giuliani and Bell, 2005). Secondly, as firms become progressively more structurally central in the network, the potential problem of cognitive distance occurs. The large flow of information and knowledge can overwhelm the firm, which may have difficulty processing the information or knowledge. Firms may be unable to select relevant information which creates a problem in absorbing and integrating novelty (Dong and Yang, 2016; Ferriani and MacMillan, 2017; Glising et al., 2008; Li et al., 2013; Karamanous, 2016). Smaller firms may find it especially challenging to synchronise the development of their absorptive capacity and the enlargement of the cluster network (Ferriani and MacMillan, 2017). This can lead to over-confident decision-making and inefficient search for innovation (Baker, 1994; Dong and Yang, 2016). There is also a high chance that firms already hold the information and knowledge received from the network (Bell and Zaheer, 2007). Lastly, the core position in a network can encourage the exclusion of outsiders. The study of Eklinder-Frick et al. (2014) demonstrates that firms in regional strategic networks with high levels of centrality express unwillingness to interact with actors outside their networks.

In conclusion, occupying the core position in a cluster can have a positive influence on innovative performance, however, after it reaches a certain threshold, the information and knowledge flow can become excessive and redundant which leads to ineffective decision making and the exclusion of outsiders. The cost of maintenance outweighs the benefits from

multiple ties. This supports an inverted-u shaped relationship between centrality and cluster firms' innovative performance (Bong and Yang, 2016; Eklinder-Frick et al., 2014; Ferriani and MacMillan, 2017; Paruchuri, 2010).

3.3.3 NEGATIVE EFFECTS OF THE RELATIONAL DIMENSION

The relational dimension reflects on the relationship actors develop with each other through a history of interaction in the form of trust, norms of reciprocity, obligation and identification, which entails the characteristics and qualities of the relationship (Nahapiet and Ghoshal, 1998). Investigation of the relational dimension includes trust and norms of reciprocity as they represent the most significant sub-construct of the relational dimension in relation to innovation (Sanchez-Franco and Roldan, 2015; Zheng, 2010).

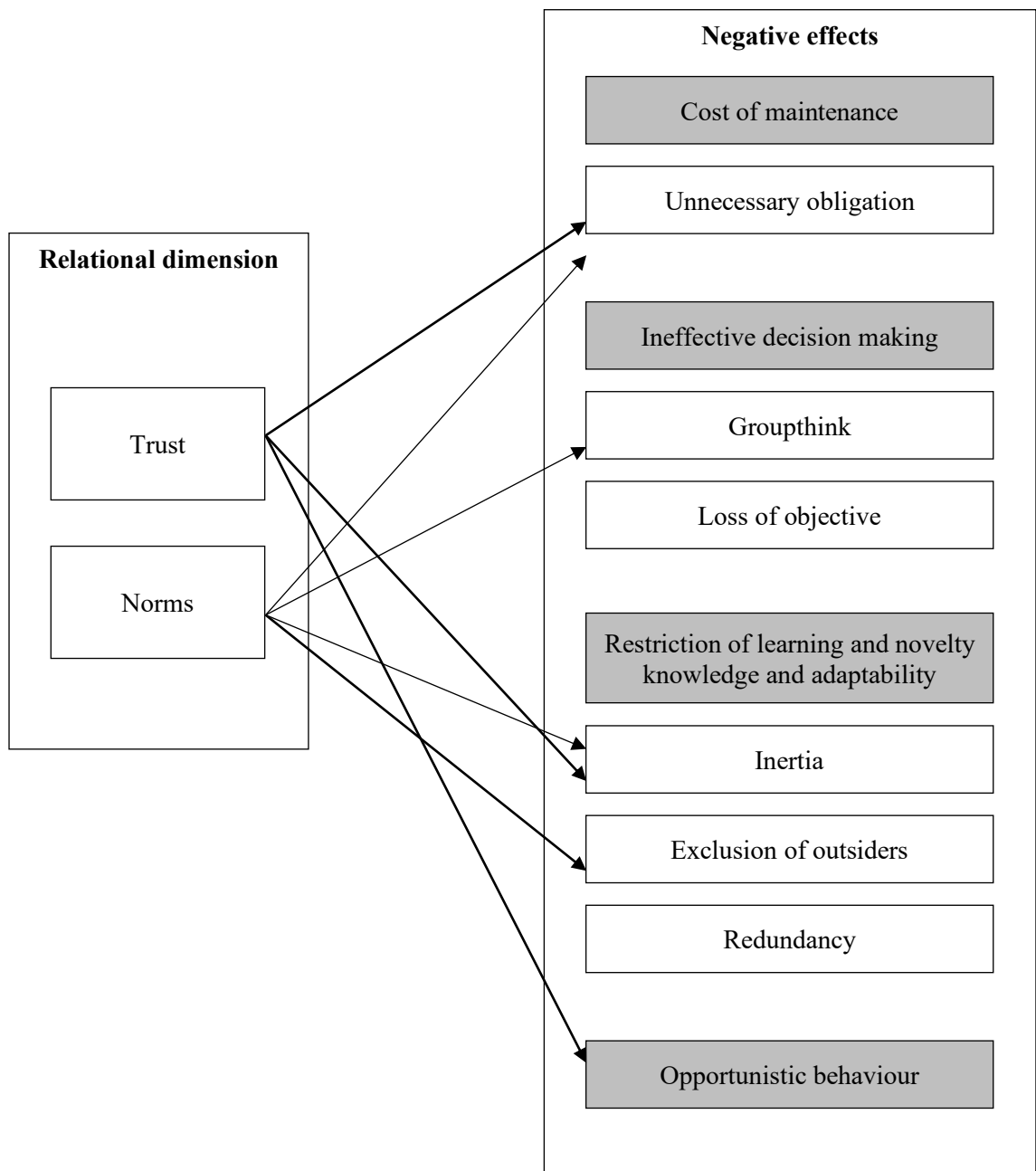


Figure 3-5: The negative effects of the relational dimension of social capital

3.3.3.1 TRUST

Trust is a measure of whether a firm is reliable and would act in another firm's best interest (Zaheer et al., 1998). The study of Waite and Williams (2009) shows that one of the characteristics of a successful cluster is the ability to develop long-term trusting relationships. When there is trust in a network, the fear of opportunistic behaviour is reduced as there is confidence that, even if an opportunity arises, the trustee will not take advantage of the situation and will keep promises without any legal contact (Tsai and Ghoshal, 1998).

Subsequently, trust increases the depth, breath and efficiency of the mutual exchange of knowledge and provides access to more valuable resources (Inkpen and Tsang, 2005; Castro and Roldan, 2013; Molina-Morales et al., 2011). A trustworthy actor naturally has a better chance of receiving high quality knowledge resources and stronger support from social connections (Levin and Cross, 2004).

Maintain trusting relationships entails cost, at least in the form of time and effort. This places a restriction on the extent to which firms can cultivate new relationships and maintain existing relationships. Therefore, firms emphasise a few 'trusted' relationships (Wu, 2008; Molina-Morales et al., 2011 Bargiulo and Benassi, 2000; Shi et al., 2015). Furthermore, when trust goes beyond an optimal level, it can increase opportunistic behaviour, since firms reduce their efforts of monitoring, vigilance and safeguarding, to a point where they are more subject to malfeasance by others (Granovetter, 1985; Molina-Morales and Martinez-Fernandez, 2009; Molina-Morales et al., 2011; Villena et al., 2011: 2016). Subsequently, excessive levels of trust foster inertia and higher risks of opportunism which can negatively affects cluster firms' innovative performance (Molina-Morales and Martinez-Fernandez, 2009; Molina-Morales et al., 2011).

3.3.3.2 *NORMS*

From the review of the literature, there are a limited number of studies that directly investigate the effect of norms on innovation performance. The definition of norms in innovation studies often departs from its original meaning and overlaps with cognitive social capital (O'Reilly, 1989; Russell and Russell, 1992; Smith et al., 2005). Therefore, this study aims to clarify this by considering norms to be its own sub-construct of relational social capital and adopting the definition of a norm as an obligation and expectation (Yu et al., 2013; Villena et al., 2011; Wang et al., 2018), which provides a clearer boundary with cognitive social capital (Zheng, 2010).

A cluster is a network with a relatively homogenous system of norms, identifications, values and culture (Molina-Morales and Martinez-Fernandez, 2009; Ruiz-Ortega et al., 2016). Norms are recognised as diminishing undesirable behaviour such as opportunism and free riding, although they can also impede certain actions (Yu et al., 2013; Wang et al., 2018). Norms of reciprocity can pressure firms to reciprocate and cooperate, and place a burden of obligation, even when it is not necessary. Firms might feel pressure to prioritise the needs of the cluster, derail their original goals or constrain their choices beyond what would be optimal (Gargiulo and Benassi, 1999; Molina-Morales and Martinez-Fernandez, 2009; Uzzi, 1997; Villena et al.,

2011; Wang et al., 2018). Furthermore, similar to formal institutions, norms as informal institutions produce the effect of exclusion of others as they provide no opportunities for newcomers and trap with inertia, which is recognised to hamper collective learning and innovation (Boschma, 2005).

3.3.4 NEGATIVE EFFECTS OF THE COGNITIVE DIMENSION

Cognitive social capital posits shared representations, interpretations and systems of meaning among parties that have the ability to enable or restrict social exchange (Nahapiet and Ghoshal, 1998). Two individuals are considered close to each other because they share cognition which facilitates their ability to interact and cooperate (Torre, 2008) and integrate or combine resources (Exposito-Langa et al., 2015; Molina-Morales and Martinez-Fernandez, 2010; Tsai and Ghoshal, 1998). According to Becattini (1990), the most important feature of a cluster community is its homogenous system of values and views. This dimension is studied through shared vision as this is recognised to be the most effective factor explaining the cognitive dimension (Merton, 1968).

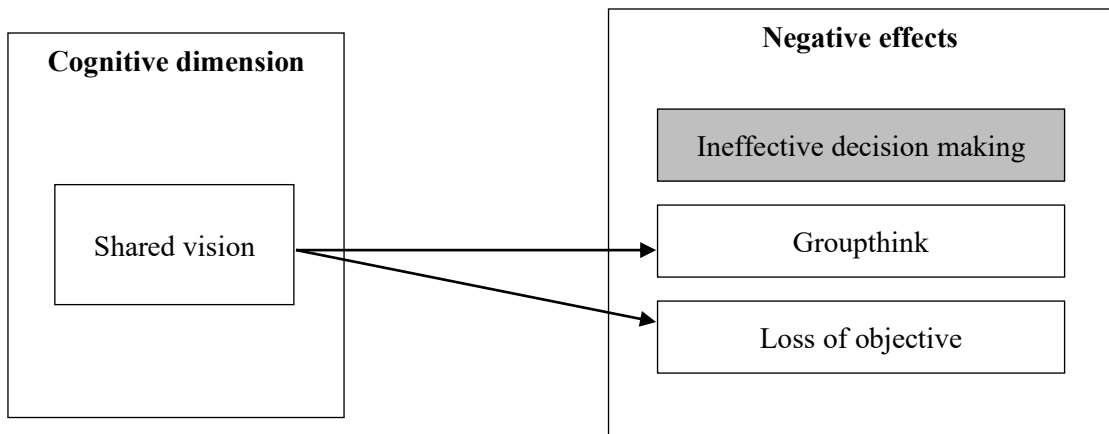


Figure 3-6: The negative effects of the cognitive dimension of social capital

3.3.4.1 SHARED VISION

Shared vision is the ambition, mutual goals and interests shared between cluster members. It is a measure of whether the actors feel the firm's future is related to other member and the willingness to pursue collective goals (Expósito-Langa et al., 2015; Lechner et al., 2010; Molina-Morales and Martinez-Fernandez, 2010; Tsai and Ghoshal, 1998). A few scholars aim to study the inverted u-shaped relationship between shared vision and firm performance, though only a positive effect is found. Villena et al. (2011), in the buyer-seller relationship, argue that the contradictory findings result from the level of shared vision of their sample not

being great enough to reach a turning point. However, in the context of clusters, there is evidence of a high level of shared vision among cluster members as cluster networks are motivated by collective action (Parra-Requena et al., 2010). Consequently, firms in cluster networks might be more exposed to the dark side of shared vision.

Shared vision can be seen as a collective norm, a binding force which may restrict the freedom of an individual to decide, by making concessions of their own interests for those of the firm (Coleman 1988; Tsai and Ghoshal, 1998). Strong shared vision can trap firms in groupthink, discouraging independent thinking and creativity (Uzzi, 1997), limiting the search for new information, reducing the number of alternative considerations (Barr et al., 1992) causing decision constriction, and negatively effecting innovation.

3.3.5 INTERRELATION BETWEEN THE FOUR DIMENSIONS OF SOCIAL CAPITAL

Nahapiet and Ghoshal (1998) introduce the three dimensions of social capital. Although they do not investigate the interrelationship between the dimensions, they do suggest that the three dimensions are highly interrelated. Ignoring the interrelationship between the dimensions of social capital can obscure the causes of the negative effects of social capital (Camps and Marques, 2014; Hsu and Hung, 2013; Lefebvre et al., 2016; Silkoset, 2013; Villena et al., 2011). The nature of the interrelationship between the three dimensions is widely recognised, but only a few studies empirically investigate it, and the findings are inconsistent (Camps and Marques, 2014; Carey et al., 2011; Lefebvre et al., 2016; Li et al., 2014; Muniady et al., 2015; Van den Hooff and de Winter, 2011).

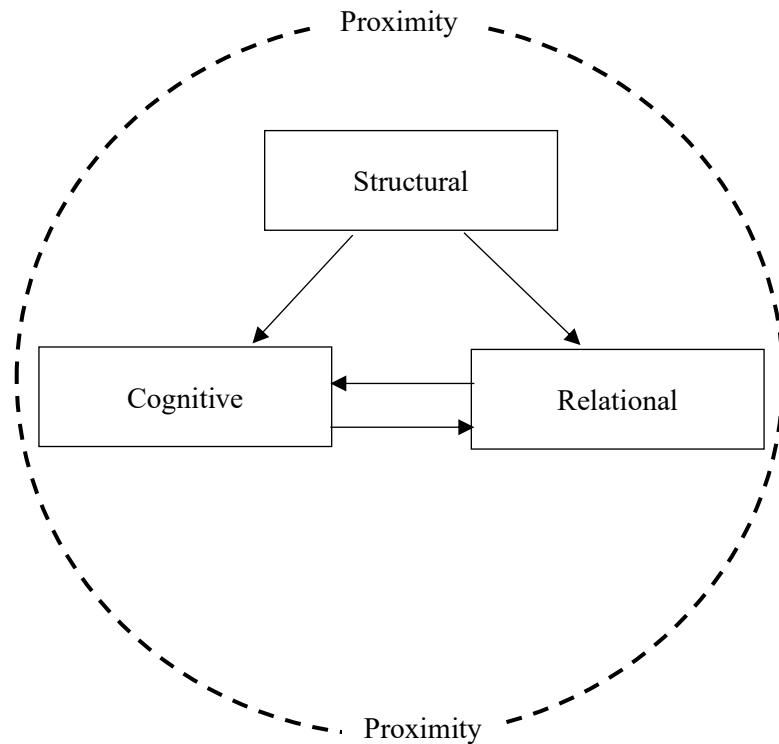


Figure 3-7: The relationship between the four dimensions of social capital

Figure 3-7 illustrates the assumed relationship between the four dimensions of social capital. The structural dimension is an antecedent to both the relational and cognitive dimensions of social capital, whereas the relationship between relational and cognitive dimensions is reciprocal. The proximity dimension fosters the development of all three dimensions of social capital.

Firstly, similarly to most interrelationship studies, the structural dimension is recognised as an antecedent to the relational and cognitive dimensions of social capital. The interaction is a prerequisite for the development of the characteristics and qualities of the relationship (relational dimension) and the establishment of shared cognition (cognitive dimension) (Castro and Roldan, 2013; Lefebvre et al., 2016; Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998; Wang and Chiang, 2009). In depth and frequent interactions are more likely to develop into close relationships and cultivate trust and norms of reciprocity (Camps and Marques, 2014; Carey et al., 2011; Li et al., 2013(b); Van den Hooff and de Winter, 2011; Van den Hooff and Huysman, 2009; Tsai and Ghoshal, 1998), as well as generating common understanding and interest, and a set of mutual goals and practices (Camps and Marques, 2014;

Lefebvre et al., 2016, Li et al., 2014; Van den Hooff and de Winter, 2011; Van den Hoff and Huysman, 2009).

Secondly, reviewing the relationship between relational and cognitive social capital demonstrates that most studies concentrates primarily on either the effect of cognitive social capital on relational social capital or vice versa (e.g. Carey et al., 2011; Lefebvre et al., 2016; Li et al., 2013(b); Li et al., 2014; Muniady et al., (2015); Tsai and Ghoshal, 1998; Van den Hooff and de Winter, 2011). This study assumes a reciprocal relationship between the two dimensions (Li et al., 2014; Zheng et al., 2010). When trust and norms of reciprocity are established in a network, without the fear of opportunism or uncertainty, firms are more willing to develop mutual understandings, visions, values and harmony (Li et al., 2014). Simultaneously, an increase in shared cognition favours the development of trusting relationships (Carey et al., 2011; Lefebvre et al., 2016; Li et al., 2013(b); Tsai and Ghoshal, 1998; Van den Hooff and de Winter, 2011).

Lastly, the proximity dimension of social capital, as illustrated in Figure 3.7 as a circle surrounding the structural, relational and cognitive dimensions of social capital, reflects its strong effect on these three dimensions. A detailed discussion of its effect is given in Section 3.3.1.5.

3.3.6 SUMMARY

Section 3.3 describes the left-hand side of the proposed conceptual model (Figure 3.1) and sets out the logic behind the proposed four dimensions of social capital. Nahapiet and Ghoshal's (1998) three dimensions of social capital (structural, relational and cognitive) and Boschma's (2005) proximity as a proximity dimension underpin the four dimensions of social capital proposed in the conceptual model. The four dimensions and their interrelations are adopted in order to investigate how social capital can produce negative effects on the innovative performance of cluster firms. Each dimension and sub-construct demonstrate both positive and negative effects once it exceeds a threshold level. This supports previous studies that reveal an inverted u-shaped relationship between social capital and innovation (Li et al., 2016; Molina-Morales et al., 2011; Ozer and Zhang, 2014; Tan et al., 2015; Yu, 2013). The following section explores the other side of the model and elaborates on the mechanism by which the negative effects identified affect the innovative performance of cluster firms.

3.4 NEGATIVE EFFECTS OF SOCIAL CAPITAL ON INNOVATIVE PERFORMANCE

As illustrated, the second part of the proposed model concentrates on the negative effects of social capital on innovation. While there might be several factors that impede the innovative performance of cluster firms, this study focuses solely on those caused by social capital. Drawing on the social capital, over-embeddedness and social liability literature, several negative effects appear (as shown in Table 2-10), though not all of them are integrated in the proposed model. These negative effects are chosen and prioritised based on their significance and repetition in the taxonomy of the literature (refer to Table 2-10, Section 2.4.2). This study posits and reflects on the key negative effects of social capital on innovative performance in cluster networks.

Drawing on the taxonomy, nine negative effects of social capital are included in the study, cost of maintenance or unnecessary obligation, inertia, cognitive lock-in and groupthink, ineffective decision-making, dependence-oriented and inward-looking culture, redundancy, risk of opportunisms, impeding of novel knowledge, and loss of objective. As there is overlap between these negative effects, they are grouped into categories. The negative effects are classified into four primary categories, cost of maintenance, ineffective decision-making, restriction of new knowledge and learning, and opportunistic behaviour. This classification is based on the negative effect on innovative capability and performance as shown in Table 3-1, below.

Negative effects of social capital	Sub-negative effects
Cost of maintenance	Unnecessary obligation
Decision-making constraints	Cognitive lock-in and groupthink, loss of objective
Restriction of novelty and diverse knowledge and unawareness of the necessity to change	Inertia, dependence-oriented culture and exclusion of others, knowledge redundancy
Opportunistic behaviour	Opportunistic behaviour

Table 3-1: Taxonomy of the negative effects of social capital on innovative performance

Rather than focus on a single negative effect, this study investigates the negative effects of social capital on innovative performance. This portion of the proposed conceptual model aims to open the black box of the mechanism of the negative effects of social capital. It contributes to a comprehensive understanding of the mechanism of the negative effect of social capital on

innovative performance of firms in cluster networks (Camps and Marques, 2014; Huber, 2009; Rutten et al., 2010).

The previous section discusses the proposed model and how the four dimensions of social capital lead to negative effects. This section provides a discussion of how such detrimental effects affect the innovative performance of cluster firms. The following section discusses in detail the negative effects of each primary category and sub-category associated with innovative performance of cluster firms.

3.4.1 COST OF MAINTENANCE

Similar to other types of capital that produce return, social capital requires investment and maintenance. Although, differently from other capital, the cost of social capital is in the form of time and energy, and less dependent on financial or physical investment and maintenance (Westlund and Bolton, 2003). The limited amount of time, energy and resources firms have, restricts the opportunities to invest in other relationships, i.e. opportunity costs (Gargiulo and Benassi, 1999, 2000). Few scholars recognise that when costs outweigh benefits embeddedness turns into over-embeddedness (Andersen, 2013).

3.4.1.1 UNNECESSARY OBLIGATIONS

Social capital can create demand for commitment and conformity, pressure for reciprocity and some degree of unnecessary obligation to maintain linkages (McFadyen and Cannella, 2004; Portes and Sensenbrenner, 1993; Woolcock and Narayan, 2000). This can be in the form of non-economic resources (e.g. time and effort) or economic resources. While the obligation is not compulsory, it is not entirely voluntary, and the time, effort and resources used to carry the obligation could be saved for other value-added activities for innovation such as searching for new opportunities (Li et al., 2016).

3.4.2 DECISION-MAKING CONSTRAINTS

Network conformity and the norm of reciprocity may develop some constraints to effective action and decision-making beyond what would be optimal (Lechner et al., 2010). This can include any decisions regarding innovation e.g. degree of innovation, type of innovation, process of innovation, etc. The constraints on optimal decision-making can be caused by restrictions on decision-making freedom (Gargiulo and Benassi, 1999; Li et al., 2013; Portes,

1998; Tsai and Ghoshal, 1998) or failure to consider alternative courses of action (De Clercq et al., 2009; Pillai et al., 2017; Villena et al., 2011).

3.4.2.1 LOSS OF OBJECTIVE

Loss of objective is when original goals are derailed from self-interest (Lechner et al., 2010). Social capital can transform decision-makers from self-centred individuals into community stakeholders with common interests (Gargiulo and Benassi, 1999; Portes, 1998) or encourage them to make concessions to other individuals' interests or collective goals, while failing to pursue their own self-interest (Lechner et al., 2010; Tsai and Ghoshal, 1998). This can be caused by concern about other members' benefits and feelings, where firms give up an initial decision as a favour to other members, making it impossible to take decisions completely according to their own mind (Li et al., 2013).

3.4.2.2 COGNITIVE LOCK-IN AND GROUPTHINK

Janis (1972, p.9) defines groupthink as "*a mode of thinking people engage in when they are deeply involved in a cohesive in-group, when the members striving for unanimity override their motivation to realistically appraise alternative courses of action*". This largely overlaps with one of Grabher's (1993) lock-ins - cognitive lock-in. Lock-ins are used in evolutionary economic studies to explain the phenomenon of cluster firms losing growth dynamics, becoming stuck in established ideas and practises and networks of interrelatedness and embeddedness no longer yielding increasing returns and producing negative externalities (Martin and Sunley, 2006). This study pays attention solely to cognitive lock-in, which refers to a common worldview or mind-set, and is most relevant to network study (Grabher, 1993).

High levels of trust and mutual understanding along with enduring personal relationships between members of networks create the perception of group cohesiveness or a mental state of 'sticking together' (Jeffries and Reed, 2000; Moorman et al., 1992). Groupthink and cognitive lock-in occur when a network becomes over-embedded in its own social context and hinders it from appreciating the values of other networks (Eklinder-Frick et al., 2011). The same strong bonds may serve as a filter for information and other perspectives reaching the actors, and isolate them from the outer world (Grabher, 1993 in Gargiulo and Benassi, 1999). This can lead to defective decision making as it encourages actors to accept non-contentious ideas in order to reach unanimity and maintain relationships (Jeffries and Reed, 2000), avoiding conflict or hurting others' feelings (Janis, 1972), failure to evaluate possible problems with group decision or discounting alternative opinions (Pillai et al., 2017; Villena et al., 2011).

3.4.3 RESTRICTION OF NOVEL OR DIVERSE KNOWLEDGE AND UNAWARENESS OF THE NECESSITY TO CHANGE

The degree to which a firm has access to external sources, and the ability to exchange and recombine knowledge are key to innovation (Koka and Prescott, 2002; Noordhoff et al., 2011). The core of social capital embedded in networks is to provide such access to resources, although, when firms become too deeply embedded, the extent to which they are exposed to new sources of information and ideas can be restricted (Noordhoff et al., 2011; Pillai et al., 2017; Villena et al., 2011). Without new and diverse information and knowledge, firms are trapped in a position of unawareness of the necessity to change outside the network boundary and therefore become incompetent to survive in the new environment (Gargiulo and Benassi, 1999; Villena et al., 2011). Eisingerich et al. (2010) indicate that adaptability determines cluster performance. In the same vein, Østergaard et al. (2015) use adaptive capabilities to explain cluster decline. Restriction of the flow of novel and diverse information and knowledge can be caused by inertia, the exclusion of outsiders and knowledge redundancy.

3.4.3.1 Inertia

Inertia in network study is defined as persistent organisational resistance to changing inter-organisational network ties (Gargiulo and Benassi, 2000). Inertia is not necessarily the result of poor network management. Instead, it comes from successfully managed networks, where the high level of attachment between parties impedes structural adjustment (Hite and Hesterly, 2001; Kim et al., 2006; Villena et al., 2011; Pillai et al., 2017), despite recognition of the need to adjust (Eisingerich and Bell, 2008; Uzzi, 1996).

From a contingency view of strong and weak ties, the configuration of the network should be dynamic enough to adapt to firms' changing needs and goals (Gargiulo and Benassi, 1999; Pirolo and Presutti, 2010). However, the presence of inertia inhibits flexibility in adjusting ties (Maurer and Ebers, 2006; Weber and Weber, 2011). When a firm attempts to change its current ties, it risks losing the value of relation-specific assets and perceives such change as being costly (Gargiulo and Benassi, 2000). This discourages engagement with new partners and dissolving ties where the cost of maintenance outweighs the benefit. This progressively diminishes learning opportunities and hinders the acquisition of new knowledge, thus impeding the innovation of cluster firms (Maurer and Ebers, 2006; Yli-Renko et al., 2001).

3.4.3.2 Exclusion of outsiders

Exclusion of outsiders is when individuals or organisations focus exclusively on the ‘insiders of the network’. It tends to be exclusive to existing member of the network and excludes actors outside that network. Social capital is recognised as leading to exclusion of outsiders (Pillai et al., 2017; Portes 1993). Small circles of strong ties and cohesive networks may generate dependence-oriented culture, based on few very small circles of strong ties and creating socio-economic conditions that restrict access by outsiders (Capaldo, 2007; Eklinder-Frick et al., 2014; Pirolo and Presutti, 2010). Over time, the exclusion of outsiders decreases diversity and increases organisational inertia (Uzzi, 1996). The lack of external links is particularly critical when facing significant changes in the external environment, since firms cannot obtain the capacities or sufficient information to compete in the new environment (McFadyen and Cannella, 2004; Poudier and St John, 1996).

3.4.3.3 Knowledge redundancy

Knowledge redundancy is the degree of knowledge overlap between actors in a network (Burt, 1992; Rindfleish and Moorman, 2001). To ensure absorptive capacity, a certain level of knowledge overlap is a necessary prerequisite for exploring and exploiting new information (Gargiulo and Benassi, 2000; Noordhoff et al., 2011). According to Nooteboom (2000, p.153) “*information is useless if it is not new, but it is also useless if it cannot be understood*”. The information received from the network is unusable either if firms are not able to understand it or if it is redundant. When information exceeds firms’ absorptive capacity, it becomes difficult to process and makes decisions to innovate more difficult (Li et al., 2013).

However, once it reaches the threshold, duplicate knowledge is a waste and has a detrimental effect on innovation (Molina-Morales and Expósito-Langa, 2013; Noordhoff et a., 2011). It is recognised to be inefficient if it is unable to deliver new or exclusive information or knowledge (Graber, 1993; Burt, 1992) or endangers the generation of quality or novel knowledge (Bell and Zaheer, 2007). Furthermore, it is costly to maintain network structures that provide access to information and knowledge. Increasing the number of redundant ties is at the expense of non-redundant ties (Ahuja, 2000). Knowledge redundancy traps firms into blind spots, preventing information acquisition and information utilisation commensurate with markets and technological changes outside the network (Poudier and St. John, 1996; Rindfleisch and Moorman, 2001). Thus, it lowers firms’ competitive capabilities and innovative performance (McEvily and Zaheer, 1999; Molina-Morales and Expósito-Langa, 2013; Noordhoff et al., 2011; Ruiz-Ortega et al., 2016).

3.4.4 OPPORTUNISTIC BEHAVIOUR

Noordhoff et al. (2011) describe opportunistic behaviour as self-interest seeking with guile. Opportunistic behaviour includes providing false information, making false accusations, being unwilling to accept responsibility and free riding (Molina-Morales et al., 2011; Noordhoff et al., 2011). Previous scholars have adopted opportunism to explain the negative effects of social capital on various performance indicators (Molina-Morales and Martinez-Fernandez, 2009; Noordhoff et al., 2011; Villena et al., 2011: 2016). As covered in the previous section, trust, norms and institutional proximity can lower the fear of opportunistic behaviour and uncertainty in cluster networks (Boschma, 2005). Subsequently, cluster members are confident that they will not be taken advantage of by other members even when the opportunity arises, and therefore are more willing to share valuable information and provide support to fellow members (Li et al., 2014; Noordhoff et al., 2011). However, when firms are over-trusting or over-confident, they tend to lower their safeguards and monitoring for opportunistic behaviour. They can be subject to dishonest and unscrupulous malfeasance by other parties (Molina-Morales and Martinez-Fernandez, 2009; Villena et al., 2011, 2016). According to Granovetter (1985) embeddedness in relationships provides an increased opportunity to take advantage and be taken advantage of. It places firms in a position that is far more vulnerable for opportunism than a stranger would be. Opportunistic behaviour may lead to misallocating precious resources or taking unnecessary risks that could have substantial negative effects on innovative capability and performance (Molina-Morales et al., 2011).

3.4.5 SUMMARY

Section 3.4 emphasises the second portion of the proposed model (Figure 3.1), setting out the logic of the proposed negative effects of social capital drawn from the literature (refer to Section 2.2.4, Table 2.9), on innovation performance in the context of cluster networks. This section demonstrates how the negative effects of social capital identified can impede cluster firms' innovation performance. Consequently, practitioners and policy-makers could use this insight to manage or mitigate the negative effects of social capital. This section briefly demonstrates how the proposed model works.

3.5 CONTRIBUTIONS OF THE CONCEPTUAL MODEL

The review of literature demonstrates that social capital can have negative as well as positive effects on firms' innovation (Li et al., 2016; Molina-Morales et al., 2011; Ozer and Zhang,

2014; Yu, 2013). However, the dark side of social capital is overshadowed by the bright side. The relationship between social capital and innovation cannot be fully understood without a comprehensive understanding of the dark side (Cuevas-Rodríguez et al., 2014). Thus, the proposed conceptual model depicted in Figure 3.1 is used to investigate the negative effects of social capital on the innovative performance of firms in cluster networks and contributes to another side of the argument on the relationship between social capital and innovation (Galunic et al., 2012; Gedajlovic et al., 2013; Kwon and Adler, 2014; Li et al., 2013; Li et al., 2016; Molina-Morales and Martinez-Fernandez, 2010; Noordhoff et al., 2011).

The proposed conceptual model aims to extend existing knowledge and address the gap in academic literature in the following ways. Firstly, the conceptual model addresses the multidimensional nature of social capital (Echebarria and Barrutia, 2013; Silkoset, 2013; Villena et al., 2011; Wang et al., 2018; Zheng, 2010). Instead of focusing on one or two dimensions, the proposed model incorporates all three original dimensions of social capital (structural, relational and cognitive) and their sub-constructs, including those that receive less attention (i.e. the cognitive dimension and norms of reciprocity).

Secondly, the proximity dimension is introduced as the fourth dimension, additional to the existing three. The proximity dimension is merged in response to the gap in the field of socio-territory and social network study that highlights the lack of consideration of proximity factors' influences on social capital (Boschma and Frenken, 2010; Huber and Fitjar, 2016; Presutti and Boari, 2008; Rutten et al., 2010). However, instead of solely focusing on the role of geographical proximity on social capital, the conceptual model is extended to include non-spatial proximity i.e. technological, organisational and institutional proximity. The review of literature on proximity indicates that non-spatial proximity can also foster network formation (Boschma, 2005; Boschma and Fernken, 2010; Fitjar et al., 2016; Huber, 2012) and therefore influence social capital. Thus, the proximity dimension in the proposed conceptual model addresses the features of actors and networks (Boschma, 2005), defines its role in social capital which remains an underdeveloped area of the study (Di Vincenzo et al., 2014; Kwon and Adler, 2014) and adds to the relationship between innovation and proximity by providing empirical evidence of the paradox of proximity (Boschma and Franken, 2010; Fitjar et al., 2016). Embracing the proximity dimension of social capital in the conceptual model may deliver more conclusive findings on the relationship between social capital and innovation (Huber, 2009; Rutten et al., 2010; Staber, 2007).

Thirdly, the conceptual model addresses the interrelationship between the dimensions of social capital by investigating how the four dimensions of social capital, structural, relational, cognitive and proximity, are interrelated. Despite the large number of prior studies acknowledging the interrelationship between the dimension of social capital (Castro and Roldan, 2013; Lee, 2009; Weber and Weber, 2001), only a few empirically investigate this interrelationship, and the findings remain inconclusive (Camps and Marques, 2014; Lefebvre et al., 2016, Li et al., 2014; Van den Hooff and de Winter, 2011; Van den Hoff and Huysman, 2009). The study of the interrelationship between the four dimensions of social capital allows comprehensive understanding of the social capital creation process and how each dimension encourages or discourages the other dimensions to develop. Consequently, this can offer more precise measurement of the effect of social capital on innovative performance than examining them separately (Camps and Marques, 2014; Hsu and Hung, 2013; Lefebvre et al., 2016; Silkoset, 2013; Villena et al., 2011).

Fourthly, while the aforementioned contributions focus on the development of the social capital conceptual framework, this contribution is made to the study of the dark side of social capital. The review of the literature highlights that the conditions for, and mechanisms of, social capital producing negative effects are neglected. Many studies reveal the negative effects of social capital on innovation but fail to closely examine 'how' or 'why' (Camps and Marques, 2014; Huber, 2009; Li et al., 2013; Pillai et al., 2017; Rutten et al., 2010) and this causes the dark side of social capital to be overshadowed (Gargiulo and Benassi, 1999). Hence, the proposed conceptual model identifies how the four dimensions of social capital generate undesirable effects on the innovative performance of firms in cluster networks and addresses the antecedents and the mechanisms of those negative effects.

Fifthly, cluster networks provide a unique context for the study. While cluster networks are recognised as being prone to over-embeddedness, there is limited study of the negative effect of over-embeddedness in cluster networks (Huber, 2009; Molina-Morales and Martinez-Fernandez, 2010; Noordhoff et al., 2011). Furthermore, in accordance with the suggestion of Belso-Martinez and Molina-Morales (2013) and Gebreeyesus and Mohen (2013), the conceptual model is designed to study the social capital of cluster networks at inter-organisational level, which is where the effect of social capital innovation takes place, rather than the more usual regional level.

Finally, on the practicality of the study, the insight offered by the conceptual model aims to increase the awareness of cluster firms of the dark side of over-embeddedness in cluster

networks and provide guidance to the relevant institutions and policy-makers on how to assist cluster firms to minimise or mitigate the negative effects, through cluster policy and support schemes.

3.6 CHAPTER SUMMARY

This chapter establishes the conceptual model in accordance with the research aim, objectives and research gaps identified in Chapter 1 and Chapter 2. The proposed conceptual model is theoretically deduced and supported by prior theoretical and empirical studies from the literature on social capital, innovation and cluster networks reviewed in Chapter 2. The model (as illustrated in Figure 3.1) consists of two parts. Firstly, the four dimensions of social capital developed from Nahapiet and Ghoshal's (1998) three dimensions of social capital (structural, relational and cognitive) with the addition of the proximity dimension based on the concept of proximity (Boschma, 2005). The proposed four dimensions of social capital are used to assess the suggestion that the structural, relational, cognitive and proximity dimensions may produce negative effects. The second part of the model concerns the way the negative effects of social capital, drawn from the taxonomy presented in Table 2.10, Section 2.2.4, can negatively affect the innovative performance of firms in cluster networks. This portion of the model addresses the mechanism of the negative effects of social capital on innovation. The proposed model aims to broaden understanding of the dark side of social capital and its effects on the innovation performance of firms in cluster networks and provide guidance to practitioners and policy-makers on how to manage or mitigate the negative effects of social capital.

The proposed model is validated using empirical data (Chapter 5) in order to satisfy the aim of the research. This evaluation both allows the model to be refined and develops a comprehensive understanding of how the various parts bond together. It will also guide the methodology and data collection in the following chapter (Chapter 4) which will discuss the appropriate methodology, the research philosophy, data collection and analysis.

Chapter 4 : METHODOLOGY

4.1 INTRODUCTION

This chapter addresses the question of how research can generate knowledge about the social world (i.e. the research methodology) and what methods are used to create such knowledge in the field of study (i.e. the research design) (Easterby-Smith, 2012). In Section 4.2, the philosophical stance of the research is discussed and why interpretivism is most appropriate for the development of knowledge in the domain of this study is justified. Section 4.3 elaborates on the choice of a deductive approach to research and how it influences the research process. Section 4.4 describes the research design employed to empirically verify the conceptual model illustrated in Chapter 3. The methodological choice of a qualitative method is discussed, as is the data collection and data analysis. In Section 4.5, ethical considerations are addressed, in compliance with Brunel University's Research Ethics Committee (REC) requirements. The risks of bias along with mitigating techniques are highlighted in Section 4.6. Section 4.7 clarifies how this research is evaluated to ensure its creditability, transferability, dependability and confirmability. Lastly, the summary of this chapter is presented in Section 4.8.

4.2 SELECTING THE RESEARCH PHILOSOPHY

The research paradigm or research philosophy is comparable to the world view of the researcher and is shaped by the frame of reference or set of beliefs and assumptions accrued through engaging with the social world. This serves as the foundation of the research method by which the research should be conducted in order to generate the requisite knowledge (Guba and Lincoln, 1984).

According to Guba and Lincoln (1994), there are four distinct paradigms, positivism, post-positivism, critical theory and interpretivism. Each accommodates a different world view of the researcher, resulting in the acquisition of an alternative collection of knowledge. However, in social science, the research philosophy often narrows to either positivism or interpretivism (Bryman and Bell, 2015; Saunders et al., 2012).

The world views of the researcher that delineate the research paradigm can be better understood by addressing three interconnected questions: ontological (“*what constitutes reality?*”); epistemological (“*what constitutes valid knowledge?*”); and methodological (“*how this can be established?*”). The answer to one question is constrained by the way the others are answered, providing the researcher with guidance about the way the topic should be investigated, and how the data should be gathered, analysed and interpreted (Easterby-Smith, 2012; Guba and Lincoln, 1984; Johnson and Duberly, 2000).

Questions	Positivism	Interpretivism
Ontology question: What is the nature of social entities?	Reality is objective, concrete and singular.	Reality is socially constructed therefore, reality is subjective, multiple, and may change.
Epistemology question: How can we know what reality is?	Only observable phenomena can provide credible data and facts. There is a focus on causality and law-like generalisations, reducing phenomena to their simplest elements	There is subjective meaning to social phenomena. There is a focus on the details of situations, and the reality behind those details.
Methodology questions: How can the inquirer go about finding out what he/she believes can be known?	Following the methods of natural scientists, researchers act as observers.	Following the methods of social scientists, researchers act as social scientists.
Data collection technique most often used	Highly structured with large sample sizes e.g. surveys.	Small samples with in-depth investigations e.g. interviews.

Table 4-1: Comparison of positivism and interpretivism based on ontology, epistemology and methodology questions

This research follows the interpretivist paradigm. The following sections justify the reasons for choosing this paradigm and differentiate it from positivism in terms of ontology, epistemology, axiology and methodology.

4.2.1 ONTOLOGY CONSIDERATIONS

Ontology considers whether the nature of reality pertains to objective entities that exist independently of the perceptions and actions of the social actor (a concept commonly referred to as ‘objectivism’) or exist as a result of it (referred to as ‘constructionism’). **Objectivist** researchers are inclined to view the world as static, with a single entity to be established, and perceive research as about discovering that objective truth. Their reality is exterior to the social actors and independent of the cognitive structure. Therefore, the truth is immutable regardless of who the investigator is. In contrast, the reality of **constructionism** is developed by social actors’ experiences and interactions with the world. As such, there are multiple realities that are only knowable through the understanding of different points of view.

This research sets out to study the perspective of participants in regards to how they make sense of the social environment, by attempting to reconstruct their worldview in order to understand social phenomena (Gray, 2014). The lack of universal agreement on the terminology of social capital postulates a controversial interpretation of the concept that the reality can be multiple, rather than being absolute, static or existing independently of social actors. Embracing the relational and cognitive stances of social actors, that is developed from interaction within the social context they are embedded in, goes beyond a widespread structuralist perspective that merely investigates the network structure in an objective manner (Borgatti and Foster, 2003). Actors can have various perceptions. Social capital in this research is therefore viewed as social construct instead of an objective entity that separates reality from its social context.

4.2.2 EPISTEMOLOGY CONSIDERATION

As the ontological question involves the philosophy of reality, the epistemological question concerns what is regarded to be appropriate, or what constitutes acceptable knowledge and the relationship between the researcher and what can be known (Easterby-Smith et al., 2014; Gray, 2014; Saunders et al., 2009). Objectivism is closely linked to **positivism**, which argues that reality exists externally of the researcher, thus the relationship between the researcher and knowledge is separate, and acceptable knowledge must therefore be investigated through the rigor of scientific inquiry (Gray, 2014). However, **interpretivists** argue that treating phenomena as a law-like generalisation causes rich insight to be lost. Interpretivists recognise the validity of knowledge derived from the understanding (verstehen) of the subjective

meaning individuals attach to their behaviour and surroundings (Guba, 1990) and only social construction can provide an understanding of reality (Bryman and Bell, 2016; Myers, 2013).

Positivism is the dominant method in social capital research (Lee and Jones, 2015). As positivism assumes that observations of phenomena can be made objectively through quantifiable measurement, rather than interfered subjectively (Galliers, 1992), social capital is a plausible concept that can be predicted and measured (Lee and Jones, 2015; Molina-Morales and Martinez-Fernandez, 2006). Positivist scholars have repeatedly developed robust, large-scale surveys and treated social capital as a process or pattern of interconnection between social actors (e.g. Cuevas-Rodriguez et al., 2014; Gebreeyesus and Mohnen, 2013; Li et al., 2013b; Li et al., 2016; Molina-Morales et al., 2011; Ozer and Zhang, 2014). Even so, positivists are able to generate valuable knowledge and generalise their findings, however, they struggle to tap into specific features of relationships that are unquantifiable (Gedajlovic et al., 2013). Based on the ontology of constructionism, interpretivists acknowledge the inter-subjective nature of reality and thus understand social capital as an interpretive process of social interaction between social actors (Borgatti and Foster, 2003; Lee and Jones, 2015).

4.3 RESEARCH APPROACH: INDUCTIVE VERSUS DEDUCTIVE

The research approach denotes the relationship between theory and research (Bryman and Bell, 2016), whether the research is a ‘deduced’ hypothesis derived from theory, or an ‘inductive’ proposition. The approach to research is often depicted as a pyramid. With a **deductive approach**, the upside-down pyramid has a theoretical foundation that narrows to a hypothesis or proposition, using data collection to evaluate whether hypotheses or propositions are confirmed or rejected in accordance with the theory. Therefore, the aim of a deductive approach relates closely to theoretical testing. This is in opposition to an **inductive approach** that avoids being influenced by pre-existing theory, concentrating on generating new knowledge using a bottom-up approach. The data collected is used to explore a phenomenon and later craft a conceptual model (Saunders et al., 2012).

This study takes a deductive approach in which the literature is used as a frame of reference and the scope of the study and the design of the research are decided prior to the empirical fieldwork. As topical theories predate this phenomenon, further development of these theories appears to be appropriate. The deductive element of this research is influenced by the conceptual framework that integrates Nahapiet and Ghoshal’s (1998) social capital dimensions (structural, relational and cognitive) with proximity (Boschma, 2005) between

cluster firms in the context of clusters (as presented in Chapter 3). Silverman (2013) posits that rather than taking the research problem at face value, theoretical imperatives can steer the analytic conception and drive the research onto a path that provides a valuable perspective on the social phenomenon. Besides, a deductive approach allows the conceptual framework to be examined by comparing emerging data from empirical studies with existing research and hypotheses.

4.4 EMPIRICAL RESEARCH METHODOLOGY

After identifying and justifying the research philosophy and research approach, the next section addresses the question of what, in the researcher's belief, can be known and what are the methods used to generate knowledge (Lincoln and Guba, 1984). Denzin and Lincoln (2003) and Staller et al. (2008) describe methodology as the way information is gathered to fit the research paradigm. Figure 4-1 presents the process of research from start to end including the processes of research design, data collection and data analysis, discussed in the following sections.

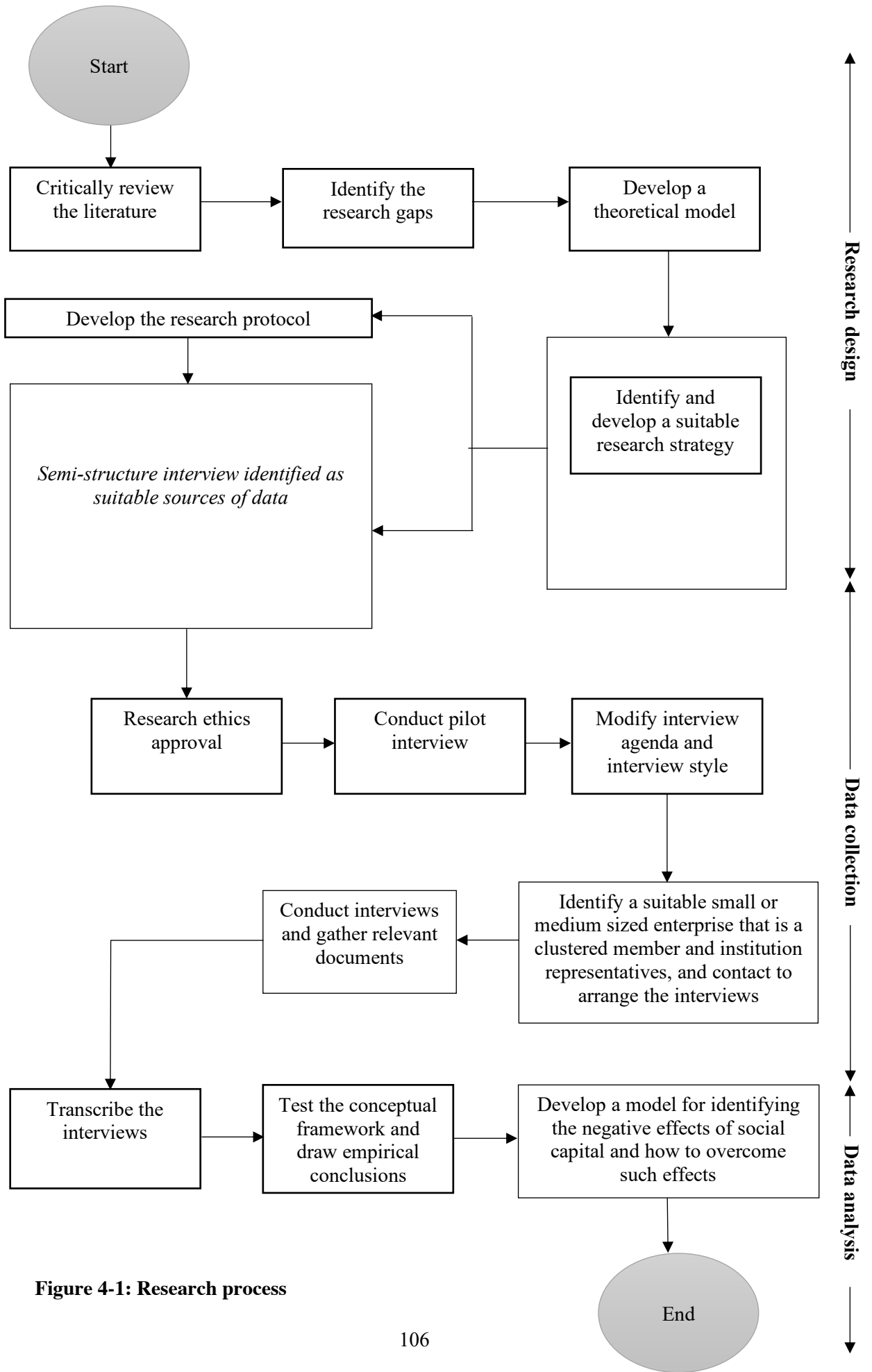


Figure 4-1: Research process

4.4.1 RESEARCH DESIGN

Research design is the first step in the empirical research process, as illustrated in Figure 4-1. The research design is the comprehensive plan of the methods and procedures the researcher uses to answer the research question (Malhotra et al., 2012). It assists the researcher to acquire the most valid findings by setting the boundaries of the study and determining the type of investigation. This includes consideration of the nature of the research, methodological choice, research strategy and time horizon. Effective research ensures the reliability of the findings (Saunders et al., 2012).

4.4.1.1 NATURE OF RESEARCH

The nature of a research project can be categorised as exploratory, explanatory or descriptive. Exploratory studies set out to explore and discover new insights into a topic of interests, pose enquiries and evaluate phenomenon leading to new knowledge. Exploratory studies are expected to be used when the knowledge available is limited (Gray, 2014). Explanatory studies are the investigation of causal relationships between concepts and variables under a particular phenomenon and are predominantly quantitative, where the data is subject to statistical tests such as correlation. They involve hypothesis testing in order to explain variances and predict outcomes. Descriptive studies aim to describe certain characteristics of a specific event (Saunders et al., 2012; Yin, 2014).

Therefore, from this classification, this research is exploratory in nature. This is because the research focus is extensive, reviewing the literature to find new insights into this emerging research area, the dark side of social capital, particularly with regard to innovative performance of firms in cluster networks. It emphasises ‘how’ social capital can impede the innovative performance of firms in cluster networks. Also, social capital is a multidimensional concept (Nahapiet and Ghoshal, 1998) that does not rest only on the quantifiable structural configuration of the network, but also on the qualitative aspects of relationships. This requires an understanding, rather than an explanation, of social actors’ behaviour (Bryman and Bell, 2016). Furthermore, there are a limited number of studies relating to the negative effects of social capital in the context of clusters. An exploratory study seeks to explore what is happening, building on and broadening existing findings, as well as generating new theoretical insights in underexplored fields (Gray, 2014; Maurer and Ebers, 2006).

4.4.1.2 METHODOLOGICAL CHOICE

Methodological choice refers to the choice of whether to conduct the research following qualitative or quantitative methods or mixing both (Saunders et al., 2012). Positivist research philosophy is often associated with a quantitative research strategy. **Quantitative** methods are based on quantifiable measurements and observations, which lead to statistical analysis. This approach focuses on causality by confirming a hypothesis or testing a proposition by reducing the phenomena to their constituent elements, usually using surveys or questionnaires. This is in contrast to the interpretivist approach adopted in this study, which emphasises the ways in which individuals subjectively interpret their social worlds, measured using **qualitative** methods. The role of qualitative researchers is to gain a deep, intense and holistic overview of the study. This research aims to answer ‘how’ and ‘why’ questions relating to the relationship between social capital and the innovative performance of firms in cluster networks, in which qualitative techniques can elicit a detailed investigation and provide a more in-depth theoretical understanding (Bryman and Bell, 2016; Yin, 2014).

Studies of social networks in the field of organisational study primarily answer two research questions, with ‘what’ and ‘how’ aspects (Carpenter et al., 2012). The ‘what’ question is evidently dominant in social capital research, as only 7% of researchers over the last two decades adopt a qualitative approach to answer the ‘how’ question (Payne et al., 2011). Quantitative researchers tend to study and measure different aspects of social capital in isolation, aggregating their findings into large-sample patterns or path-dependent algorithms denoting network action (Lounsbury and Ventresca, 2003). Therefore, highlighting the structural features of networks and measuring the extent of networking activity is beneficial, yet limited, in providing a detailed explanation of the relational content and what actually occurs between connections (Algezau and Filieri, 2010; Camps and Marques, 2014; Huggins, 2000; Jack, 2010). However, Ibarra (1993) states that studies which rely on surveys or questionnaires lack well-developed theoretical explanations of the mechanisms that produce variation in the structural characteristics of, and access to, interactive networks. As they are limited by the variety of questions that can be asked, they risk missing informational nuance (Knox et al., 2006), preventing the ‘why’ and ‘how’ aspects from being answered sufficiently.

Few studies adopt a qualitative approach to gauging the dynamic and fluid nature of social capital, which is difficult to capture and understand using quantitative methods alone. The qualitative approach provides an in-depth description of the real context of the phenomena

relating to social interactions, and emphasises the social construction of reality, as well as focusing on revealing how extant theory operates in a specific case and context (Camps and Marques, 2014). This allows the content aspects of networks to be examined and new variables and relationships to be discovered (Bryman and Bell, 2016). The more used qualitative approach is therefore critical for increasing understanding and would certainly complement, supplement and even challenge existing research (Jack, 2010). For these reasons, it is decided that the best method to adopt for this study is qualitative.

In general, an inductive approach is associated with qualitative research methods, while a deductive approach is associated with quantitative research. However, this creates a situation where theories are tested only on those elements of the social environment that are amenable to quantification, whereas the generalisability of these theories, beyond the scarce quantifiable aspects of social processes, remains unaddressed. Nevertheless, Patton (1991) argues that qualitative researchers can adopt both inductive and deductive approaches. This research aims to overcome the methodological deficiency by using a deductive approach to qualitative research. This offers a rich understanding of the topic beyond explanation of the quantifiable measurement (Bitektine, 2008).

4.4.1.3 RESEARCH STRATEGY

Having justified the use of interpretivism as the epistemological stance (see Section 4.2.2) and adopting a qualitative exploratory research approach (see Section 4.4.1.1), this section justifies the research strategy of this study. Galliers (1992) explains that a research strategy is the process by which research is conducted, including the techniques and methods of data collection. The prevailing research strategies used are experiment, survey, archival research, case study, ethnography, action research, grounded theory, narrative inquiry and mixed methods (Saunders et al., 2012). Yin (2014) emphasises that to choose between research strategies, there are standards that need to be taken into consideration:

- The kind of the research question to be addressed;
- The degree to which the researcher can control the research setting; and
- The degree of the research's focus on contemporary, as opposed to historical, events.

Considering these standards and the nature of the research question, case study appears to be the most appropriate strategy. The various perceptions of social capital, the necessity of studying the phenomenon in its natural setting, the need to cope with resource constraints such

as time, budget and access to data, and most notably the need to capture ‘reality’ and ‘rich’ primary data, all need to be taken into consideration, along with the reasons advocated by Yin (2014). Therefore, a case study research is adopted.

Case study is an appropriate research strategy when the research seeks to address in-depth questions of ‘why’ or ‘how’ a complex social phenomenon occurs. A case study method can be used to describe a phenomenon, test theoretical concepts and relationships, build theory, or be used for all of these. Following the deductive approach (see Section 4.3), a case study can be used to examine a research proposition by comparing emerging data with existing research and hypothesising connections among newly identified factors and results (Benbasat et al., 1987; Yin, 2014).

A case study can be conducted of single or multiple cases. A single case study focuses extensively on a single case, allowing the researcher to get a deeper understanding of the subject and make a significant contribution to knowledge and theory building by confirming, challenging or extending theory. However, single case study generally faces the criticism of being difficult to replicate and only suitable for certain circumstances and rationales (Yin, 2014). Multiple case study allows the researcher to analyse data both within each case and across cases (Yin, 2014) and thereby understand the similarities and differences between cases. It allows more compelling and robust findings and creates more convincing theory with its wider exploration of research questions and theoretical evaluation. Incorporating multiple cases (multiple cluster companies), permits comparison, contrast and verification which offer a more solid and broader view of the subject (Miles and Huberman, 1994).

There are critical voices against case study as a research strategy. Some of the key arguments include a risk of taking an unstructured and biased approach, restriction on generalisation and being time consuming. It may also result in very complex data to analyse (Yin, 2014). While bias cannot be completely eliminated, being aware of this as a weakness allows the researcher to take precautionary action to minimise the negative effects. The criticism of generalisation is addressed through conducting multiple cases from various industry and non-cluster company/members interviews. Further discussion of bias is presented in Section 4.6.

4.4.1.4 TIME HORIZON OF THE RESEARCH

Due to the time constraints that characterise PhD research, this study adopts a cross-sectional rather than longitudinal time horizon, meaning that instead of the study changing and

developing over a period of time, the phenomenon is studied within a brief window. Therefore, the findings represent a ‘snapshot’ of time. This does not necessarily imply in any way that cross-sectional studies provide less detailed information (Stam et al., 2014).

4.4.2 DATA COLLECTION

This section offers a detailed explanation of the data collection strategy, in which the boundary of the sample and the methods of data collection are derived from the aim and objectives of the research. Before these are discussed, the level of research needs to be reviewed to clarify the focus of the study.

4.4.2.1 DEFINING THE LEVEL OF THE STUDY

Garcia (2006, p.11) points out that social network studies are complex as they have no natural frontiers. Scholars examine social networks from a variety of perspectives, using different levels of study and constructs. For example, networks can be identified as the context (in which actors are embedded and which can impact their actions) (Granovetter, 1985; Porters, 1998) or as the phenomena under study (Provan et al., 2007). Subsequently, researchers’ theoretical models can focus on various directions of causality, that is, whether networks and network features serve as causes or consequences in those theoretical models (Borgatti and Foster, 2003). The level of construct can range from an individual actor to a nation, from a single node to dyadic ties between pairs or the whole network (Carpenter et al., 2012; Moliterno and Mahony, 2011). This creates confusion and difficulty when comparing findings.

Hence, it is important that researchers clarify the boundaries and relationships to be studied. Firms can be embedded in a multiplicity of networks. However, to avoid confusion and methodological problems, this research follows the guidance of Carpenter et al. (2012) whose systematic research provides a classification scheme for network research in organisational contexts, as illustrated in Figure 4-2.

The systematic research of Carpenter et al. (2012) responds to confusion in network-related studies, including within the contextual literature relating to organisations, by dividing network studies into four cells (2x2) based on the direction of causality (social capital research or network development research) and the level of the network (interpersonal or inter-organisational).

	Interpersonal-Level Research: Research in Which Actors Are People in Organizations	Interorganizational-Level Research: Research in Which Actors Are Organizations or Their Representatives
<i>Social capital research: Research in which networks serve as causes and predictors and their consequences are examined</i>	<i>Cell 1: Social capital research at the interpersonal level</i> (examining the effects of networks on individual members in organizations) Example: Burt (1997), "The Contingent Value of Social Capital," <i>Administrative Science Quarterly</i> , 42: 339- 365.	<i>Cell 2: Social capital research at the interpersonal level</i> (examining the effects of networks on firms and other organizations) Example: Peng & Luo (2000), "Managerial Ties and Firm Performance in a Transition Economy: The Nature of a Micro-Macro Link," <i>Academy of Management Journal</i> , 43: 486-501.
<i>Network development research: Research in which networks serve as consequences and phenomena of interest and their formation and change are examined</i>	<i>Cell 3: Network development research at the interpersonal level</i> (examining the patterns and determinants of formation and evolution of networks formed by individual members in organizations) Example: Burkhardt & Brass (1990), "Changing Patterns or Patterns of Change: The Effects of a Change in Technology on Social Network Structure and Power," <i>Administrative Science Quarterly</i> , 35: 104- 127.	<i>Cell 4: Network development research at the interorganizational level</i> (examining the patterns and determinants of formation and evolution of networks formed by organizations in industry) Example: Rosenkopf & Padula (2008), "Investigating the Microstructure of Network Evolution: Alliance Formation in the Mobile Communications Industry," <i>Organization Science</i> , 19: 669-687.

Figure 4-2: A classification scheme for network research in organisational contexts

Source: Carpenter et al. (2012, p.1331)

Firstly, that which is grouped under 'social capital research' aims to investigate the network as the antecedent or predictor of outcomes, rather than focusing on the development or evolution of the network as in 'network research development research'. This study comes under the social capital research group as it studies the outcomes and effects of social networks and clusters (Adler and Kwon, 2002; Carpenter et al., 2012; Lin, 2002).

Secondly, the level of the network is determined by the scope of the focal actors, either at interpersonal or inter-organisational level. This study defines a cluster as an inter-firm network, where the various actors connect and interact with one another (similar to other scholars such as del-Corte-Lora et al. (2017)). However, Capaldo (2007) and Kadushin (2012) argue that the boundary between interpersonal and inter-organisational is quite blurred. In practice, inter-organisational relationships are managed by individual boundary spanners who interact on behalf of their organisations. Accordingly, behaviour at the individual level

impacts inter-organisational relationships and outcomes at organisation level. This argument is strong in the case of small firms where inter-firm relationships develop from the social interactions between owners or managers, rather than the departments of firm. Consequently, this study also emphasises the interpersonal side of inter-firm in cluster and takes it into account at inter-firm level.

Finally, the study focuses on the single node level, facilitating the derivation of outcomes for individual firms participating in the cluster under examination instead of the performance of the cluster itself.

4.4.2.2 SAMPLE CONSIDERATION

This research selectively focuses on SMEs that are members of cluster networks, proposing that the aggregate scale of these companies has an effect on the level of social capital and embeddedness, and so innovative performance (as discussed in Chapter 1). The sampling parameters outlined in the table below follow Miles et al.'s (2013) sampling parameters and are derived from the aim and conceptual model of this research.

Sampling parameter	Sample
Settings	SME cluster networks across diverse industries
Participants	Owners of small and medium-sized enterprises that are members of cluster networks, and the representatives of institutions involved in cluster development
Events	Networking between the cluster members and the development of social capital
Processes	Conceptualisation of the negative effects of social capital towards innovative performance and the establishment of solutions that minimise such negative effects

Table 4-2: Sampling parameters

Source: Adapted from Miles et al. (2013)

This research uses a 'non-probability' or 'purposive' sampling technique. With this technique, the choice of sample is based on the researcher's own opinion of what participant characteristics are desirable in order to derive the most significant insight, and who might possess them (Saunders, 2012). This sampling technique is recognised to provide in-depth

information (Cohen et al., 2011) and to be driven by qualitative research and the interpretative epistemological posture identified previously (Easterby-Smith et al., 2012).

- Criteria and steps for selecting the research sample

Step1: the criteria for the research sample

I. DEFINITION OF SMALL AND MEDIUM SIZED ENTERPRISES

The first criterion for selecting the sample is the official definition of SME by the Small and Medium-sized Enterprise Development Bank of Thailand. There is no universal definition of SME, as it varies by country or qualitative definition. In Thailand, the criteria for a SME include the sector of business, number of employees and value of the assets the business holds.

Size of business Industry	Small enterprises		Medium enterprises	
	Criteria			
	No of employees	Value of assets	No of employees	Value of assets
Manufacturing	<50 employees	< 50 million Baht	>50 but <200 employees	>50 but <200 million Baht
Service	<50 employees	< 50 million Baht	>50 but <200 employees	>50 but <200 million Baht
Wholesale	<25 employees	< 50 million Baht	>25 but <50 employees	>50 but <100 million Baht
Retail	<15 employees	< 30 million Baht	>15 but <30 employees	>30 but <60 million Baht

Table 4-3: Definition of small and medium sized enterprises in Thailand

Source: The Small and Medium Enterprise Development Bank of Thailand (2014)

II. INDUSTRIAL CLUSTERS

The second criterion is registration with the Thai Department of Industrial Promotion (DIP), which is responsible for the development of clusters. As SMEs are highly informal and have access to limited public information, initial firms are identified through their registration with the DIP. There are 17 SME cluster networks listed on the DIP's site from various industries.

While, focusing on a single industry carries strong advantages relating to the homogeneity in the meaning and duration of the relationship but endangers the generalisability of the findings (Ahuja, 2000; Casanueva et al., 2013). Therefore, this research selects clusters from a wide range of industries, avoiding the usual approach of analysing high-tech or knowledge-intensive industries when considering clusters as the context of the study (Capello, 1999; Chiu, 2009).

III. CLUSTER CHARACTERISTICS

The third criterion is the activeness of cluster networks. Because the aim of the research is to investigate the effect of over-embeddedness, the participants need to be engaged in active networks. This criterion is checked via DIP's site as well as confirmed via the telephone call made to the presidents of each cluster network that fall within the two criteria above.

The researcher uses the criteria identified above and the lists of cluster members from the DIP for information about clusters and members as a preliminary assessment to ensure they are in active networks and match the Small and Medium Enterprise Development Bank of Thailand's definition of SME. The population of the study includes any firms that fall within these criteria.

Step 2: identifying suitable participants

The identification of suitable participants aims to target those that meet the criteria of the sample and are most likely to yield the richest data. There are grounds for arguing that a more relevant methodological approach would be to focus on the owners of SMEs when studying social phenomena in this context (Hill and Wright, 2001). As the owner is a representative of the firm, in the case of a SME, his or her individual perspective best explains the socio-cultural issues of social capital (Giuliani et al., 2018; Huber, 2009; Stam et al., 2014).

I. SNOWBALL SAMPLING TECHNIQUE

Establishing the criteria and attempting to identify potential participants reveals a limited number of available participants. The study targets at least two participants from each cluster network. The sample is therefore broadened using the snowball technique, in which the researcher contacts participants (particularly the presidents of the clusters) and asks them to propose or persuade other possible participants who fit the criteria to participate in the study. This particular technique is recommended and highly useful when networks of individuals are

the focus of attention or when the research focuses on or reflects the relationships between people or tracing connections (Bryman and Bell, 2016; Patton, 2014).

II. HETEROGENEOUS OR MAXIMUM VARIATION SAMPLING TECHNIQUE

Even though the snowball technique can provide rich information, there is a danger of including only a homogeneous sample with similar characteristics (Patton, 2014) and therefore a risk of drawing biased conclusions. This is highly relevant to the current research as the level of social capital and embeddedness is largely determined by inter-organisational factors, so another sampling technique is needed.

Combining multiple sampling techniques is not unusual. It often strengthens the validity and rigour of the findings. The heterogeneous sampling technique relies on the researcher's judgement in selecting participants with diverse characteristics. Hence, the second round of interviews includes the perspectives of those that Miles and Huberman (1984) call 'neighbours', who are not central to the phenomenon, but are on the periphery. This includes participants from supporting organisations who play a role in cluster development (Expósito-Langa and Molina-Morales, 2010), but who are not within the close social circle of SME owners. The researcher contacted various organisations. The representative of the government agency (the Department of Industrial Promotion) and the Thai Chamber of Commerce (TCC) agreed to be interviewed. The DIP is responsible for establishing interconnections between cluster members throughout the supply chain, whereas the TCC serves as a coordinating agent between the government and private sector as well as a cluster development agent promoting cluster activities. The interviews address the question of the level of social capital within cluster networks, the management of social capital and the practicality of the framework. Subsequent analysis of these diverse perspectives reveals interesting key patterns that mostly match, confirm or add further explanation and elaboration to the views of the first group of participants.

Finally, the total number of research participants was narrowed to 25; 23 owners of firms from 11 of the 15 cluster networks that meet the criteria, and 2 representatives of institutions. The expected sample was one participant from clusters than have less than 20 members and at least two participants from clusters that have over 20 members (an expected total of 35-40 participants). However, nearly half of the potential participants contacted refused the interview.

The reasons provided include limited time and a lack of understanding and knowledge of the topic. The researcher's restriction on time, budget and access to data about cluster members also played a role in determining the final number of participants. Nevertheless, in some clusters, the researcher did have the opportunity to interview more than two members (three), providing extra insight.

While the total number of participants was relatively small, they all generated insightful information to meet the needs of the research. The sample size meets the suggested minimum of 5-25 for semi-structured interviews (Saunders et al., 2012). Moreover, 'data saturation' was reached in the later interviews, as new information stopped emerging. As highlighted by Jack (2005) the value of research lies in its capacity to provide insight, rich detail and thick description rather than the number of participants.

Gray (2014) suggests that the sample size should not be too large as it might be difficult to extract thick and rich data. At the same time, it should not be so small that it becomes difficult to achieve theoretical data saturation (Corbin and Strauss, 2008; Flick, 2009). The small number of samples allowed the researcher to concentrate on fewer participants and intensify the investigation, which led to a holistic understanding of the complex objectives of the inquiry and their embedding in a context of action (Eisenhardt and Graebner, 2007). The table below provides examples of relevant studies that have relatively small sample sizes.

Authors	Aims of the study	Data collection
Edelman et al. (2004)	To explore the benefits and drawbacks of social capital in organisations	Interviews with 16 senior and/or middle managers of organisations
Maurer and Ebers (2006)	To investigate how the configuration, management and evolution of entrepreneurial firms' social capital affect firm performance	Interviews with 19 founding entrepreneurs and senior scientists
Eklinder-Frick et al. (2011)	To describe bonding and bridging forms of social capital in the empirical setting of a regional strategic network	A case study of a regional network, 15 interviews with managers

Lindstrand et al. (2011)	To examine how individual's social capital and its dimensions affect biotech SMEs' acquisition of foreign market knowledge and financial resources during their internationalisation processes	Longitudinal cross-case study of 14 Swedish biotech SMEs
Weber and Weber (2011)	To investigate social capital and social liability resulting from network formation and transformation and assess their impact on inter-organisational knowledge transfer and creation	Interviews with 34 founder entrepreneurs, investment professionals, CEOs and relevant managers
Eklinder-Frick et al. (2012)	To investigate both positive and negative effects of social capital in regional strategic networks	A case study of a regional network, 15 interviews with managers
Lowik et al. (2012)	To investigate whether relational capabilities mitigate the negative effects of over-embeddedness	Interviews with 20 CEOs or operation managers
Camps and Marques (2014)	To explore the three dimensions of social capital in depth and how they link with different types of innovation capabilities	Interviews with 10 employees at managerial level of a company

Table 4-4: Examples of other studies with a small number of participants

4.4.2.3 METHODS OF COLLECTING DATA

Data collection involves the identification of the methods of data collection and the determination of the appropriateness of the data collection tool. To contribute to the reliability and validity of the findings, the study adopts multiple sources of primary data (i.e. interviews, field notes and archival data) which ensures a high level of data consistency.

- Semi-structured interview

Interview refers to a conversation in which a mixture of open and closed questions is asked, and answers are given. The researcher improvises using his/her own judgement. Interview can serve as a means of gathering rich information about a person's knowledge, values and attitudes, to test out a proposition or identify variables and their relationships (Cohen et al.,

2002). There are a number of situations in which the interview is the most logical research technique, such as when the objective of the research is largely exploratory involving the examination of experiences, opinions, feelings or attitudes (Gray, 2014).

There are various types of interview technique, for examples, structured interviews and semi-structured interviews. This research adopts the semi-structured interview as it is most appropriate when the research is exploratory in nature and requires a deep understanding not only of 'what' but also 'why'. It allows the researcher to probe for more detailed responses and allows the respondent to expand their answer to clarify what they have said (Gray, 2014).

Drawing on the literature review and the conceptual framework, interview agendas were developed as guidance for the researcher during the semi-structured interviews. Two interview agendas were used. Interview Agenda A (for owners of cluster firms) covers questions regarding the conceptual model, social capital within cluster networks and its effect on innovative performance, as well as the validity and practicality of the conceptual model. There are six sections to be addressed: 1) general information about participants and their cluster network; 2) innovation capability and innovative performance; 3) the relationships within clusters; 4) the negative effects of social capital; 5) management of the social capital and its negative effects; and 6) the validity of the conceptual framework.

To determine the appropriateness of the interview agenda, two pilot studies were conducted via telephone. As the sample of the study is Thai cluster firms, it was not convenient to conduct interviews in person at this stage. Hence, the participants for the pilot study were contacted via telephone. The participants in the pilot study were identified based on the same criteria for sample identification mentioned. The pilot study provided an opportunity for the researcher to discuss any vagueness or ambiguity in the interview agenda, refine this agenda, optimise question phraseology and practice interview technique.

Prior to the actual data collection, the potential participants were contacted, initially by phone, to ascertain whether they agreed to be interviewed. A formal introductory e-mail consisting of a participant information sheet (see Appendix B) followed, outlining the purpose and process of the research, the confidentiality that applies to the information given and that the outcomes of the research would be sent to the consenting participants. It assured them that the information they provided would remain confidential and each interviewee was assured of anonymity in accordance with research ethics. An overview of the interview agenda (see

Appendix C) was sent to the participants at least 48 hours before the interview, to allow them to reflect on the questions in advance.

The interviews were conducted through the interview agendas, which mostly comprise open-ended questions. As SMEs do not necessarily have formal reports on innovation performance, Expósito-Langa et al. (2015) and Vlaisavljevic et al. (2016) suggest that subjective assessments can be improvised if precise performance indicators are not available.

The interviews were conducted over two sessions, between February 2017 and May 2017. The first set of interviews was with SME owners and the second set was with the government agency and business association who contribute to cluster development in Thailand. The length of each interview in the first set was about one hour to one hour and thirty minutes and in the second set was about one hour. Every individual interview was conducted on a one-to-one basis to stimulate discussion and overcome any obstacles that may have arisen between the researcher and interviewee. The interview process took place at the interviewee's workplace, mainly in the offices of the interviewee or available meeting rooms, which were silent with no interruptions. The natural setting improved the likelihood of capturing details and making sense of the individual's subjective understanding. During the interviews, the verbal and non-verbal reactions of the respondents were considered as part of the feedback.

Drawing on the findings from the first round of interviews, which focused on the owners' perspectives of over-embeddedness and its undesired effects, the decision was made by the researcher to conduct a second round of data collection. The second-round of interviews included the perspectives of the government agency directly responsible for cluster policy, and the business association responsible for SME development. This decision derived from the quest to obtain a more holistic picture and fully understand the perspective of the institutions on the practicality of the conceptual framework, in line with Geldes et al. (2015) who suggest that future research should incorporate other actors who play a role in promoting and facilitating inter-firm activities. Interview Agenda B (for institutional representatives) focused on an overview of the intra-cluster relationship, current policy and guidance on managing the negative effects of over-embeddedness, and the feasibility of the suggested guidance on managing negative effects drawn from the first round of interviews (see Appendix D).

The following table is a list of all the interview participants. For confidentiality reasons, the participants are referred to as 'F' for the owners of cluster firms and representative from

institutions are referred to by the organisation. In total, the researcher interviewed 25 individuals. Table 4-5 provides a breakdown of the individuals interviewed, their cluster or organisations, the number of hours spent interviewing and how the interviews were conducted.

Code	Interviewees' cluster or organisation	Number of cluster members	Number of interviews per cluster or organisation	Process
F1	National herbal cluster	26	1	Formal interview - Semi-structured interview agenda (refer to Appendix C) - About 60-90 minutes for each participant - One-to-one basis
F2	Starch manufactory	20	1	
F3	Maha Sarakham's cow and dairy	104	2	
F4				
F5	Thai leather cluster	24	3	
F6				
F7				
F8	Can cluster	28	1	
F9	1 st Craft cluster	20	3	
F10				
F11				
F12	Eastern Para wood product cluster (EPPC)	20	3	
F13				
F14				
F15	Ceramic (Lampang) cluster	28	3	
F16				
F17				
F18	Bangkok fashion cluster	51	2	
F19				
F20	Thai food cluster	44	2	
F21				
F22	Tea cluster	20	2	
F23				
TCC	Business association		1	Formal interview - Semi-structured interview agenda
DIP	Government institution		1	

				(refer to Appendix D) - About 60 minutes for each participant - One-to-one basis
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Table 4-5: List of interview participants

These interviews were all recorded, transcribed verbatim and analysed. NVivo 11 software (a computer assisted qualitative data analysis software) was used for storing and retrieving the interview transcripts as well as the development of a manual coding system for data analysis. In subsequent chapters, quotes from the owners and representatives of the government institution and business association are used to support the thematic analysis.

- Field notes

The raw field notes were written up immediately after the interview with each participant to ensure the accuracy of the interviews. The field notes in this research captured both descriptive (i.e. non-verbal behaviour and any interruptions during the interviews) and reflective information beyond the interview records. Making field notes provided an additional context to understanding the phenomena and a descriptive narrative which was referred to during the data analysis.

- Secondary data

Secondary data was obtained mainly from cluster development organisations, research on cluster development in Thailand, and the company and cluster websites. Secondary data were also analysed comprehensively to support the empirical evidence reports which assisted in the development of findings and conceptual framework.

4.4.3 DATA ANALYSIS

Analysis is the process of refining data to generate, develop and verify concepts (Corbin and Strauss, 2008). Data analysis is the final part of the empirical research methodology. Empirical data obtained from the data collection procedures was analysed in order to draw empirical conclusions.

The data analysis began simultaneously with the data collection, which gave the researcher an opportunity to fill any gaps that existed in the data collected by suggesting new questions or a new focus for the interviews and indicating relevant or non-relevant constructs (Gray, 2014).

This study adopts a thematic analysis method. Thematic analysis is a method of identifying, analysing and reporting patterns within data. The central framework for conducting a thematic analysis is to construct an index of central themes and subthemes, based on the research participants reported events and actions (Braun and Clarke, 2006). There are two level of interpretative thematic analysis, semantic and latent, this research adopts latent thematic analysis, which goes beyond the semantic content of data, as it identifies the underlying ideas, assumptions and conceptualisations that give particular form and meaning.

4.4.3.1 DATA ANALYSIS APPROACHES: DEDUCTIVE AND INDUCTIVE REASONING

Thematic analysis can be inductive or deductive depending on the relationship between the themes identified and the researcher's analytic preconceptions (Braun and Clarke, 2006). In an **inductive** approach, themes emerge through the data themselves without a pre-existing coding frame or the researcher's theoretical interest in the topic (Gray, 2014; Patton, 1991). Inductive analysis is 'data-driven', as the themes are strongly linked to the data themselves without paying attention to the themes that might have been identified by previous research. This research is carried out in accordance with the **deductive** approach or theoretical thematic analysis (Gray, 2014). The conceptual model is examined by comparing the emerging data with existing research and theorising connections among the newly identified factors to generate new knowledge. The data are 'theoretically-driven' as the initial codes are predetermined deductively by developing a coding scheme derived from the research question and conceptual framework prior to fieldwork (Miles et al., 2014). The provisional coding developed is the pre-set list of categories which inform the analysis. This is not meant to restrict the theme, or impose certain definitions or categorisations on the data, but to guide the analysis directly to answering the specific research question and protect against the overload of data characterising qualitative inquires (Braun and Clarke, 2006; Miles and Huberman, 1994).

4.4.3.2 DATA ANALYSIS PROCESS

There is no concrete rule about how data should be coded in qualitative research, but the procedure for performing thematic analysis is adopted from Braun and Clarke (2006), Miles

and Huberman (1994) and Miles et al.'s (2014) recommendations. The process of data analysis involves a cyclical act between the entire data set, the coded extracts of data and the analysis of the data.

STEP 1: FAMILIARISATION WITH THE DATA

The first step of data analysis is to transcribe the interviews. The researcher transcribed the interviews, by herself, into Word documents, replayed the interview records and reread the transcripts multiple times. The process was time-consuming, but provided a great opportunity for the researcher to develop familiarisation with the data at an early stage. The researcher also kept notes of initial coding ideas which later fed into the coding process.

STEP 2: FIRST CYCLE OF CODING - OPEN CODING

Blisaa et al. (1983) as cited in Miles and Huberman (1994) believes that *“a word or a phrase does not ‘contain’ its meaning as a bucket ‘contains’ water but has the meaning it does by being a choice made about its significance in a given context”*. Coding is the process of disaggregation of data into units and assigning a ‘tag’, ‘name’ or ‘label’ that attaches meaning to that piece of data (Miles and Huberman 1994).

Miles and Huberman (1994) described this process as ‘descriptive’ coding or ‘lower level’ coding. In the first cycle of coding, the researcher focused on summarising segments of data by identifying and labelling ‘what is in the data’ with little inference. In this step, the researcher transferred the interview transcripts, field notes and document from the data collection procedure to NVivo 11 software, where the coding took place. The coding began with the entire set of data being systematically extracted, and the sections that seemed relevant to the provisional coding being highlighted and assigned as codes. The codes were assigned to reflect the conceptual meaning of the data to the social phenomenon being investigated. The researcher then collated each code to investigate any interesting aspects of data that might form potential themes in the next step.

STEP 3: SECOND CYCLE OF CODING – PATTERN CODING

This step involves sorting the codes from the previous steps into a set of core themes. A theme captures something important about the data in relation to the overall research question and represents some level of patterned response or meaning in the data set (Braun and Clarke, 2006). Similar codes are clustered together to create a smaller number of categories or pattern codes.

The coding is taken in a hierarchical order, where the early themes (i.e. the four dimensions of social capital, the negative effects of social capital and innovation capability) form the basis for the data analysis, and lead to the higher-level codes (tree nodes in NVivo). These ‘pattern codes’ or ‘higher codes’, as they are called by Miles and Huberman (1994), are more conceptual and analytical. As the analysis progresses, more salient themes are moved to the higher levels to become main themes, while less salient themes are moved down to become subthemes and non-relevant themes are discarded. Data that does not fit into any group is classified as miscellaneous.

STEP 4: RE-CODING OR REVIEWING THE THEMES

It is usual for several codes to change and develop as the coding process continues. There are codes that are removed in this stage as they seem to imply the same meaning. Table 4-6 below gives a summary of the coding for the analysis.

Tree nodes	Branches
1. Interview background	
2. Company profile	2.1 Company facts
3. Cluster profile	3.1 Industry 3.2 Geographical 3.3 Number of members 3.4 Motivation of participating in cluster 3.5 Cluster mission/vision 3.6 Characteristic of cluster networks 3.7 Support from the institutions
4. Social capital definition and intra-cluster relationship	4.1 Definition and perception of social capital 4.2 Intra-cluster relationship through; <ul style="list-style-type: none"> • Structural dimension • Relational dimension • Cognitive dimension • Proximity dimension 4.3 Interrelationship between social capital dimensions; <ul style="list-style-type: none"> • Structural and relational

	<ul style="list-style-type: none"> • Relational and cognitive • Structural and cognitive • Proximity
5. Negative effects of social capital	<p>5.1 Cost of maintenance</p> <ul style="list-style-type: none"> • Unnecessary obligation <p>5.2 Decision-making constraints</p> <ul style="list-style-type: none"> • Lock-in effect/ Groupthink • Loss of objective <p>5.3 Restriction of novelty and diverse knowledge, and unawareness of the necessity to change</p> <ul style="list-style-type: none"> • Inertia • Redundancy • Exclusion of others <p>5.4 Opportunistic behaviour</p>
6. The relationship between four dimensions of social capital and the negative effects	
7. The relationship between the negative effects of social capital and innovation capabilities	
8. Innovation capabilities	<p>8.1 Innovative product</p> <p>8.2 Innovative process</p> <p>8.3 Innovative marketing</p> <p>8.4 Innovative programme and system</p> <p>8.5 Involvement of government institutions, trade associations and universities</p>
9. The comparison between case studies	
10. Miscellaneous (Free node)	<p>10.1 Negative case (low level of social capital)</p> <p>10.2 The challenges of cluster in Thailand</p>

Table 4-6: Coding for the analysis

STEP 5: LINKING DATA AND CONFIRMING THE CONCEPTUAL FRAMEWORK

This step involves identifying the connections between the themes and theoretical concepts that emerge from the empirical data, confirming and contrasting the data with the conceptual framework developed, and looking for the explanation of ‘how’ and ‘why’ in negative cases (Saunders et al., 2012). Table 4-7 below shows the link of between the nodes and the conceptual framework.

Conceptual framework categories	Relevant trees and branches
A. Social capital definition and the social capital between cluster’s members	3.2 Geographical proximity 3.4 Motivation of participating in cluster 3.5 Cluster mission/vision 3.6 Characteristic of cluster networks 4.1 Definition and perception of social capital 4.2 Intra-cluster relationship 4.3 Interrelationship between four dimensions 9.1 Negative case (Low level of social capital) 9.2 The challenge of cluster in Thailand
B. Social capital multidimensional	4.2 Intra-cluster relationship 4.3 Interrelationship between four dimensions
C. Negative effects from over-embeddedness	5.1 Cost of maintenance 5.2 Decision-making constraints 5.3 Restriction of novelty and diverse knowledge and unawareness of the necessity to change 5.4 Opportunistic behaviour
D. The effect of social capital on firms’ innovation capabilities	6. The relationship between four dimensions of social capital and the negative effects 7. The relationship between the negative effects of social capital and innovation capabilities

	8. Innovation capabilities 9. The comparison between case studies
E. Other emerging concepts	10.1 Negative case (Low level of social capital) 10.2 The challenge of cluster in Thailand

Table 4-7: Linking of nodes to the conceptual framework

STEP 6: PRODUCING THE REPORT

The final stage of analysis is writing up the findings from the data analysis (Braun and Clarke, 2006). The research findings are reported in the next chapter (Chapter 5), following a structure similar to the conceptual model presented in Chapter 3. In Chapter 6, the findings are further interpreted and compared to the literature which leads to a revised conceptual model, before a conclusion of the study is drawn in the last chapter (Chapter 7).

4.5 ETHICAL CONSIDERATIONS

This research is conducted in compliance with the procedure approved by Brunel University Research Ethics Committee (REC). In advance of the data collection, participants were issued with a ‘participant information sheet’ (see Appendix B), which provided information regarding the aim of the research and the data collection procedures, as well as the benefits and their rights as participants. The participants were aware of their right to decline to answer questions, and to withdraw at any time without reason or consequence. The researcher ensured sufficient information was given, answered any concerns and explained any aspects that the participants did not fully understand before they signed the consent form.

Data collection procedures were compiled with in an ethical and professional manner and were not contaminated by data bias. The researcher acted as custodian of the data generated in the study, taking appropriate measures to ensure that all data was stored securely in terms of privacy and confidentiality. The participants are not identified by their real names anywhere in the study, or by any specific information that could potentially reveal their identity. This ensures anonymity for the participants, except those who gave express permission for their identities to be revealed (such as the representative of the DIP). The data is to be kept no longer than necessary and only disseminated for academic purposes as part of this PhD thesis and potential future academic publications. The data is to be securely deleted as soon as this process is concluded.

4.6 BIAS

The language and the definitions of words used in the study of social capital can be a challenge. *“Many English-language words used in social capital research do not easily translate into other languages. When possible, work with a translator early in contemplating how questions, instructions or exercises might best be communicated”* (Dudwick et al., 2006, p.31; Woolcock, 2001). The researcher and translator worked together from the stage of drafting the interview agenda and revised the interview agenda several times to ensure the translated version communicated well with the participants.

Similar to other studies that collect self-reported data (e.g. Presutti et al., 2007; Stam et al., 2014) there is a risk of bias in the responses. Self-report bias in social capital studies is largely concerned with the perception of the relationships within networks, such as underreported weak ties, overestimated centrality in a network and perceived non-existent relationships among their network contacts. Even though Stam et al. (2014) found that self-reported and archival data produce similar effects, they advise researchers to employ multiple data collection techniques. Interview and archival data were all in used in this study and cross-checked in order to minimise the bias in self-reported data. Obtaining objective assessment of innovation is challenging when dealing with a wide range of firms in various sectors, especially SMEs. Their products, productive systems and administrative innovation are not always reported objectively, as is the case with most of the samples in this study. Under these circumstances, data collected from their own assessments might suffer from subjectivity. Nevertheless, similar to the study of Casanueva et al. (2013) this bias is avoided by incorporating Bell’s (2005) suggestion of referring to external informants, in this case a government institution, to validate the innovativeness of each participant firm.

Bias can occur during the interview process, some of the challenges of which were noted by the researcher. While some participants responded clearly to each question asked, others were keener to communicate a message or tell their own story rather than answer the question, which might not fully match the interview agenda. Nevertheless, these reactions added to the research, as sometimes the participants who deviated from the interview agenda brought in new and valuable insight. Also, some participants were reticent about sharing ‘negative effects’. Watson (2011) states that participants might not always share the truth as they want to portray a positive image of both themselves and the cluster. To help ensure honesty from the participants, the researcher specified that there were no right or wrong answers to the questions, their identity would remain anonymous and the data would be confidential. The

researcher intervened further to ensure the rigor of the study by following the recommendation of Saunders et al. (2012). An overview of the questions was sent to the participants after they agreed to participate but prior to the interview. The researcher followed protocol on how to introduce herself and the topic, made a conscious effort to use a neutral and objective tone during the interview and avoided leading questions. The interviews were recorded and transcribed to ensure completeness of the data.

4.7 EVALUATION OF THE RESEARCH

Guba (1981) raises four concerns that all researchers, irrespective of the research paradigm, need to address to ensure the ‘trustworthiness’ of the research processes: truth value, applicability, consistency and neutrality. Positivist researchers demonstrate they have addressed these concerns with internal validity, external validity, reliability and objectivity. However, each view held in the research world has its own criteria for addressing the four concerns. Guba and Lincoln (1994) propose ‘alternative criteria of trustworthiness’, different from the positivist perspective, which are credibility (or ‘internal validity’ in positivist studies), transferability (or ‘external validity’), dependability (or ‘reliability’) and confirmability (or ‘objectivity’), as a means of rigorously assessing the trustworthiness of research. Accordingly, the following table presents a number of applications that are adopted to address the trustworthiness criteria in this research.

Trustworthiness techniques	Application to current research
<p>Credibility</p> <ul style="list-style-type: none"> I. Member checks II. Negative case analysis III. Persistent observation IV. Prolonged engagement in field or research site V. Use of peer debriefing 	<ul style="list-style-type: none"> - Data verified by the research participants - Dissemination of the research through academic discussion with eminent scholars, and receipt of feedback from international conferences (e.g. BAM)
<p>Transferability</p> <ul style="list-style-type: none"> I. Thick descriptive data 	<ul style="list-style-type: none"> - See Section 4.4.2 for the data collection process. In Chapter 2 (Section 2.5), social capital in the context of cluster networks and the characteristics of clusters are described. See Chapter 5 for discussion and interpretation of the

	analysis, highlighting the particularities of the context
Dependability & confirmability I. Audit trail	<ul style="list-style-type: none"> - NVivo 11 software used for data retention, retrieval and future checks - Supervision, discussion, updates and feedback ensured a rigorous research process (particularly during the data collection and analysis) - Cross-checking of interviews, field notes and documents obtained from the government agency

Table 4-8: Alternative criteria for establishing the trustworthiness of the current research

Source: Adapted from Lincoln and Guba (1985) and Miles and Huberman (1994)

Credibility (equivalent to the internal validity of positivism) means confidence in the accuracy of the research findings. This research attains credibility through the use of peer debriefing, negative case analysis, and member check methods. Peer debriefing involves considering the perceptions of peers involved in the process of developing the research findings. The researcher consistently consulted academic scholars, colleagues, and the team of supervisors during the research process. An overview of the research was presented to Brunel’s annual doctoral symposium, as well as three international conferences to ensure and improve the quality of the findings. A member check is considered crucial for enhancing the credibility of findings (Lincoln and Guba, 1985). Accordingly, the data, interpretation and conclusion were verified and tested by the participants to certify their credibility.

Transferability (equivalent to ‘external validity’) means the possibility of transferring the findings from the context of the research to alternative settings. Qualitative research can often be problematic in this regard as it emphasises context. “Whether or not findings hold in some other context or even in the same context at some other time is an empirical issue” (Lincoln and Guba, 1985 cited by Bryman and Bell, 2016, p.402). To ensure the transferability of the findings, ‘thick description’ is incorporated into the process, from data collection through the context of the study to the conclusion (Lincoln and Guba, 1985). Chapter 4 provides details of the data collection, and a step-by-step guide to the procedure. Chapter 5 elucidates the

particularities of the context of the study, which might postulate insights into social capital in cluster networks. This ensures transferability for potential readers in other contexts.

Dependability and confirmability (equivalent to reliability and objectivity) are attained through repeated investigation of social phenomena to show the same results. This is achieved when the characteristics of the data demonstrate the rigor of the research procedure. Lincoln and Guba (1985) stress the closeness of the link between dependability and confirmability, stating that, in practice, the methods used to address these concerns overlap. Cross-checking of the enquiry processes was carried out using raw data, interview and field notes and peer briefing. The data collected was organised and stored in NVivo 11 software for the purpose of future retrieval and future checks.

4.8 CHAPTER SUMMARY

This chapter presents the research methodology for answering the research questions presented in Chapter 1 and empirically validating the proposed framework presented in Chapter 3. The review of the research methodology discusses and justifies the methodological choices made. This research is carried out with a constructionist ontology and interpretivist epistemological stance as a way to develop knowledge. Since this study derives from the identification of gaps in the literature and a conceptual model crafted from a theoretical foundation (as shown in Figure 4-1), a deductive approach is employed. In order to empirically investigate the proposed conceptual model, a qualitative exploratory methodology is selected with 25 semi-structured interviews as the primary data. The first set of interviews are with 23 owners of firms in cluster networks. The second set of interviews are with 2 representatives of relevant institutions. Then, the thematic analysis technique is employed and the findings as the result of this process are presented in the following chapter. Table 4-9 in the following page summarises the methodology and research design adopted in this study.

Research philosophy	Constructionism
Research approach	Deductive
Research methodology	Qualitative
Time horizon	Cross-sectional
Pilot testing	2 pilot interviews with SME owners
Data collection method	Semi-structured interviews with SME owners (23), representatives from government (1) and business associations (1)
Sampling technique	Non-probability sampling technique
Amount of data gathered	25 interviews (32 hours)
Analytical technique	Thematic analysis

Table 4-9: Summary of the methodology and research design of this study

Chapter 5 : FINDINGS

5.1 INTRODUCTION

The objective of this chapter is to present data collected from the research methodology that was elaborated and chosen for conducting the study presents in the previous chapter (Chapter 4). The empirical data analysed and presented in this chapter has been collected from an in-depth study of cluster networks in Thailand from the perspective of cluster firm's owners, representative from institutions and secondary data available. This chapter will review the insights from the data collection largely following the structure of the conceptual model. The detail of cluster in Thailand and its challenges are presented in Section 5.2 to provide an overview of the context settings. Section 5.3 presents the perception of social capital and over-embeddedness from the institution and cluster firms' perspectives. Section 5.4 presents the data on the negative effect of social capital where participants identified the negative effect of social capital and its significance on innovative performance. Four dimensions of social capital and its interrelationship are addressed in Section 5.5. In addition to proposed conceptual model, Section 5.6 offers the comparison between case studies. In addition to proposed conceptual model and Section 5.7 examined the decision to remain in a cluster after the identification of the negative effect. Lastly Section 5.8 presents the empirical conclusions to summarise the chapter.

5.2 OVERVIEW OF CLUSTERS IN THAILAND

The concept of the cluster was first introduced in Thailand by a group of entrepreneurs under the supervision of Michael Porter, an academic scholar, who introduced the concept to the academic community and practitioners in 2000. The success of two initial clusters, the tourism cluster in Phuket and Thailand's black tiger shrimp cluster, were presented to the National Economic and Social Development Board (NESDB), who officially marked the beginning of clusters in Thailand on 10th June 2004. The NESDB officially defines clusters as:

“Clusters are geographical concentrations of inter-connected companies and institutions linked by commonalities and complementarities for common benefits of all involved parties while maintaining considerable competition among cluster members.” (NESDB's Executive summary on cluster mapping, 2007, p.28)

This definition shares a similarity with Porter's (2000) definition, which interprets clusters as networks of firms and institutions linked by commonalities and complementarities which cooperate and compete simultaneously in close geographical distance. His involvement at the initiative stage of cluster development lays the foundation for clusters in Thailand, and the definition, framework and model of clusters in Thailand are heavily based on his work, as outlined in Chapter 2.

Another government agency report highlights the aim and functionality of the cluster:

“To boost the level of support and cooperation in all facets of the business, both vertical and horizontal, in order to strengthen the industrial value chain, enhancing Thailand's investment potentials and competitiveness, and expand socioeconomic development to regional and local levels.” (Thailand Board of Investment, 2015, p.2)

Clusters serve as a network that coordinate firms, both upstream and downstream, along the value chain. These cooperative networks aim to enhance competitive advantage and socioeconomic development at local level and on a larger scale. This statement echoes the importance of connection in cluster networks. In the same direction, another statement from the NESBD report points out that the strength of a cluster is determined by the strength of connections between the cluster members and institutions:

“The strength of a cluster is enhanced by connections with supporting organisations and agencies such as trade associations, academic institutions, research and development institutions, consulting agencies and government sector for exchange of ideas, knowledge and experience. This connectivity leads to the emerging of new and fresh knowledge leading to a knowledge-based society which promotes innovation and total productivity.” (NESDB Executive Summary on Cluster Mapping, 2007, p.28)

This statement highlights the key component of a successful cluster, the connection between cluster members. The connection among cluster firms and between the cluster and supporting organisations builds a community that is knowledge driven, where ideas, knowledge and experience are exchanged and transferred. The emergence of novel ideas and knowledge enhances innovation and total productivity. Hence, the cluster is recognised as a cooperative network between various stakeholder to enhance the level of competitiveness and regional development.

There are nine institutions that play major roles in cluster development:

	Organisation involved in Thailand's cluster development	Role
1	National Economic and Social Development Board (NESDB)	<ul style="list-style-type: none"> • Create knowledge, understanding and awareness of cluster development by studying related theories and cluster development in Thailand and other countries • Establish criteria to evaluate the initial cluster development, publish articles and hold seminars to disseminate the concept of cluster development • Execute a memorandum of cooperation on the establishment of a network of coordination (implemented as a guidance for the DIP) • Develop a cluster database to be used in establishing overall cluster policies
2	Ministry of Industry	
2.1	Department of Industrial Promotion (DIP)	<ul style="list-style-type: none"> • Develop strategic industrial clusters as suggested by Porter and implement guidelines developed by JICA, UNIDO and Scottish Enterprise which emphasise inter-connection of entrepreneurs throughout the entire supply chain
2.2	Office of Industrial Economics (OIE)	<ul style="list-style-type: none"> • Establish links between cluster networks as part of the national competitiveness enhancement strategy
2.3	Office of SME Promotion (OSMEP)	<ul style="list-style-type: none"> • Create and develop entrepreneurs • Improve productivity and innovation for SMEs in the production sector • Improve trade efficiency and reduce negative impacts of international trade • Improve services to add value
2.4	Industrial Estate Authority of Thailand (IEAT)	<ul style="list-style-type: none"> • Establish a policy on industrial estate development in the form of specialised zones with the objective of providing an integrated service for target industries

3	National Science and Technology Development Agency (NSTDA)	<ul style="list-style-type: none"> • Emphasise the enhancement of competitiveness in manufacturing industries
4	Institute of Fiscal Policy Research	<ul style="list-style-type: none"> • Initiate cluster development projects for production and service groups
5	Ministry of Interior (MoI)	<ul style="list-style-type: none"> • Organise clusters according to a provincial administration system based on geographical area and in accordance with the integrated public administration strategic framework
6	Department of Agricultural Extension (DAE)	<ul style="list-style-type: none"> • Use the Community Enterprise Promotion Act B.E. 2548 to promote community business activities and cluster development networks
7	Federation of Thai Industries (FTI)	<ul style="list-style-type: none"> • Promote cooperation among research institutes and the manufacturing sector to encourage the effective commercialisation of research results
8	Thai Chamber of Commerce (TCC)	<ul style="list-style-type: none"> • Establish a strategy to develop potential clusters • Act as cluster development agents promoting cluster activities
9	Private organisations i.e. Kenan Institute Asia, Thai Military Bank Public Company Limited and Bangkok Bank Public Company	<ul style="list-style-type: none"> • Provide experienced consultants for newly formed clusters • Act as cluster development agents to promote cluster activities

Table 5-1: List of organisations involved in Thai cluster development

In addition to the organisations on this list are local universities, research and development institutions and specialist organisations which contribute to cluster development. From the first initiative of two clusters, there has been a constantly increasing number, until today there are over one hundred clusters across the country in various industries, from agriculture to high technology, initiated by both government agencies and the private sector. In 2016, cluster firms contributed 50,639 million Baht, around £1,000 million, to the gross domestic product of the country, exported goods to the value of 1,557 million Baht and reduced production costs by 103 million Baht (Thansettakij, 2017). Clusters are still implemented as an economic policy to boost the competitiveness of the country and socioeconomic development. There is a supporting plan for an upcoming regional integration of the Association of South East Asian

Nations (ASEAN) (as part of the AEC's agreement) and global competitiveness. The current focus of clusters in Thailand is small and medium sized businesses, super clusters³ and the upcoming Thailand 4.0.

5.2.1 THE CHALLENGES OF CLUSTERS

This section illustrates the key findings regarding the challenges faced by cluster firms, policy-makers and cluster development institutions in Thailand. It provides a panoramic view of the circumstances of cluster networks in Thailand. Several interview questions seek to answer the broader question “*what impedes effective cluster networks and the success of clusters?*” The views of the participants were fairly consistent and in accordance with reports by government and research institutions. The results of the data analysis identify four main themes relating to the difficulties that prevent the effectiveness of cluster networks, lack of understanding of the cluster concept, the bureaucratic system, political instability and unsystematic evaluation of cluster performance, as spelled out in the following sub-sections.

i) LACK OF UNDERSTANDING OF THE CLUSTER CONCEPT

The interviews and secondary data reveal an issue with understanding and interpreting the cluster concept, with different firms and institutions defining and interpreting the concept differently. When cluster firms were questioned about what a cluster is, the responses varied from a lack of understanding to detailed descriptions. Interviewee F15 showed a vague understanding of clusters:

“..I want to know what the actual meaning of the cluster is and what exactly the direction we are heading to is.” (F15)

Whereas other participants were able to describe their understanding in more detail:

“A cluster can be defined as the connection between firms from mainstream to upstream within the same industry, leading to a homogenisation of products due to mutual cooperation.” (F22)

³ A super cluster is a cluster for activities using advance technology and future industries e.g. automotive and parts, electrical appliances, electronics and telecommunication equipment, eco-friendly petrochemicals and other chemicals, digital-based, and medical hubs.

“Cluster is important. It connects businesses and institutions in the same industry together. It encourages cooperation and exchanging of information and knowledge among us. Though, there is some level of competition, but we get to learn so much from each other. It is better than being alone.” (F21)

These statements demonstrate a varied understanding of the concept. While the first statement (F15) clearly reflects a lack of understanding, with the participant unsure what a cluster is, its functionality or its goal, the other two participants (F21, F22) are more certain and describe a cluster similarly to the original definition adopted by institutions in Thailand. However, these understandings seem to focus on connection and cooperation and pay less attention to geographical orientation which is a key feature of cluster networks.

DIP elaborated on this issue:

“...clusters that have been established longer than 5 years, the new members might not fully understand the whole process. We have tried to set the foundation of the concept by holding conferences with the CDA of the cluster regularly. But whether they [cluster members] understand or not is down to the individual. They might have forgotten or overlooked the detailed part of the concept as they mainly focus on the actual benefits gained from cooperation.” (DIP)

After clusters were first introduced by practitioners, the concept was introduced directly to the initial participating firms by government institutions. After that, cluster development agents (CDA) or the cluster administration teams became responsible for transferring the information regarding cluster development to members. The quote from the DIP shows that information might get lost in translation or deviate from its original form, and the formal details of the concept might be overlooked or blurred by practice. The DIP statement implies that without accurate understanding cluster firms can still manage to gain benefit from cooperation, however the firms themselves perceive this differently. They express a lack of understanding of clusters that raises fallacious interpretations and causes dysfunction in the cluster as illustrated by the following quotes:

“The expectation of some of the members is tangible, whereas a cluster gives you more of the intangible benefits of education and knowledge. Unfortunately, most members do not understand and expect something tangible and concrete. However, the main point of a

cluster is to increase competitive advantage through increasing productivity, innovation and network linking from the cooperating relationship.” (F4)

“A lot of members do not understand the concept of a cluster. They have the expectation to continuously gain government support. Once the government stops providing funding, they feel reluctant and stop pushing forward. Then, the cluster cannot progress further.” (F19)

The misunderstanding on the part of cluster firms of the function of a cluster can lead to misinterpretation of the roles and responsibilities of firms and supporting organisations. Cluster firms that misunderstand the concept of the cluster were described as over-emphasising the support provided by supporting organisations, especially government agencies, and were reluctant to develop coordinated and cooperative networks. This may show why there is more apprehension about the lack of social connection than the problem of over-embeddedness in cluster networks.

This confusion also has implications at the institutional level, as this quote from a government organisation report indicates:

“The project faced limitations due to varied understanding of clusters among key organisations.” (NESDB’s Executive Summary on Cluster Mapping, 2007, p.29)

As different organisations play different roles in cluster development, the understanding, interpretation and agenda might not always be in accordance with other organisations. Another report indicates the same issue:

“The understanding of clusters and advisory process of cluster development are not in accordance with the aim of the cluster.” (DIP Executive Summary Report, 2017, p.47)

These reports offer evidence of the issue of a lack of understanding of the cluster concept and a lack of aligned direction at the various layers of authority, which pose a challenge for clusters and supporting organisations becoming synchronised, create confusion about the direction of clusters, build false expectations and place restrictions on effective cluster networks.

ii) BUREAUCRATIC SYSTEM

A large number of the cluster firms that participated identify bureaucratic systems as impeding cluster development in Thailand. The interviews and evaluation report reveal that the cluster development programme is often designed using a top-to-bottom approach, by supporting organisations with little involvement of the cluster firms:

“Our findings reveal that the needs of cluster firms are not met. This is because the cluster support programme is designed through a top-bottom approach; from the cluster policy maker without the real understanding or the involvement of the SMEs.” (OSMEP Monitoring and Evaluation of the 2017 SME Promotion Projects, p.63)

“The cluster roadmap does not always come from the consensus of the whole cluster. Therefore, the activities or projects do not match with their needs and the development of the cluster. Clusters need to have clear vision, mission and a cluster roadmap, where all the stakeholder, private sectors, government, education institution, and other relevant institutions, should take part. This will provide the cluster a clear direction, suitable activities and initiatives that support the cluster to achieve their goal.” (Trade Association)

Similarly, one of the cluster participants expressed frustration on this issue:

“They (government agency) should have asked us. They should not just organise anything that doesn’t meet our need just for the sake of spending budget! It shows the lack of awareness and capacity to improve the situation. For example, one of the members is thinking to discontinue her business. How are you going to help her? If they are interested and want to help, they should help with the marketing or innovative ideas to progress this product to a different end product. Or in another case, they invited high-budget buyers to buy our products, they were not interested as we are only SMEs... It should start from firms; bottom-to-top instead of what they think is right.” (F11)

The above statement implies that the current top-to-bottom approach fails to understand the challenges and needs of cluster firms, resulting in ineffective cluster development programmes in which the support provided makes an insignificant contribution to development or impact on cluster firms’ performance. A lack of involvement in cluster development lessens cluster firms’ enthusiasm for cluster activity and impairs trust in bureaucracy, as the support received is perceived to be irrelevant or insufficient.

The same cluster firm interviewee added that the root of this problem might be poor communication between government institutions and the private sector:

“This might be because there is no middleman to communicate for both sides.” (F11)

The wording in this quote suggests that the underlying problem is one typical of the strong bureaucratic systems in developing countries, where formal bureaucracy with a strong hierarchy of authority poses difficulties in communication between the private sector and the institution and slower processes. Moreover, poor coordination and communication of organisations also decelerates the process of decision-making and practice:

“The bureaucratic system is weak in terms of processing time. The decision is made through hierarchy levels and takes more time to gather relevant organisations. The project is often found to spend a large portion of time on processing rather than actual working and needs to extend the timeline.” (OSMEP Monitoring and Evaluation of the 2017 SME Promotion Projects, p.47)

iii) INACCURATE INFORMATION AND UNSYSTEMATIC EVALUATION OF CLUSTER PERFORMANCE

Inaccurate information and unsystematic evaluation of cluster performance were reported by representatives of institutions as significant issues that hinder cluster development. The previous section points out the issue with a top-to-bottom approach, but the bottom-to-top approach is also found to be problematic, trapping clusters in the dilemma of top-to-bottom approach or bottom-to-top approach.

The inaccurate information received from cluster firms presents a daunting challenge for institutions to evaluate the situation and provide appropriate support, particularly for smaller firms which are more likely to have informal and unsystematic records of performance, as a representative of a trade association illustrates:

“The evaluation of the cluster performance, especially in the case of SMEs, is not as developed as in the western world where they have clearer measurement and standards. For instance, SMEs do have the accounting and financial department in their businesses, most of the financial transactions are written down by hand. By the end of the year, they calculate whether they made loss or profit. In contrast, the systematic system will give more detailed information on profitability, liquidity and liability, and where exactly the strength, weakness and costs are, and where they can properly gain more... also, they are not always provided honest information. Sometimes, the information provided is false as they want to be qualified

to receive funding... the problem with evaluation is it makes it uneasy for the government and institutions to provide the right supports for the SMEs. Since the patients have never been told what disease they have, how can we provide the right cure?" (Trade Association)

This view shows that the support institutions provide is based on the information received from the cluster firms. Being self-employed and having restricted financial resources (e.g. no financial department or external recruitment), smaller cluster firms might feel that the performance measurement requirement is for larger firms. Consequently, the information and records lack standardisation. Unsystematic measurement and inaccurate information do not reflect actual performance or the capability issues that cluster firms experience.

Nevertheless, the review of relevant reports and research in the field of clusters shows signs of unsystematic monitoring and evaluation of cluster performance by institutions. The key performance indicators of cluster projects adopted in the past appear to be inappropriate in terms of delivering anticipated outcomes. For example, the number of clusters under development, and the number of entrepreneurs participating in clusters are used as a measure of achievement.

Furthermore, there is an issue with the data on clusters in Thailand. The cluster mapping database (CMBD), an online database for storing information on business clusters and the cluster map of Thailand, has been largely ignored and the data has not been updated since the initial attempt by the NESDB and Kenan Institute Asia (KIASia) in 2008. While this database provides insightful information, it exclusively focuses on the twenty most successful cluster networks (based on geographical proximity, economic impact, strength and potential of cluster) for analysis. Similarly, later reports and studies include only certain, mostly successful, clusters. The exclusive focus on successful cluster networks indicates a lack of coherence between the information and data collected on cluster development and the overall situation of clusters in Thailand. There are gaps in the information regarding clusters at the stages of development, seeking direction and initiation, which may have the potential to become successful clusters with appropriate support.

iv) POLITICAL INSTABILITY

An OSMEP monitoring and evaluation report identifies political instability as impeding cluster development:

“One of the reasons was the inconsistency of the government’s policies, particularly confusing provincial policies that frequently changed according to the expertise and vision of each provincial governor.” (OSMEP Monitoring and Evaluation of the 2017 SME Promotion Projects, p.42)

This statement is in the same vein as the World Economic Forum survey of executive opinion in 2017 which identifies government instability (13.6%) and policy instability (12%) as two of the three most problematic factors for doing business in Thailand (Global Competitiveness Report 2017-2018, 2017, p.286). The dramatic change in the Thai political system over the last decade has proved to be a pivotal issue, with instability of government and policy:

“It has been three governments over the last decade. The change of the government often involves change of the country’s policy. Some governments emphasise the business sector, while some prioritise other sectors... DIP has provided continuing support over the course of time, but we can only make do with the budgets received from the ministry for industrial promotion.” (DIP)

This quote illustrates that, after the ousting of two elected prime ministers, Thaksin and Yingluck Shinawatra in 2006 and 2014, the primary objective of the military-appointed parliament is to restore order and enact political reform rather than boost the competitiveness of the country. While the role of the government agency is to provide support to cluster members, regardless of the governing party, it is inevitable that the amount of support provided depends on government policy, priority in disputes and allocation of budget. Hence, the change of government restricts the continuity of budget, and the support policy might be slowed or suspended leading to obstacles to projects that require long-term collaboration.

Addressing this concern, a cluster member points out the effect of political instability:

“The policy has been changed when there is new government in charge. Currently, with the military government, the business sector is not the priority. The government of Thaksin’s family had introduced more business supporting policy... Businesses have been suffering, trying to cope with these repeated changes.” (F11)

This shows that the instability of the government and inconsistent policy lead to economic and environmental uncertainty, where firms are required to constantly adapt to change. Some firms

fail to do so, showing the significant effect of instability of government and government policy on cluster development.

5.3 PERCEPTIONS OF SOCIAL CAPITAL AND THE NEGATIVE EFFECTS OF SOCIAL CAPITAL

This section underlines the participants' perceptions of social capital and the negative effects of social capital, which forms a useful and important starting point for discussion of the conceptual model. In the previous sections, the participants emphasised the advantage of intra-clusters on innovative performance (section 5.1.1) and how they help overcome the challenges of cluster development (section 5.1.2). However, when the researcher introduced the terminology of 'social capital' and asked the participants to discuss their understanding of social capital, most were unsure of what is social capital was, as shown by the following quote:

"Is it similar to credit or being trustworthy?" (F4)

The participants suggested that the formality of the terminology was confusing and difficult to understand. The English words used in field of social capital do not translate easily into other languages. In Thai, it is more understandable to describe social capital as 'connection' or 'networking'. Once the researcher explained this, the participants understood and were able to convey an understanding of social capital, as demonstrated by the following statements:

"It is resource gained from connecting and having relationships with people. For example, when I need help, I know where to get help and who has the capability and willingness to help." (F23)

"It is the benefit of having connections. Similar to having priority (over who does not have connection) ... It is very important in business. It makes the business deals go fasters and easier as we do not need all the fuss with formality and easy access to information." (F20)

The statements above demonstrate that cluster firms understand social capital as a benefit from having connection or networking. The respondents drew attention to the benefits of social capital, particularly the ease of business transactions and access to resources owned by other cluster members e.g. knowledge, experience and capability. All the participants overwhelmingly perceived social capital positively.

When the participants were asked about the dark side of social capital, they articulated varying levels of awareness and understanding. Their initial responses on the negative effects of social capital were concerned with a lack of social capital, including a lack of cooperation, coordination and cohesiveness within clusters, free riding and opportunistic behaviour) rather than the negative effects of over-investment in social capital:

“I would say that being in a cluster is overwhelmingly a positive decision. But I admit there can be some negative effects... In the same way that cluster membership can spark innovation, there have been instances where certain cluster members have been reluctant to commit to progress, therefore holding other members of the cluster back.” (F14)

The DIP added to this point:

“We have to understand that a cluster is a group of a large number of people who come from different backgrounds and maybe with different needs. We were facing a lot of problems; there were conflicts between members, lack of cooperation and some communication failure. Some members are free riders or have opportunistic behaviour. It was very difficult at the formation stage when they were all individuals. When they develop relationships, start to have trust, honesty, that is where it begins to pay off.” (DIP)

The statements above highlight concern about the lack of social capital from both cluster members and institutions. A lack of social capital is perceived to impede coordination, cooperation and the commitment of firms to the cluster network. This ultimately slows down cluster development and the innovation of the whole cluster. This echoes the findings from the previous section that underline the importance of social capital on the success of the cluster and innovative performance, and the overwhelmingly positive view of social capital.

When the participants were asked specifically about the negative effect of over-embeddedness, the majority were not aware of over-embeddedness nor viewed over-embeddedness negatively. They admitted naivety in terms of their views of social capital:

“I don’t think being overly embedded in the network is a bad thing. It cannot be a poison, is not it?” (F5)

This statement illustrates that cluster firms emphasise a lack of social capital over an excess of social capital. Therefore, it is unsurprising that cluster development programmes prioritise the development of intra-cluster relationships.

Moreover, those cluster firms that were aware of negative effects struggled to identify over-embeddedness or the cause of it, as shown by the following quote:

“I think there definitely are negative effects associated with being over-embedded in any network. I mean anything that is lacking or excessive cannot be good... but I think it is better than being alone.” (F17)

Interestingly, the very few firms that expressed awareness of the negative effects of over-embeddedness were unable to clearly explain the cause of over-embeddedness and found it challenging to identify any specific negative effect. This demonstrates the limitation of the awareness and understanding of the potential negative effects of over-embeddedness and consequently the lack of proper assessment of the advantages and potential disadvantages of social capital. However, once the researcher elaborated, the participants understood more about over-embeddedness and were able to identify the negative effects (as shown in Table 5-2) and explain how they affected their innovative performance.

In contrast, the representatives of both the DIP and Trade Association were already familiar with the concept of over-embeddedness and were able to elaborate on its negative effects. The following quote from the DIP, which is directly responsible for cluster policies, illustrates this point and explains the upcoming strategic plan to manage the effects of over-embeddedness:

“Over-embeddedness happens because once they spend a lot of time together, they start to form relationships, it is easy to get trapped in that small circle. The most common effect of over-embeddedness in the cluster network is the lock-in effect. Firm’s connections are restricted to actors inside the cluster, without connection to outsiders. It can have a negative impact on their business performance. We have acknowledged the possibility of such an effect... currently, we are trying to test the water with plans to overcome the problem of over-embeddedness. For instance, the first project is ‘matching clusters’, where different cluster networks co-produce products. The second one is to encourage clusters to increase the number of members, which is expected to help firms in clusters expand their connections to new people from different sectors and not be trapped in just their own network.” (DIP)

This statement shows high concern about over-embeddedness in cluster networks, although the plan to cope with it is still at the development stage. It underlines that the development plan only includes ‘exclusion of outsiders’ and the ‘lock-in effect’ as negative effects of over-embeddedness among the many possible negative effects covered in the literature. The lack of awareness of the other negative effects of over-embeddedness can keep organisations trapped in over-embeddedness, as the negative effects are highly related (discussed further in Chapter 6). Furthermore, the review of relevant research and reports about clusters in Thailand shows that none properly highlight the issue of over-embeddedness of firms in cluster networks. This implicitly reflects the limited research, study and awareness of over-embeddedness in Thailand.

Without awareness or any effort to manage over-embeddedness by institutions, policies and projects that aim to manage the negative effects are perceived as irrelevant, as demonstrated by the following quote from a cluster firm interviewee:

“...they (DIP) want us to undertake new members [into the cluster]. I am not quite sure why they think it would be a good idea... They cannot just expect us to keep accepting new people. How can we be sure that the cluster will be better with a larger number of members?” (F5)

This quote emphasises the lack of understanding of the purpose and benefit of policy on managing over-embeddedness of cluster firms in cluster networks. Most cluster firms feel it is irrelevant to cluster development, to the point where some expressed feeling abandoned, and questioned the competence of the government agency supporting cluster development.

Hence, it can be seen that there is an imperative to increase awareness and understanding of the negative effects of over-embeddedness among cluster firms, policy-makers and supporting institutions. Without awareness or a clear understanding of over-embeddedness, the coordination and cooperation between firms, policy-makers and institutions is more challenging. Attention to the rationale for the policy of cluster firms can lead to cooperation, and the assessment and management of the negative effects of over-embeddedness. Further understanding of over-embeddedness by policy-makers can assist in the development of more accurate cluster policy for managing over-embeddedness in cluster networks.

The next section presents the findings in relation to the conceptual model as depicted in Chapter 3, starting with identification of the negative effects of social capital, and following

with the identification of the four dimensions of social capital proposed in the conceptual model as the causes of negative effects.

5.4 IDENTIFICATION OF THE NEGATIVE EFFECTS OF SOCIAL CAPITAL ON INNOVATIVE PERFORMANCE

The literature referred to in Chapter 2 indicates that social capital can have both positive and negative effects on innovative performance. According to Galunic et al. (2012), Gedajlovic et al. (2013), Kwon and Adler (2014), Li et al. (2013) and Li et al. (2016), the literature pays less attention to the negative effects of social capital, offering limited explanations for the interplay of relevant theoretical mechanisms that effect the outcomes of study. Consequently ‘how’ social capital negatively affects innovative performance remains a black box (Camps and Marques, 2014; Huber, 2009; Rutten et al., 2010).

Drawing from the literature presented in Chapter 2, the negative effects of social capital can be classified into four categories based on their effect on innovation: cost of maintenance (Westlund and Bolton, 2003); decision-making constraints (Lechner et al., 2010); restriction of novelty and diversity of knowledge and unawareness of necessity to change (Koka and Prescott, 2002; Noordhoff et al., 2011); and opportunistic behaviour (Molina-Morales et al., 2011; Noordhoff et al., 2011). As shown in Table 5-2, each interviewee was asked to identify whether the list of negative effects of social capital presented applied to them

Cluster firm/organisation	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20	F21	F22	F23	DIP	TA	
Negative effects																										
Cost of maintenance	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Unnecessary obligation	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Decision-making constraints	√	√	√	√	√	X	√	√	√	√	√	√	√	√	X	√	√	X	X	√	√	√	√	√	√	√
Groupthink	√	√	√	√	√	X	√	√	√	√	√	√	√	√	X	√	√	X	X	√	√	√	√	√	√	√
Loss of objective	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Restriction of knw. and change	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	X	X	√	√	√	√	√	√	√
Inertia	X	√	√	√	√	X	√	√	√	√	√	√	√	√	√	√	√	X	X	√	√	√	√	√	√	√
Exclusion of outsiders	√	√	√	√	√	X	√	√	√	√	√	√	√	√	√	√	√	X	X	√	√	√	√	√	√	√
Knowledge Redundancy	√	√	√	√	√	√	√	√	X	X	X	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Opportunistic behaviour	X	√	X	√	X	X	√	X	X	X	X	X	X	X	X	X	X	√	√	X	X	X	X	X	X	X

Table 5-2: Identification of the negative effects of social capital within cluster networks

The empirical findings shown in Table 5-2 indicate that most of the negative effects identified from the literature were incurred by the cluster network, except ‘loss of objective’, which all the participants agreed did not happen within their cluster networks. Also, F18 and F19, from the textile cluster, identified the least negative effects of social capital in their cluster network, which shows the low level of social capital in their cluster network (discussed further in Chapter 6). The following section presents the significance of the negative effects of social capital, explaining in detail how they impede innovative performance.

5.4.1 THE SIGNIFICANCE OF THE NEGATIVE EFFECTS OF SOCIAL CAPITAL ON THE INNOVATIVE PERFORMANCE OF FIRMS IN CLUSTER NETWORKS

As mentioned above, investigating the negative effects of social capital on innovation and its process are the main concerns (Camps and Marques, 2014; Huber, 2009; Rutten et al., 2010). Thus, after the identification of the negative effects shown in Table 5-2, the participants were asked to illustrate the significance of these negative effects of social capital, divided into the four categories identified: cost of maintenance; decision-making constraints; restriction of novelty and diversity of knowledge and unawareness of necessity to change; and opportunistic behaviour in relation to innovative performance, in order to frame the overall picture. The findings show that the significance of the negative effects of over-embeddedness, such as unnecessary obligation and groupthink, was considered high by the majority of the participants, while others made various responses. The following subsections provide a discussion of some of the noteworthy findings about each negative effect.

5.4.1.1 COST OF MAINTENANCE

Cost of maintenance was identified as a significant factor caused by social capital by all the participants. The participants said that social capital requires substantial investment and constant maintenance:

“For relationships to flourish, it requires investment. I do not mean money necessarily. It just takes time and effort. It does not just happen in a day or two, it requires maintenance and consistency throughout time. Initially, we did not know each other so well, but with time and effort, we became close and continue to be even closer.” (F14)

This quote indicates that, similarly to other types of capital, social capital requires investment and maintenance.

A representative of the DIP also stressed the cost of social capital and its role in cluster networks:

“The success of the cluster heavily relies on the relationship between members. The core of a successful cluster is cooperation between members. Their willingness to share and help out each other is from the relationship they have, and such a relationship requires investment and maintenance.” (DIP)

Both statements emphasise that relationships need to be built and cultivated to exercise social capital. Hence, both cluster firms and institution are fully aware of the inevitable cost associated with social capital. Social capital is perceived as a seed for a cooperative and cohesive network and inevitable for a successful cluster network.

- UNNECESSARY OBLIGATION

The majority of the participants recognised, as extremely to moderately significant, unnecessary obligation as affecting innovative performance. All described previous experience of unnecessary obligation in the cluster network. Two cluster firm participants provided examples of unnecessary obligation undertaken in the past and elaborated on how it affected innovative performance:

“At the cluster’s product showcase, most of the time I was the one responsible for setting up the backdrop. Was it affecting my innovation? Yes, it did cost my own money, labour and time. From the business perspective I could have spent that on my own business innovation project. It was not obligation for me to do that. But I did it as I felt the need to contribute to the cluster.” (F13)

“One of the members wants to collaborate where I have to provide material (tie dye) for her to produce bags. I honestly did not even have enough time with my own projects, but I did not want to say no. So, I had to delay my project for the collaboration to be completed first.” (F11)

From the quotes above, unnecessary obligation is perceived as volunteering to fulfil the requests of other cluster members in a way that may not contribute to the firm’s own interests,

objectives or performance. The examples of unnecessary obligation provided by the participants included providing consultancy and knowledge and using their capability to assist other members, the cluster and the community the firms operate in. This extends to lending resources such as people, machinery and labour. Financial resource was not mentioned much, due to the restricted finances of small and medium sized companies. These obligations cost time, energy or resources. Although this might not have a direct impact innovation, it can delay the achievement of firms' own objectives and the cost spent on unnecessary obligation could be used for other innovative activities.

Cluster firms undertake unnecessary obligations to meet the expectations of, and avoid upsetting, other members. It is perceived as a way to maintain and develop relationships, and it can be seen as a way to contribute to the cluster. Cluster members want to be portrayed as good members who cooperate and take part in an active and cohesive network. They are willing to contribute to benefit the whole cluster and avoid being recognised as opportunistic or free riders.

All the participants identified unnecessary obligation and perceived it to be inevitable. The question was how much, and to whom, they should invest. This quote from F10 provides one answer to this question:

“Unnecessary obligation definitely happens. It is because being in the network requires cooperation and reciprocation. But, of course, I do not help everyone or help to the point that my business will collapse. I only offer what I am capable of, maybe not financial but labour, ideas or knowledge.” (F10)

This quote points out the closeness of relationships, the willingness to invest in relationships, and the capabilities of firms are used as criteria for the level of unnecessary obligation cluster members are willing to undertake. It shows that social capital is not a naturally given resource, but one provided through the intentional investment. Furthermore, a few of the cluster firms in assessing their capability to carry unnecessary obligation, identified a lower negative effect.

5.4.1.2 DECISION-MAKING CONSTRAINTS

The literature points out that over-embeddedness can constrain decision-making, as the influence and concerns of others can restrict freedom of decision and prevent firms considering alternative courses of action (De Clercq et al., 2009; Pillai et al., 2017; Villena et

al., 2011; Gargiulo and Benassi, 1999; Li et al., 2013; Pillai et al., 2017; Portes, 1998; Tsai and Ghoshal, 1998; Villena et al., 2011). The literature identifies groupthink and loss of objective as negative effects of over-embeddedness in networks which can constrain effective decision-making. However, only groupthink was considered an issue by the participants, and none described a loss of objective.

- GROUPTHINK

The majority of participants felt that groupthink was a significant factor impeding innovative performance. One cluster firm member reported how groupthink had, in the past, constrained effective decision-making by rejecting a new idea and impeding potential innovation development in the cluster:

“Sometimes a very cohesive network can be problematic. A while ago, I proposed an idea to add a herb into milk to produce herbal milk, but I got shut down by the other members. When a few members started to doubt it, then their friends began to follow without even taking a proper look at it yet! Finally, they all lost interest and think that I am thinking way ahead of myself and the cluster.” (F4)

This quote elucidates the way in which a high level of group cohesiveness can lead to groupthink and place restrictions on cluster firms’ decision-making. Cluster firms trapped in groupthink follow the opinions and decisions of the members without proper evaluation of ideas and situations or consideration of alternative courses. As illustrated in the quote, this can result in missing opportunities for potential innovation and reducing innovative capability.

Another interviewee gave an example of groupthink behaviour and an insight into why some cluster members may be trapped in the situation of groupthink:

“I think it definitely happened in this cluster. When there were discussions, a lot of the members were rather quiet, not giving any opinion and just voted in line with the closer group. I am not sure whether they did not have opinions or were afraid to go against their friends.” (F15)

This statement shows that cluster firms with a high level of cohesiveness can become trapped in a situation where their decisions depend on their members, they might have different

opinions or want to make different decisions, but choose to follow other members to avoid disagreement, conflict or upset.

This leads to difficulty in developing and implementing novel ideas. The lack of proper evaluation of ideas, discussion and consideration of alternative courses, places barriers in the way of innovation. Consequently, cluster firms with an extremely high level of cohesiveness find themselves moving in the same direction, producing products and processes with only minor differentiation.

- LOSS OF OBJECTIVE

According to the literature, loss of objective is considered a decision-making constraint (Hagedoorn and Franfort, 2008; Uzzi, 1997), whereby an actor makes concessions to another individual's interests or collective goals and fails to pursue their own interests (Lechner et al., 2010; Tsai and Ghoshal, 1998). In this study, loss of objective was not incurred by all the participants, as envisioned by the literature. One interviewee expressed this as:

“I do not think loss of objective occurs at all. I do not find myself needing to choose between the cluster's objective or my own business objective... although with personal objectives, sometimes you might not get as much support as if it was a cluster objective. But that is understandable.” (F9)

This view was confirmed by another interviewee who affirmed that intra-cluster relationships do not influence the objective of the firm:

“The objective of the cluster is a consensus of the members and is not always what I personally prefer. The intra-cluster relationship does not really have an influence on this. For instance, at the moment, the cluster wants to focus on marketing, whereas I want to improve product design as I am already good with marketing. Unfortunately, there is limited funding and resources available within the cluster, we can only focus on one thing at a time. Hence, I have to develop my product design by myself without more support from the cluster and institutions. This does not mean I do not support the cluster objective, though.” (F13)

These statements offer an interesting insight not directly revealed by the literature, which is that cluster firms have their own business objectives, separate from the objectives of the cluster, and their own business objectives are not swayed by being embedded in the cluster

network. The cluster firms did not express the need to choose between two objectives. When the objectives of the cluster and the business were not in accordance, the cluster firms chose to pursue both objectives simultaneously, not give up on their own objectives. Nevertheless, pursuing their own objectives, understandably did not gain large support from the cluster or relevant institutions, consequently making it slower to accomplish personal objectives.

5.4.1.3 RESTRICTION OF NOVELTY AND/OR DIVERSE KNOWLEDGE AND UNAWARENESS OF THE NECESSITY TO CHANGE

According to the literature, over-embeddedness can impede innovation by restricting novel or diverse information/knowledge and unawareness of the necessity to change due to inertia, exclusion of outsiders and knowledge redundancy (Gargiulo and Benassi, 1999; Koka and Prescott, 2002; Noordhoff et al., 2011). Most of the participants recognised the negative effect of exclusion of outsiders, inertia and knowledge redundancy. The interviews show that exclusion was recognised to be the most significant, followed by knowledge redundancy and inertia. These three negative effects are similar, although exclusion of outsiders and inertia focus on ties whereas knowledge redundancy focuses on the resources that ties bring to the network. These negative effects were found to be highly related, with redundancy strongly influenced by inertia and exclusion of outsiders.

- EXCLUSION OF OUTSIDERS

The majority of the participants, both cluster firms and representatives of supporting organisations, identified exclusion of outsiders as a negative effect of over-embeddedness. However, the level of significance identified varied, with most participants recognising exclusion of outsiders as a moderately significant to significant negative effect on innovative performance.

The participants interpreted an outsider as anyone outside the network of the cluster. The exclusion of outsiders included preventing outsiders being involved in the cluster and extended to accepting new members into the cluster. The negative effects of exclusion of outsiders were expressed in terms of prohibiting potential ideas, capabilities and resources that lay beyond the existing network, as demonstrated by the following quote:

“Not accepting new members is a loss in itself. We need new and more diverse members to develop further. We are missing out on a variety of knowledge and resources that new members can bring in! But not everyone agrees with me on this.” (F6)

Another owner of a cluster firm confirmed the negative effect of the exclusion of outsiders by sharing his personal experience:

“In the past, I have proposed to the cluster to let a private company help us with packaging and marketing as we are not very familiar with that area. I want to package raw milk in milk cartons which should allow us to double the value of what we are currently selling. But other members do not want outsiders to be involved and have this perception that outsiders cannot be trusted. They are afraid that these outsiders will take advantage when that is not really the case. In the end, we ended up not doing anything about it.” (F4)

Both statements emphasise the importance of the inclusion of outsiders on innovation and development, and the exclusion of outsiders was conveyed as excluding potentially beneficial new actors, narrowing the flow of novelty, diversity of knowledge, capability and resources of the cluster network. In particular, the statement of F4 impeccably demonstrates how the exclusion of outsiders impedes innovative performance, as envisioned in the literature. These cluster firms were highly aware of, and concerned about, the negative effect of the exclusion of outsiders. However, the enthusiasm to be associated with outsiders was not agreed by all members. There was high apprehension of the issues associated with the interference of outsiders, particularly lack of trust.

Cluster firms concerned with the interference of outsiders identified their exclusion as less significant. One of these firms discussed the DIP’s encouragement to enlarge the number of cluster members:

“I insist that we must have some criteria and filter for accepting new members or working with outsiders. We just really need to ensure that this will actually work and add some value to the cluster instead of ruining what we already achieved.” (F5)

This indicates that the efforts of the DIP to address the high concern of institutions about the negative effect of exclusion of outsiders did not receive the desired response. The potential value that outsiders can bring to clusters is well recognised, but concerns about the interference of outsiders, e.g. the level of cohesiveness, opportunistic behaviour or cost of

management, outweighs this. The criteria mentioned by the interviewee is a filter to guard the cluster network, to ensure outsiders bring value to the cluster, and most importantly ensure that new members or outsiders will get along with existing cluster members and not take advantage of them.

The Trade Association recognised the tension caused by the exclusion of outsiders in various clusters and its negative effect on innovative performance. They offered an insight into why some cluster firms are strongly concerned about interfering outsiders:

“Once they (cluster firms) form a cohesive network, it is not easy to add new people or make the new relationships work. It becomes us and them. They just stick to the people they know. They are very concerned that anyone who is not the close circle will take advantage of them and should not be trusted and are not willing to develop new relationships. They are not even going to try.” (TA)

The statement indicates a strong cohesive group with robust bonds which would prove difficult for outsiders to interfere with. In such a network there is a clear separation between the cluster and outsiders, with cluster firms more willing to coordinate and cooperate with cluster members than outsiders. The lack of trust and unwillingness to form relationships outside the network traps cluster firms in a situation where sources of innovation are obtained exclusively from the existing members.

- INERTIA

The negative effects of inertia and the exclusion of outsiders have a similarity, both restrict new relationships. Although exclusion of outsiders concentrates on relationships outside the cluster network, to avoid the confusion, inertia in this study emphasises intra-cluster relationships. The interview questions about inertia focused on the difficulty of dissolving existing relationships and the formation of relationships with new members of the cluster. In other words, inertia is a resistance to changing intra-cluster ties (Gargiulo and Benassi, 2000).

“It can be uncomfortable sometimes. I had a supply deal with one of the cluster members, but I found a better deal from somewhere else. Though, the difference was not extremely significant, but it is still something. I felt uncomfortable cancelling the deal or re-negotiating pricing. I did not want to damage our good friendship.” (F23)

This quote shows that, even with a recognition of the need to adjust ties, cluster firms find it difficult to do so. This is due to fear of damaging relationships and losing connections. The underlying thought is protecting the value of the existing connection. Furthermore, intra-cluster relationships are not solely based on business orientation, the interviews revealed that the majority of the cluster firms developed friendships with other members. This high level of attachment can override the decision to adjust the ties. Being in the same cluster network implies inevitable interaction, which makes it more difficult to dissolve relationships.

Another theme pointed out by the participants, related to inertia, was parochialism, a sense of prioritising old ties over new ties:

“The old members are very attached to each other which makes it difficult for new members to fully blend with them, creating sub-groups inside clusters, between new and old members. Therefore, there are obstacles to communicating and exchanging information and ideas.” (DIP)

This is supported by the comment from a cluster firm interviewee:

“Obviously, I would pick the members who I am closer to because we have been through a lot together. I know them well, how they work and what can be expected from them. I do not mean that I do not want to get to know new members, but this sort of thing takes time to build. But with old members, I do not need to start from one.” (F14)

These statements reveal that cluster firms prioritise old relationships because of the high level of attachment. This makes it harder to form new relationships. This supports the previous section (5.3.1.1) which underlines the cost associated with social capital. Forming new relationships requires investment and constant maintenance, but firms have restricted time, energy and resources available.

However, when asked about the effect on innovative performance, the participants were unsure. Over half identified the negative effect as less significant. This is unsurprising, because there is no cost-benefit evaluation for existing and new intra-cluster relationships to determine the significance of the effect. However, none of the cluster firms participating in this study reported any incident that would require dissolving a relationship with an existing member or forming a new relationship with a new member, hence the significance of inertia is found to be difficult to determine.

- KNOWLEDGE REDUNDANCY

All except three participants identified knowledge redundancy in the cluster network. Although, the significance level of the negative effect of knowledge redundancy on innovative performance varied, with the majority identifying a moderately significant to significant negative effect. The participants were asked about the degree of redundancy in the information and knowledge shared in the cluster network. Most said there was more redundant information and knowledge in comparison to non-redundant, and the non-redundant knowledge came from the institutions/supporting organisations rather than the cluster members themselves.

A common view among participants, who identified an extreme to moderate negative effect, was that knowledge redundancy prevents novel and/or diverse ideas and knowledge flow in the cluster:

“The reason for the lack of innovation is largely because there are no new ideas and knowledge in the cluster. We already have similar expertise, information and knowledge and there is not a lot of new stuff. Therefore, the information and knowledge we share becomes repetitive. The way we produce and market, and even the product itself are very similar and have not been changed much for the last several years.” (F17)

This demonstrates that knowledge redundancy is perceived as detrimental to the development of innovation in the cluster by restricting diversity and/or novelty of knowledge inside the network. It is observable that the diversity of the members contributes to knowledge redundancy. Cluster firms that indicated extremely high to high levels of negative effect of redundancy were mostly original equipment manufacturers (OEM), the product of which were marketed by another manufacturer, restricting the creativity and innovation to the specific requirements and/or orders of the other manufacturer, and thus there is less diversity among the cluster firms. Furthermore, the core function of the cluster is to boost innovation via mutual exchange and sharing, but without the injection of non-redundant information and knowledge, especially in combination with the exclusion of outsiders and inertia, the shared information and knowledge eventually lead to redundancy.

Nevertheless, there were participants who did not perceive knowledge redundancy to be purely negative. Interestingly, the participants who perceived a less significant or fairly

significant negative effect of knowledge redundancy revealed that a certain level of redundancy is beneficial to the cluster network.

“Repeated information and knowledge are not ideal, but a certain level of redundancy is required. I do not see it as 100% negative as not all of us have equal knowledge or expertise. Sometimes, I need to repeat the same piece of information several times that I already know but they do not, to make sure that everyone is on the same page.” (F1)

Cluster members may come from different backgrounds and might not have the same knowledge base. A certain level of knowledge redundancy is essential to enhance mutual understanding, ease communication and transfer tacit knowledge between cluster members. This echoes the literature on absorptive capability (Cohen and Levinthal, 1990), where a certain level of knowledge overlap facilitates communication and understanding. The results suggest that knowledge redundancy might be vital to innovation, even though the process of innovation development might be delayed.

Another theme revealed by participants who identified a less significant to fairly significant negative effect of knowledge redundancy, is that cluster firms reduce the negative effect of knowledge redundancy:

“I constantly learn new things and try to bring them to the cluster. Sometimes they listen and follow my idea and sometimes they do not. My concern is if we keep talking and doing the same things we have already done, there is no real added value. It is just repeated!” (F4)

This quote offers an example of the role of the gatekeeper of knowledge, who absorbs information and knowledge from external sources and ultimately injects it into the network. Hence, a connection to external sources helps gatekeepers escape the negative effect of knowledge redundancy as well as reducing its effect in the cluster.

Lastly, a minority of the participants did not identify knowledge redundancy within the network, all members of 1st Craft cluster (F9, F10 and F11). One commented on the relationship between diversity of members in the cluster and knowledge redundancy:

“I do not think we face this problem because in this cluster, everyone has completely different business. For example, my product is metal status whereas another cluster is tie-dyed clothing and another one is organic bags using material from bamboo.” (F10)

Firms in 1st Craft cluster are in the creative industry and their products are handmade. There is a high level of differentiation, with occasional collaboration between cluster firms. However, their dissimilarity results in a lack of mutual understanding and restricts the information and knowledge shared in the cluster:

“Because we are doing things that are different from each other, when there is a problem, it is difficult to help or consult with each other. Therefore, we only help each other out in terms of marketing rather than anything to do with innovation, as we do not know each others’ businesses well enough.” (F10)

However, according to the absorptive capacity, while the members of this cluster manage to escape redundancy, it is difficult to find mutual understanding and communication of tacit knowledge. Correspondingly, they struggle to cooperate at a radical innovation level.

The results demonstrate that the diversity of the cluster members and the knowledge shared in the clusters determine the significance of the knowledge redundancy. Unlike other negative effects of over-embeddedness, there is an optimal level of knowledge redundancy. A certain level of redundancy facilitates innovation as it helps cluster firms share and comprehend knowledge, whereas a high level of redundancy can restrict the novelty and/or diversity of knowledge and therefore harm innovation.

5.4.1.4 OPPORTUNISTIC BEHAVIOUR

The participants’ descriptions of opportunistic behaviour include being taken advantage of, receiving false information, free riding and other opportunistic behaviours. Unlike the other negative effects of social capital identified in the literature, opportunistic behaviour can occur with both a lack of social capital and over-embeddedness.

The participants expressed a lack of social capital among cluster firms as causing opportunistic behaviour:

“People were afraid when they shared information as they were scared of ideas and products being duplicated. It took a bit of time before they begin to open up.” (F18)

This is an example of the concern about opportunistic behaviour among cluster firms. Fear of opportunistic behaviour lowers the willingness to share and exchange information and knowledge within the cluster. Cluster firms felt the need to protect their knowledge and innovative ideas and products from being taken advantage of. This suggests that social capital can lower the fear of opportunistic behaviour. Nevertheless, most participants who identified lack of social capital as causing opportunistic behaviour perceived a less significant effect on innovative performance. This is because the lack of social capital was incurred at the initial stage of cluster formation and those firms with opportunistic behaviour had already left the cluster or were no longer active members.

On the other side of the argument about over-embeddedness and opportunistic behaviour, differently from the literature, only two of the participants (F2 and F4) identified opportunistic behaviour to be caused by over-embeddedness and highly significant for innovative performance. F2 provided an example of an incident of opportunistic behaviour from experience:

“There was an occasion when I lent one of the members a part of machinery, I had only one part and no spare. He said he would borrow it for a day or two. But he did not return it until a week afterwards. It delayed my productivity quite a bit... I guess I just learned from it. But now I am aware of this person’s behaviour and I might refuse to help him out next time.” (F2)

This shows that when cluster firms are over-embedded in clusters, they feel confident and safe, and consequently lower their guard and/or monitoring processes, becoming more vulnerable to opportunistic behaviour. While the example given might not implicitly reveal an extreme case of the negative effect of opportunistic behaviour on innovative performance, the participants who had previously experienced opportunistic behaviour from over-embeddedness expressed it as having a highly significant effect on innovative performance (as shown in Table 5-3). When opportunistic behaviour occurs, tension is built. Similar to the effect of opportunistic behaviour from a lack of social capital, cluster firms that have been taken advantage of are afraid of repeated events, and therefore protect themselves by restricting cooperation, exchange or transfer of knowledge, which are key to innovation. These precautions might not only be applied to the opportunistic person but also to others in the

network. A person who takes advantage of others will find it more difficult to regain trust and access to resources.

5.4.1.5 SUMMARY

This section explains the significance level of each negative effect of over-embeddedness on the innovative performance of firms in cluster networks, some of which resonate or contrast with the literature thereby adding to knowledge of this phenomenon. Further discussion of these findings is presented in Chapter 6. The following section examines the cause of these negative effects through the four dimensions of social capital.

5.5 THE FOUR DIMENSIONS OF SOCIAL CAPITAL

This section addresses the four dimensions of social capital (proximity, structural, relational and cognitive) developed in Chapter 3 (Figure 3-1), which are developed from the three existing dimensions of social capital (Nahapiet and Ghoshal, 1998) and the concept of proximity (Boschma, 2005) as a theoretical grounding for understanding the causes and processes of the negative effects of social capital. The participants were asked, for each sub-dimensions of social capital, the effect on innovative performance and to identify whether it causes the negative effect proposed in the conceptual model.

In accordance with the proposed conceptual model illustrated in Chapter 3 (Figure 3-1), this section begins with a discussion of proximity, followed by the structural, relational and cognitive dimensions, and lastly the interrelationship between the four dimensions of social capital.

5.5.1 PROXIMITY DIMENSION

This research applies the concept of proximity as a theoretical grounding for understanding the influence of both spatial and non-spatial proximity (i.e. technological, social, organisational and institutional proximity) (Boschma and Fernken, 2010; Boschma, 2005) on social capital and innovative performance. Proximity provides a useful theoretical lens to examine how geographical proximity and similarity between cluster firms can influence the negative effect of social capital. From the conceptual framework, there are four dimensions

of proximity, geographical, technological, organisational and institutional, included in this empirical study.

The interview questions regarding proximity were based on an ego-network analysis, in which the participants responded based on overall cluster network relationships rather than the particular dyadic relationships inside the cluster. The results highlight that the majority of participants indicated a high level of proximity in all four dimensions. More than half signified high proximity in every dimension. Low level of proximity was the least common response, and none of the participants described no proximity in any dimension.

5.5.1.1 GEOGRAPHICAL PROXIMITY

Geographical proximity is measured by the physical distance between members of the cluster network (Boschma, 2005). In this study, most of the cluster members were located within the same municipality, classified as ‘high’ geographical proximity, ‘medium’ for firms within the same region, and ‘low’ when located at a greater distance across the country.

Cluster	Interviewee	Location	Proximity
National herbal cluster	F1	North eastern region of Thailand	Mid
Starch manufactory	F2	North eastern region of Thailand	Mid
Maha Sarakham’s cow and dairy	F3, F4	Maha Sarakham province	High
Thai’s leather: the exotic	F5, F6, F7	Bangkok and Bangkok metropolitan region	High
Can cluster	F8	Bangkok and Bangkok metropolitan region	High
1 st Craft cluster	F9, F10, F11	Bangkok and Bangkok metropolitan region at the centre, but located across the country	Low
Eastern Para wood product cluster (EPPC)	F12, F13, F14	Eastern region of Thailand	Mid
Ceramic (Lampang) cluster	F15, F16, F17	Lampang Province	High

Bangkok's fashion	F18, F19	Bangkok and Bangkok metropolitan region	High
Thai food cluster	F20, F21	Bangkok and Bangkok metropolitan region	High
Tea cluster	F22, F23	Chiang Rai province	High

Table 5-3: Geographical Proximity of Participants

Table 5-3 shows that the majority of the participants in this study are classified as 'high' in geographical proximity, with the members of the clusters located within the same province, some even within the same neighbourhood. This close geographical spread is possibly explained by the availability of raw materials in the local area (e.g. clay in Lampang or tea in Chaing Rai), or that a particular area is designated an industrial park (e.g. can cluster) or for agriculture purposes (e.g. cow and dairy cluster). Only participants from 1st Craft cluster (F9, F10 and F11) located across the country are designated as having 'low' geographical proximity. This differs from the cluster networks described in the literature that considers only the geographical orientation of clusters.

The dissimilarity in physical distances between clusters is the result of an unclear spatial scale of geographical distance. The review of the documents related to clusters in Thailand indicates two types of cluster, the typical geographical concentration and commercial clusters. The geographically concentrated cluster is similar to the typical cluster considered in literature which focuses on the benefits of agglomeration externalities provided by close geographical proximity. However, in a commercial cluster, the location of members is of less concern, as the cluster aims to add value via expanding market channels and knowledge transfer rather than the agglomeration of externalities. Hence, the ambiguous concept of the cluster is difficult to translate in practice, as the operation of the cluster is somewhat derailed from the original definition.

The government agency attempts to alleviate this issue by narrowing the scope of distance, to ensure the success of the formation and development of intra-cluster relationships, as noted by DIP:

“There is no clear requirement on the distance between members. Though, we aim to have clusters that members operate within 100 kilometres distance of each other when it is possible. The group activities and the cooperation between members are less likely to be successful at further distance.” (DIP)

This extract implies that close geographical proximity is not only expected to provide agglomeration externalities but to double up as a facilitator of social interaction and social relationship development underpinning a collaborate and cohesive network. This stresses the importance of the intra-cluster relationships perceived by the institutions.

Cluster firms also confirmed this role of co-location:

“Not just our businesses are located nearby, we actually live nearby too. I know some of the member even before the cluster. It is just inevitable to bump into others in this neighbourhood.” (F23)

The convenience of co-location provides opportunities for face-to-face, repeated, personal interaction, which contributes to the development of relationships between cluster firms. Furthermore, the quote above shows that there is a chance that some of the clustered firms in close geographical proximity were already acquainted or had established close relationships with fellow members before the cluster network.

Not all the participants expressed social linkage as a result of co-location. For instance, F19 from the textile cluster revealed that the social links among firms in the cluster were low, even though all of the cluster members were located in Bangkok or the Bangkok metropolitan region.

“Our businesses are not far from each other, actually we are located very nearby, but we do not have close relationships. Other clusters might have activities and intimate relationships, but we do not. This cluster does not function like other clusters. I guess the idea of a cluster does not really strike people in this cluster. It is more like writing the name down to get funding from the government. Their motivation is merely about networking. Once they got the funding they aimed for, they went separate ways and when they did not get what they wanted they blamed government institutions. There is no continuous or further coordination... I think the DIP is disappointed too. We have the potential and capacity to grow together as a cluster, but it does not happen.” (F19)

The quote above shows that co-location does not automatically produce linkages between cluster members. The various motivations, visions and understandings of the cluster were described as obstructing relationship formation. The majority of members in this cluster

emphasised the exogenous advantages provided by supporting organisations and neglected the intra-cluster synergy which is the core element of long-term sustainable success. Firms in this cluster were reluctant to establish relationships.

On the contrary, the participants from 1st Craft cluster (F9, F10, and F11), who were not located in close physical proximity, showed signs of strong links. This reflects the digitalised world, with the participants from 1st Craft cluster who, in the past, faced severe communication drawbacks, elaborating on how information and communication technology (ICT) substituted for the benefit of close geographical proximity and face-to-face interaction:

“In the early day, we had more members than this. However, at that time, the communication system was a problem. We did not have advanced communication technology or transportation like today. We used to fax information to cluster members, and it was not easy. To contact just 15 people was a challenge. Face-to-face interaction was not easy either as some of us were not located close by. The number of members was reducing. However, since we use this application ‘Line’ a couple of years ago and created ‘line group’, we communicate daily, and we have become much more active as a group. Before the social network took place, we only met face-to-face occasionally. But now, we can talk or chat daily from business to personal matters or have some jokes or entertainment among ourselves. It has definitely tightened us closer together. Need to thank the social network.” (F9)

The quote above demonstrates that the immense advances in ICT provide an alternative way of communicating and reduce the importance of face-to-face interaction between cluster firms. ICT, particularly social network applications, provide opportunities for firms at large geographical distances to strengthen relationships and develop cohesive and cooperative networks wirelessly, and, to a certain extent, this convenience permits more frequent, repeated and personal interactions.

Similarly, other participants from clusters with geographical proximity pointed out that ICT is used to further strengthen relationships:

“Though we are located quite close to each other, it is more convenient to text for a quick chat, saying hello or asking a few questions than to actually go there.” (F21)

However, the participants from 1st Craft cluster indicated that some cluster activities required face-to-face interaction:

“The ‘Line’ application has definitely helped us to develop and maintain the relationships inside the cluster, in the sense that we can communicate as frequently as we want. But of course, we still meet in person, especially for annual meetings, seminars and workshops. When there is a need to meet in person, we just travel to see each other.” (F11)

The statement above confirms that ICT cannot completely replace face-to-face interaction. Cluster activities that involve the transfer of knowledge, especially tacit knowledge (e.g. seminars and workshops), require face-to-face interaction. Firms at a distance travel to simulate close geographical distance. Thus, ICT and temporary proximity reduce the importance of geographical proximity in developing and maintaining relationships and transferring knowledge, and therefore innovation. Cluster firms in less close geographical positions are able to explore an effect similar to geographical proximity.

When asked about the negative effect of geographical proximity, most participants in close geographical distance articulated that the negative effect of geographical proximity was to prioritise physically close members, as one reported:

“When I want to know something or do some business transactions, I think of those that are located nearby first. It is just easier and more convenient to contact and meet up in person than at a distance; as I already know them, and I trust them. If problems or situations occur, it will be easier to sort out with them.” (F22)

This statement gives another insight into the effect of geographical proximity, showing that cluster firms prioritise members based on the strength of the relationship and trust, which is facilitated by the opportunity of repeated face-to-face interaction that geographical proximity provides. When the participants were asked whether they prioritised all close members, all answered no. This illustrates that geographical proximity does not directly lead to over-embeddedness or the negative effects envisioned by the literature, though there is a negative effect from facilitating interaction, which provides the opportunity for the development of social capital, particularly in the structural dimension, i.e. frequent interaction and intensity of relationships.

As geographical proximity does not directly lead to social links, close geographical proximity does not directly contribute to over-embeddedness or negative effects. Instead, geographical proximity serves as a facilitator of social capital and potential over-embeddedness. The

findings on the influence of geographical proximity on the three other dimensions of social capital are described in Section 5.5.6.

5.5.1.2 TECHNOLOGICAL PROXIMITY

The interview question about technological proximity focused on the extent to which members of the clusters share knowledge and expertise (Boschma, 2005; Fitjar et al., 2016; Geldes et al., 2017). The responses were mixed, which provides an opportunity to explore the effect of various levels of technological proximity on the effect of social capital.

All the participants agreed that technological proximity contributed to shared understanding and transferring of information and knowledge in cluster networks, as shown in the following:

“The cluster can grow more efficient and faster if members have similar levels of knowledge base and capacity. When the differences are too significant, then it is difficult for everyone to understand the information, hence those that are more advances need to slow down, pull those in the bottom up and bridge the gap, which can slow down the entire development of the cluster as well as members’ own performances.” (F2)

This highlights the importance of technological proximity in cluster networks and its role in cluster development where it allows firms to communicate, understand, explore and exploit information and knowledge.

Most participants identified moderate to significant levels of technological proximity inside their cluster, reporting that the members of the cluster shared similar knowledge bases but had different levels of expertise that differentiated them from other members, as illustrated by the following statement:

“Our base knowledge is very similar, we all use para wood as the raw material. But we are specialised in different aspects. Most of the members are long-term manufacturers and focus more on the manufacturing side. Whereas, a few of the members such as myself focus more on incorporating new designs to produce more of the unique pieces.” (F13)

This shows an overlapping knowledge base between cluster members who identify moderate to significant levels of technological proximity. However, different products and production processes of some cluster firms imply a unique set of expertise, skills and knowledge.

Unsurprisingly, this echoes the description of cluster networks expressed by the DIP previously, that a cluster is a coalescence of various firms within the same industry. The different knowledge base is a result of different sizes of company as well as the ages of the firms in the study.

The differentiation between cluster members creates a gap where cluster firms can exchange knowledge and expertise with other members, while the overlapping knowledge base facilitates the process of knowledge transfer as it enhances communication, shared interpretation and understanding. The participants conveyed the importance of technological proximity and that a certain level of overlap of knowledge base is required. However, their strong expression shows the development of inertia and exclusion of outsiders, as cluster firms prefer to establish relationships and connect with members who share a similar knowledge base and therefore share a certain level of understanding and speak the same language. This overlap with the cognitive dimension of social capital is discussed in Chapter 6.

All the participants who identified a high to extremely high significance of technological proximity in the cluster, reported that the high level of overlap of knowledge base between cluster members had a negative effect on the innovation of the firm, as one explained:

“Our cluster is suffering from knowledge redundancy. First, this is because we have a similar type of customers. Secondly, because our end product is almost identical. Cans can be different colour and size, but the shape will not be much dissimilar. Also, we all manufacture to resell to other manufacturers. We cannot just change things, our product needs to precisely fit with customers’ requirements. We try to be different, but these restrictions are here. It does not really allow us to be very diverse.” (F8)

Participants that described a high to extremely high significance of technological proximity were mostly original equipment manufacturers. They are restricted in terms of innovation as their product is produced based on the explicit requirements of customers. Furthermore, the similar raw materials, production processes and end products result in a lack of diversity, leading to the negative effect of redundancy and groupthink among the members of the cluster reported by these participants.

The other six participants, who identified low to non-significant technological proximity, did not suffer from these negative effects. However, these participants articulated a different issue:

“Our products are highly distinguished; the entire chain is also different. For example, one of the member businesses is curved metal art, which I have very little idea about as I am working on textile which is completely different. Therefore, it is more challenging to collaborate and cooperate on that technical level, hence, we concentrate more on the marketing and retail aspect that we all are related to, rather than product or production itself.” (F11)

This statement shows that a high level of diversity in a cluster places difficulty in the way of knowledge sharing and cooperation between cluster members. This is because the gap in the technological proximity restricts the ability to communicate, develop mutual interpretation and understanding and absorb knowledge. Hence, in these clusters, apart from the ceramic cluster, the information and knowledge sharing are focused on less complex knowledge i.e. explicit knowledge of marketing development rather than tacit knowledge which is a greater source of innovation (Vlaisavljevic et al., 2016). This echoes the views of both representative participants, who find it difficult to provide appropriate support to all cluster members when the cluster is very diversified.

One respondent pointed out the larger problem of a lack of technological proximity in his cluster, as it affects the functionality of the cluster network:

“It is essential that this cluster needs to be sub-categorised. There are members whose raw material is silk and those that are cotton. The difference is very high. Anything that involves textiles can be included in the cluster. It includes also clothing into one single cluster. Not all of them are really relatable. It is all very mixed up here.” (F18)

Another interesting finding is that some participants in clusters with relatively low levels of technological proximity, is the anti-behaviour that a few of the participants reported:

“I believe all the members have good knowledge about what are they doing. However, I feel that I am more active and eager to learn new things, whereas some members who have always been OEM are more conservative. Sometimes, instead of implementing change, they are against it. It requires some ice-breaking for them to accept new ideas and new technology.” (F5)

“The difference in terms of business is not significant. Most of us operate a farm. However, I cannot say everyone shares the same knowledge and expertise. Sometimes, when

we share information, some of them understand but some of them do not and develop anti-behaviour and presume that the cluster is not providing any benefit.” (F3)

The above statements illustrate that the gap in technological proximity can stimulate anti-behaviour where cluster firms oppose learning things that they are not acquainted with. The lack of absorptive capacity restricts their ability to understand and willingness to explore and exploit the knowledge available in the network.

5.5.1.3 ORGANISATIONAL PROXIMITY

The interview question about organisational proximity concentrates on the degree of similarity in routines and incentive mechanisms, by investigating the number of past collaborations and previous experiences of interaction (Boschma, 2005; Fitjar et al., 2016; Geldes et al., 2017). All the participants identified their organisational proximity to be between moderately and extremely significant, as one commented:

“I suppose all have close organisational proximity as we are all business organisations and are similar in size. Although, I cannot say this for 100% because I do not know every detail about other members’ firms.” (F14)

This quote shows the difficulty of evaluating organisational proximity, and the issue was reported by other participants. This might be because the small number of collaborations between cluster members and the interaction of cluster firms is less likely to concentrate on the details of organisational management.

None of the participants identified organisational proximity as significantly influencing intra-cluster relationships. Only a few of the participants pointed out the potential contribution to smooth collaboration:

“It might help with the collaboration at the initial stage as it helps us to understand each other better; to know how other firms operate.” (F16)

When asked about the negative effects of organisational proximity, none of the participants identified any, which is in opposition to the conceptual model that assumes the negative effect of inertia.

5.5.1.4 INSTITUTIONAL PROXIMITY

To avoid overlapping with the norm of reciprocity of the relational dimension of social capital, the interview question about institutional proximity focused on formal institutional proximity in the cluster network. i.e. the extent to which cluster firms operate under the same laws, regulations and rules (Boschma, 2005). The participants reported strong compliance with laws and industry regulations. However, in terms of clusters, there are no formal rules or regulations, as demonstrated by the following statement:

“There are no formal written rules or restrictions on what cluster members can and cannot do. Members can even decide to leave the cluster anytime they want.” (F6)

This suggests that the interaction of cluster members is largely informal with minimal or no hard institutional proximity in the network. The participants generally reported complying with the soft institutional norms of the cluster, discussed in Section 5.5.3.2. None of the negative effects caused by institutional proximity outlined in the conceptual model were identified.

5.5.2 STRUCTURAL DIMENSION

5.5.2.1 STRENGTH OF TIES

According to the literature, strength of ties is determined by the frequency of interaction and the intensity of the relationships (Rindfleish and Moorman, 2001; Garcia-Villaverde et al., 2018; Stam et al., 2014). High frequently interaction and intense relationships are characteristic of strong ties, and vice versa. From the interviews, the theme of the duration of relationships emerged, as the participants described it as influencing the strength of ties. Thus, duration of relationships is considered, in order to evaluate the strength of intra-cluster ties.

The findings about the strength of ties first focuses on the frequency of interaction, duration of relationships and intensity of relationships. Then the findings about the negative effects of strength of ties is presented.

- FREQUENCY OF INTERACTION

Frequency of interaction is divided into three levels according to Burt (1997). Daily interaction signifies 'high' frequency, weekly interaction implies 'medium' frequency, and monthly interaction represents 'low' frequency of interaction. Most of the participants indicated that the frequency of interaction ranged between daily and weekly, except one who said that interaction with other members was only on a monthly basis.

Intra-cluster interaction comprises formal and informal interaction. The frequency of formal interaction differs depending on the schedule and activity of each cluster. The frequency of formal interaction includes attending occasional activities organised by the cluster or third-parties e.g. government agencies or the local university or other academic institutions. They include workshops, seminars and product cases which are beneficial to cluster firms. Also, regularly scheduled meetings take place on a bi-weekly, monthly or quarterly basis, depending on the arrangement of the cluster. Attending cluster activities and formal meetings is not compulsory, however the government agency (DIP) said they use this to evaluate the cooperation and activeness of cluster networks. Cluster members with high stature attend most activities and meetings, whereas some members attend less regularly.

The frequency of informal meetings is reported by the participants as ranging from daily to monthly, depending on personal preference, and members who have mutual interests or close relationships are more likely to interact with other members frequently, as demonstrated by the statement:

“There are nearly ten guys who play golf. In addition to formal meetings, we also meet at the course and play together every week or two. In fact, I am meeting them tomorrow.”
(F5)

This interviewee conveyed feeling closer to this group of cluster members than other members. This shows the interrelationship between frequency of interaction and intensity of relationships, where cluster firms prefer to interact with members who have closer relationships and more intense relationships.

The same interviewee highlighted how informal meetings can lead to business-related discussion.

“Sometimes, while we are walking around the course, we have some conversation related to business. It is a mixture of both, and golf just provides the perfect opportunity for that.” (F5)

A similar comment was made by another interviewee who highlighted the blurred line between formal and informal meetings:

“Occasionally, we have attended seminars or workshops; however, we schedule formal meetings on a monthly basis in line with the government’s recommendations. The meetings themselves are not really all that formal, though. It is more like a friendly and relaxed discussion between friends about how they are doing.” (F6)

The blurred line between formal and informal interaction and leisure and business orientation is not unusual within a cluster, especially considering the characteristics of the small and medium sized firms which are the participants of this study.

Furthermore, it is important to highlight the effect of geographical proximity and ICT on frequency of interaction. It is undeniable that close geographical proximity provides the opportunity for face-to-face interaction, both formal and informal, as revealed in the findings about geographical proximity in Section 5.5.1.1. Cluster firms with less geographical proximity employ ICT as an alternative method of interaction. Therefore, cluster firms, regardless of their geographical proximity, can interact and intensify relationships.

- DURATION OF RELATIONSHIPS

The duration of a relationship is measured by the time over which firms had participated in the cluster network. In this study, cluster firms that had participated for less than 2 years were classified as having a ‘low’ duration relationship, ‘medium’ for 3-5 years, and ‘high’ for 6 years or more. This is in accordance with the classification of Burt (1997). The duration of participation for all participants in the study was from 3 to over 10 years, representing medium or high durations of relationships (as shown in Table 5-4).

Duration of relationships was described repeatedly by the participants when asked about the strength of ties, and therefore emerges as an additional factor in determining the strength of ties. The participants described the duration of relationships as strengthening cluster ties, as illustrated by one long-time cluster member:

“The development of a relationship does not just require effort but also time. At first, we did not know each other. But with time, the relationship begins to slowly develop and now after nearly 10 years, we can say that we are very close.” (F17)

Therefore, it is unsurprising that the long-time members of the cluster expressed closer relationships to other long-time members, as one said:

“I am closer to the members who have been in the cluster longer, especially those that we start this together, in comparison to new members.” (F11)

Another added:

“I believe that with time, we all can become closer.” (F11)

The above quotes underline how the duration of a relationship fosters the development of ties, as it provides an opportunity for interactions that intensify and maintain the relationship. The majority of the participants described the intra-cluster relationship as beginning with weak ties, then slowly developing stronger ties over time.

- INTENSITY OF RELATIONSHIPS

The participants were asked to elaborate on their emotional closeness to other members in the cluster network. Most expressed having highly to extremely significant intensity relationships with other members of the cluster network, whereas only six participants identified moderate to significant intensity.

The participants who identified high intensity relationships in the cluster network described intra-cluster relationships to be more than professional or purely business orientated. Instead, they recognised the relationship to be personal, as shown in the statement:

“I have known a few of the members for over 10 years. We have become more than just another member of a cluster, but friends.” (F23)

The intensity of relationships was described by most participants as determined by the duration of cluster participation and frequency of interaction, as presented in the previous

sections. The participants that had long cluster participation and a high frequency of interaction reported closer relationships with other cluster members, especially those that were also long-time members of the cluster.

However, two participants (F1 and F8), who had already established a close relationship with other members before participating in the cluster, offered another insight into the development of relationships within the cluster:

“The reason why our cluster is so close is because we have members who speak the same language and have the same understanding and mind-set.” (F8)

This shows that shared cognition can also determine the intensity of intra-cluster relationships. To avoid reiteration, this is discussed in Section 5.5.5.

In conclusion, the findings about frequency of interaction, duration of relationships and intensity of relationships denote that the ties in cluster networks are strong.

After identifying the strength of ties within the cluster, the participants were asked to identify the negative effects of strong ties, based on the discussion of all three factors. Unnecessary obligation, exclusion of outsiders, inertia, groupthink and redundancy were all identified.

“I sometimes need to help others, but I only help those that I am close too. If we are not close, I do not think they will ask for help.” (F3)

This quote highlights how intimate relationships are subject to obligations that are not necessary. Cluster firms offer assistance and support to fellow members to develop or continue a good relationship. This echoes the discussion about the cost of maintaining relationships, where maintaining and furthering relationships requires an investment of energy, time and effort. The idea of the closer the relationship, the greater the cost of maintenance was expressed.

The participants were asked whether strong ties cause the effect of exclusion of outsiders and inertia. Unlike the conceptual model, the participants expressed it as not significant. One elaborated:

“I think it does contribute, but not that much. To a certain extent I prioritise people who I am close too, but whether I decide to have relationship with new people or not, other factors also contribute.” (F17)

This statement implies that strength of ties combines with other factors to contribute to the exclusion of outsiders and inertia. Cost of maintenance implicitly show that strong ties may in fact unintentionally impose exclusion of outsiders and inertia due to the cost of maintenance restricting cluster firms’ ability to establish new relationships. The limited amounts of time, energy and resources available to invest in maintaining relationships restricts firms’ ability to invest in multiple relationships, and that the cost of having strong ties is at the expense of weaker ties.

Likewise, groupthink was identified as being partly caused by strong ties. A few participants saw knowledge redundancy as being caused by strong ties, as shown in the following quote:

“Maybe because we are close, we see each other a lot. It just not a surprise if we all have similarly information, as we share a lot too.” (F16)

This highlights the advantage of strong ties, but that a willingness to share information and knowledge, can cause knowledge redundancy. The amount and frequency of knowledge exchange and transfer can reach a point where the information and knowledge become repeated and redundant.

Nevertheless, the participants also highlighted the positive effects of strong ties, including developing a cohesive and cooperative network and assisting with the development of trust and shared vision, which is discussed in detail in Section 5.5.5 to avoid repetition.

5.5.2.2 DENSITY

The majority of the participants recognised the cluster as having a dense network structure, identifying extremely significant to significant mutual connections between cluster members (McEvily and Zaheer, 1999); as one stated:

“I know all of the members as our cluster is quite small compared to others. We only have 20 members in total. It is much easier to manage and easy for everyone to get to know

others. Plus, we have been doing this for quite a while now, it won't be possible to not know every member.” (F13)

The density of the network is determined by the degree of mutual connection, where the strength of the mutual connection is determined by the size of the cluster network and the duration of participation. Firstly, the size of the cluster implies the number of ties that exist within the cluster (Powell, 2012). The smaller the cluster, the smaller the number of actors available for connection. As illustrated by the quote, in a small network most of the members are mutually connected. This was confirmed by an interviewee from a larger cluster, the beef and dairy cluster, which has the largest number of members of any cluster in this study, who reported a less dense network structure:

“It would be impossible to say that I know everyone very well. I know a large number of them, but I am not close to all of them. It is quite a large group of people. I mostly connect with active members.” (F3)

This shows that the majority of the density appears around the core of the cluster. As F3 and other participants who held core positions in cluster networks revealed, core members are those that are most connected to fellow members.

Secondly, supporting the previous statement of F13, another interviewee described the duration of relationships as influencing the solidity of the cluster network:

“This cluster is over 10 years old, obviously I know all of the members. We have done a lot of meetings and activities together. When there are new members, it is also easier to connect them to the cluster as we already have a strong network foundation.” (F7)

This demonstrates that a longer duration of membership facilitates interaction through cluster activities which form mutual connections between cluster firms. This consistent social interaction preserves dense network structures and forms cohesive networks. The statement also points out that new members have a low effect on the density of the cluster network as a whole. Once a dense structure is formed, it is difficult to loosen the structure. It often takes time for new members to become fully merged into the network.

The participants underline the benefits of strong dense networks which indicates that in a dense network structure, information and knowledge flow faster and more efficiently,

providing greater access and mobilising diverse and valuable information, as one interviewee stated:

“When we are all connected, sharing and receiving of news, information and knowledge becomes easier. You just have to share it once and everyone is sure to receive the information.” (F20)

Nevertheless, during the discussion of density, the same interviewee, among others, shed light on the negative effect of density:

“As we all have the same information, connecting to the same people, the same institutions and with shared of news and information, it is undeniable that there is strong overlapping. Except some of them who went the extra mile to get information and knowledge outside the cluster.” (F20)

This quote shows that a strong dense network can lead to knowledge redundancy. The mutual connection and dissemination of information and knowledge may reach a point where the information and knowledge between members overlaps. Nevertheless, the exclusion of outsiders and inertia were not identified by the participants as negative effects of density as suggested by the literature.

5.5.2.3 CENTRALITY

This study adopts degree of centrality and betweenness centrality to determine the core and peripheral positions in cluster networks. The participants who identified themselves as holding core positions in the clusters (e.g. the president of cluster) were those who had been in the cluster for a long-time and/or particularly resourceful members. Firms at the core positions in clusters are recognised to have wide connections with other members and/or bonds with sub-groups inside the cluster. They can act as a bridge between the cluster and other institutions, as illustrated by the following statement from a firm in a central position:

“The main responsibility of my role as the president of the cluster is to ensure coordination and collaboration between and among firms in the cluster and relevant institutions. Therefore, I often find myself in the middle of the (knowledge exchange) process... with connection to all of the members in my cluster and workers from institutions, it is not that difficult to access to information or get things done. I can contact someone that I know.” (F20)

Central firms have good reputations and are trustworthy. Other cluster members are more willing to share information and knowledge or cooperate with them. By serving as structural bridges between cluster members and between the cluster and other institutions, central firms are strategically positioned at the middle of the knowledge transfer process which provides faster access and more diverse information, knowledge and resources. They are able to influence the flow of information and knowledge within a cluster. It was seen that the firms at the core of the networks tended to be more innovative than other firms. One interviewee from a central firm spoke of the advantage of centrality in relation to innovation:

“I was trying to reduce the cost of fodder. I had an idea to use potatoes as an alternative source of yeast; however, I was unable to figure out how to remove contaminants from potatoes. I contracted research from a university that cooperates with this cluster. Together we successfully produced potato yeast to mix with fodder, which reduced 20%-30% of cost. Then, we wanted to develop this further. One of the members used to run a distillery and told us that he fermented yeast into alcohol. A researcher tested this in the lab and added nutrients. We fed it to cows, and it produced the expensive wagyu meat.” (F4)

These firms are recognised by institutions as actively participating in cluster activity and playing a major role in cluster development. The roles described by the participants included encouraging other members to participate in cluster activities, fostering cooperative and cohesive networks, coordinating between members and between clusters and institutions and being involved with cluster development planning.

The firms at the core of the cluster can reach other members, and vice versa, they are highly visible and easy to reach. Hence, it is unsurprising that firms at the core of the cluster are the recipients of many requests and, in order to maintain their position, they are required to carry unnecessary obligations:

“Other members are not very good with the design and marketing. Because they are more on the manufacturing side, while my products are highly on the creative side. Therefore, a lot of members ask for help in this area which allows me to connect with most of them.” (F13)

Unnecessary obligation was identified by most central firms as having a highly significant effect on innovative performance. Nevertheless, it is worth mentioning that a few of the firms

did not identify this as significantly negative. They described it as an unavoidable investment for the long-term success of the cluster.

Other negative effects of social capital were not ascribed to centrality. In fact, most of the firms at the core positions of the clusters reported being able to ameliorate the effect of knowledge redundancy and exclusion of outsiders described in the literature, as one stated:

“I do not think the information and knowledge are redundant. Yes, I receive a large amount of information and knowledge from other members. However, I also do a lot of self-study as well as regularly keep in touch with workers from supporting organisations e.g. the local university or the researchers from the university. This actually provides an opportunity to get to new information and knowledge that I did not know before.” (F5)

As structural gatekeepers, firms in the central position are less likely to focus exclusively on insiders and the diverse information and knowledge they gain reduces knowledge redundancy. Most of the central firms reported managing this well, apart from one (F9) who felt that some information and knowledge flow was irrelevant. This shows that central firms maximising the advantage of their position might depend on other factors such as diversity of information and absorptive capacity.

5.5.3 RELATIONAL DIMENSION

5.5.3.1 TRUST

There was consensus agreement among the participants on the importance of trust governing relationships (Uzzi, 1996), described as the foundation of the functionality of the cluster:

“Trust is like a pillar of the relationship, without the strong foundation, the relationship is at stake.” (F22)

“It is not easy to cooperate with someone, you have to be concerned when you are afraid that they will take advantage of you that you have to constantly watch your back – reduces fears.” (F14)

These statements provide examples of the way the participants described trust; the expectation that the trustee will treat the trustor with ‘sincerity’, ‘honesty’, ‘fairness’, ‘promise’ and

'respect'. The participants also described treating the trustee the same way. The quotes above show that trust is recognised as playing a pivotal role in fostering relationships and providing a harmonious environment of cooperation in the network. When there are reciprocal exchanges, cluster firms feel confident and secure in sharing information and knowledge without fear of opportunism. This can be to the point where a formal contract is not required, and business transactions are processed by verbal contract, bound by personal trust.

Firms base their trust on past experience, and repeated interaction and transaction. Hence, it is observable that trust and strength of ties are correlated where the intensity and duration of the interaction assists trust development and, simultaneously, trust intensifies the intensity and continuity of relationships. An interviewee explained how trust develops:

"I learn how to trust others based on past experience. For example, I placed an order with other members, and they send it on time or if the person throughout time has always been honest, sincere and transparent, then I do not have any reason not to trust them. We can just shake hands, no need for formal stuff." (F1)

This development of trust mirrors the interpretation of trust described. Trust is accumulated over time through repeated interaction. However, trust is fragile; it is easier to break trust than develop a trusting relationship. Trustees need to ensure they behave without being opportunistic and meet the expectations and promises made to trustors in order to maintain trust. This may carry unnecessary obligation, as the same interviewee elaborated:

"When you are trusted by other members, to maintain a trusting relationship, you need to make sure that you do everything to fulfil the promise. For instance, when other members make orders with me, they are certain that they will definitely receive high quality materials as I have promised regardless." (F1)

When questioned about the impact of trust on the other negative effects identified, the participants confirmed the negative effects of inertia, exclusion of outsiders and opportunistic behaviour which resonate with the assumptions of the conceptual model. The participants also identified groupthink as an additional negative effect caused by high levels of trust.

The mechanisms of exclusion of outsiders and inertia formed by trust are relatively similar. The quote below provides an example of the process of accepting new members into a cluster which heavily involves trust:

“To join this cluster network, the potential new members are guaranteed by existing members. That existing member will be responsible to certify the trustworthiness of this potential member. He/she needs to know this new person well enough to provide all the essential information when other members ask.” (F9)

Uncertainty about the trustworthiness of new members or outsiders plays a filtering role, where cluster firms choose to focus exclusively on a few trusted relationships and feel reluctant to trust new members or outsiders to the cluster. Furthermore, the requirement of time and effort needed to develop trusting relationships may restrict firms from forming new trusting relationships.

Groupthink is an emergent negative effect of trust which is not identified in the literature. An interviewee at a core position in the textile cluster demonstrated the effect of trust on groupthink:

“Members are less involved in the cluster decision-making as they believe that I can make the decision on behalf of them.” (F9)

A participant from the same cluster confirmed the negative effect of trust on the decision-making process, saying she trusted the core members of the cluster (e.g. F9) to make cluster decisions.

“I think they [core members of the cluster] know what they are doing, well, I think it is definitely better than me. I do not feel I need to be involved all that much.” (F10)

This shows the impact of trustworthiness in the cluster. Most cluster members trust the core members to make decisions and follow their decisions without appropriate monitoring or consideration of alternatives. They trust that the trustee will make the best decisions in the interests of the others and will not take advantage. However, this may lead to opportunism, as the trustee may restrict the area of activity or make a decision in their own favour.

Discussing opportunism, all the firms said it was associated with trust, although most participants saw an absence of trust as triggering opportunism which the majority experienced during the initial stages of the cluster. One reported that, during that time, the absence of trust

created scepticism and placed restrictions on information and knowledge sharing as a precaution against opportunism:

“..of course, this (lack of cooperation) was an issue for a number of years because it takes time for people to get to know each other and to trust each other. Before, some of us used to be business enemies as we were competing against each other, with similar products, similar markets, it was not easy to see eye to eye. They did not trust each other, no one wanted to share the details about suppliers, materials... but people began to know each other and trust each other, and eventually open up.” (F8)

Cluster firms initially felt insecure and afraid of being taken advantage of. Unsurprisingly, the absence of trust raises concerns for both cluster members and institutions that it will prevent cooperative and cohesive networking and the effectiveness of the cluster.

Nevertheless, when firms trust each other they tend to reduce the monitoring process and expose themselves to opportunism. However, only two participants (F2 and F4) confirmed the effect of trust on opportunism. F2 shared his personal experience of opportunistic behaviour by another cluster member:

“He (the other member) asked me to step in to help him complete his order when he did not have enough quantity. He promised that he would pay me within 30 days. So, I helped him, but now it has been over two months.” (F2)

This is an illustration of over-trust reducing the monitoring process and the formal written contract being replaced by a verbal contract based on personal opinion and past experience without reappraising the situation. This increases the risk of exposure to opportunistic behaviour. After the incident, both participants (F2 and F4) shifted their behaviour in light of the experience to be more aware of opportunistic behaviour from over-trust and put significantly less trust in their previous trustees.

The conclusion drawn from the interviews is that trust fosters an environment where firms feel confident to share and exchange information, although trust requires constant maintenance which may involve unnecessary obligation to fulfil expectations and promises, keep in touch etc. Over-trust can discourage cluster firms from forming relationships with new members and outsiders, placing cluster firms in the situation of groupthink and making them more vulnerable to opportunistic behaviour.

5.5.3.2 NORMS

Similar to trust, norms are also recognised as a foundation of reciprocal relationships and vital to the success of cooperative and cohesive cluster networks. The responses from the participants indicate a high level of collective norms within the cluster networks. The participants described their understanding of norms through the idea of ‘appropriate behaviour’, ‘expected behaviour’ and ‘acceptable behaviour’.

Norms in a cluster network develop when an individual or group of individuals set an example of preferred behaviour in the network. Commonly, the core members of the cluster serve as a frame of reference. Over time, these behaviours develop into collective norms. One interviewee, the core member of his cluster, provided an insight into how collective norms develop:

“I began to help other people out first, in this industry, we had the culture of not sharing information about suppliers as pricing and profits are largely based on that. However, I began to hand out this information first. Then other members felt more confident, and also began reciprocity.” (F8)

This statement conveys the idea that, at first, the effort was individual, and its impact was minimal, but it slowly created a ripple effect and developed into the collective norms of the network. The initial cooperative action of an actor in the network triggers others to reciprocate and generates a ripple effect, subsequently developing into norms of collective behaviour. There are no formal written materials in regard to the norms of the network, but members of the cluster are expected to recognise, accept and act in accordance with them:

“The members come from various business and personal backgrounds, I would not expect for everyone to see eye to eye. However, over time, we develop the collective norms that standardised behaviours. Without this, it would be tough to be united.” (F20)

“There is expectation that every member is going to be cooperative in the cluster’s activities and not take advantage of others. Some of us have been in the cluster for nearly 10 years, we manage to keep the relationship for this long because we understand and respect

the social rule... those who did not understand left the cluster as they did not understand how this cluster works.” (F5)

The above statements show that collective norms are understood as guidance on the expected and acceptable behaviour in the network and serve to prevent undesirable behaviour. Firms that do not accept the collective norms or behave with a lack of adherence to the norms are not accepted by other members and may leave the cluster or even get sanctioned by other members. Members getting sanctioned harms their trustworthiness and business reputation. This is in line with previous research, which demonstrates that norms can facilitate, as well as constrain, certain actions (Coleman, 1990).

When asked about the negative effects of social capital, the participants identified similar mechanisms for the negative effect of norms as the negative effect of trust - unnecessary obligation, groupthink, inertia and exclusion of outsiders. Although, in contrast to trust, strong norms reduce the likelihood of opportunism.

All the participants reported extremely significant to significant levels of norms of reciprocity in the cluster networks, with an expectation of cooperation between members:

“We have the norm of reciprocity in this cluster and I feel the need to help other members and contribute back to the cluster. For instance, every year we have the product showcase at an international trade and exhibition centre. I volunteered to create the backdrop for the cluster’s product showcase. It was not necessarily my responsibility, but I felt the need as well as the willingness to do so, even though, it did cost money and quite a lot of time.” (F13)

This describes expected behaviour in the interviewee’s cluster network, and sheds light on the inevitable obligation of the members to the cluster network. Firms carry unnecessary obligation to meet the expectations of fellow members as well as contribute to cluster development and avoid being recognised as not reciprocating or the possibility of sanctions. Norms sway decisions from pure self-interest to the interests of collective action. Hence, norms of reciprocity in the cluster involve unnecessary obligation.

Groupthink is another negative effect of norms reported by a few participants. One stated:

“I think we struggle a bit on the range of opinions and ideas in the cluster. It is because no one wants to raise different opinions or ideas. Even when I tried to encourage new and different ideas, they just went with what most members agreed on and were unanimous.” (F9)

This shows that a strong level of norms of reciprocity and cohesiveness can make cluster members afraid of raising different opinions or agree with the majority when it comes to decision-making, as cluster members do not want to be perceived as uncooperative or risk upsetting other members. Thus, over time, the members of clusters develop ever more similar ideas and thoughts and traps into a situation of groupthink. Consequently, this damages the diversity of information and knowledge of the cluster and impedes the potential development of innovative performance.

Another statement describes the effect of norms on inertia:

“There are some people who I do not think share the same level of moral standard. I found it is uneasy to communicate and coordinate with them. We were able to work together to a certain extent. But I prefer not to work with them if there is an option.” (F10)

The above quote demonstrates that norms are recognised as smoothing interactions. Different levels of commitment to norms can cause firms to be reluctant to strengthen relationships, as they prefer individuals who share the same norms.

The participants described a similar effect of the exclusion of outsiders, where the concern of cluster firms about accepting new members was a lack of adherence to existing norms, as one said:

“I think we have developed good understanding of each other already. I do not know whether accepting new members will be beneficial or not, and whether they will have the same mind set as the rest of the cluster. I do not want to accept people who see things differently.” (F17)

This quote shows that cluster firms are reluctant to accept new members because of the high level of shared norms. The participants expressed two themes to explain this phenomenon. Firstly, there was concern that potential new members might not accept or act in accordance with the existing norms. There is risk of misjudging and excluding potential members who might contribute to the diversity of the cluster. Secondly, the existing collective norms might

be damaged by a new set of behaviours from the new members of the cluster. Existing members can exclude outsiders with the intention of preserving collective norms.

These findings are consistent with the existing research that shows an inverted u-shaped relationship between norms and innovation. Norms play the role of soft institutional rules, guiding the expected behaviour in the cluster network. They serve as a filter for new members and which firms will maintain or develop relationships. However, a strong level of norms in a network can pressure firms to carry unnecessary obligation and risks inertia and exclusion of outsiders, which inhibit new knowledge and learning, negatively affecting innovation and, potentially, cluster development.

5.5.4 COGNITIVE DIMENSION

5.5.4.1 SHARED VISION

The visions of the clusters that the participants in this study participate in revolve around the themes of internationalisation, sustainability, boosting competitive advantage, advancing technology, and innovation development. The visions of all the clusters are associated with industry development.

A large proportion of the participants reported participating in clusters partly because the vision of the cluster matches the interviewee's vision of the industry, as one stated:

“I joined this cluster initially because of the vision of the cluster is what I want to see this industry grow into.” (F22)

Two of the clusters in the study were formed from the shared vision of a group of entrepreneurs (the clusters of F1 and F8):

“Initially, there were two to three manufacturers that I felt we were ‘business friends’ and it was enough. We were just informally exchanging business information. There was no budget allocated to things we could have done together, any concrete roadmap or plan. Though, we all want to strengthen our competitive advantage over other countries. We thought we can definitely do more with the support of the government agency and a larger number of connections. That is how we came to an idea of establishing this cluster.” (F8)

F1 states a similar motive for his involvement in establishing a cluster:

“I want to add value for herbs. I think it should not be perceived as local or low-income, it should be for middle and higher income. I want to revolutionise the perception that herbs as medicine are not reliable... if we can achieve that it will open up new markets and be beneficial to the whole industry.” (F1)

This demonstrates a shared vision as the initial motivation for participating in or establishing a cluster network. Most of the participants described a shared vision as providing a sense of the direction and purpose of the cluster and as the drive for collective action. They also recognise shared vision as differentiating intra-cluster relationships from other business relationship.

Therefore, it is unsurprising that all the participants, apart from one, identified it as moderately to extremely significant to share vision with fellow cluster members. This one interviewee (F15) expressed having less or fairly significant shared vision with his fellow cluster members, providing this explanation:

“The rest of the members’ business is ceramic. It is only me whose business is papier-mâché in the whole cluster. Therefore, the vision of the cluster is focusing on that and I do not see myself sharing it with them.” (F15)

This statement expresses a feeling of differentiation and not being related to other cluster members; therefore, this interviewee did not perceive the vision of the cluster to be relevant. This shows that the level of diversity of the cluster members can contribute to the significance of the shared vision of the network.

The rest of the participants signified a moderate to extreme significance of the shared vision of their cluster networks. These participants shared a vision and were enthusiastic about pursuing the collective goals of the cluster. Nevertheless, when asked whether their company’s future was related to the other members, some gave another insight:

“I share and contribute to achieving the vision of the cluster as the rest of the members, however I also have my own personal objective that I want to pursue, and it is different from the collective goals of the cluster. I do not feel I need to choose one over the other. I can do both at the same time.” (F13)

This statement offers another noteworthy viewpoint not directly revealed by the literature, which is that cluster members may have personal goals and objectives that do not necessarily harmonise with the vision shared with the other members. Consequently, cluster firms do not consider the future of the firm to be strongly related to other members or purely based on the cluster network. This is echoed in the following:

“Different manufactures have different issues and visions. The different of size and capacity make it impossible to have one common vision. Vision of the members who are large manufacturers is more advanced, focusing on competing at the international level, whereas the medium and smaller or new cluster members just want to increase market share in their own market.” (F2)

Similar to technological proximity, the different sizes and capabilities of firms in a cluster contribute to the significance of the shared vision in a cluster network. On one hand, larger firms may pay more attention to long-term and large-scale vision, while on the other, smaller firms may perceive that vision as quite difficult to achieve based on restricted resources and capability. Hence, each firm develops its own goals and pursues both collective and personal goals simultaneously, as reflected in the quote of F13, above.

One interviewee shed light on the personal experience of formulating the vision of a cluster, which may contribute to a less significant shared of vision for some cluster members:

“We develop the vision of the cluster through discussion among ourselves and with the help of the government agency. Even though, it is a ‘shared vision’, not everyone has contributed to this, although, we have tried to include all of them. In the end, it is the majority of members, who are actively engaged, who come up with the vision.” (F20)

The above statement emphasises the lack of consent about the vision of the cluster. Different from the cluster initiated by a group of entrepreneurs, where the shared vision was the foundation of the cluster, the vision of this cluster is assigned by the government agency but may be developed or contributed to by the core active members of the cluster. These members are usually the ones that drive the success of the collective goal and vision. However, this can leave some members excluded and not satisfied with the vision of the cluster.

These explanations illustrate how a shared vision may not be as significant as the participants expressed. While the conceptual model postulates an inverted u-shaped relationship between shared vision and innovative performance, the findings reveal only positive effects of having a shared vision, and none of the participants reported the negative effects of groupthink or loss of objective as identified in the conceptual model.

The discussion above provides evidence of the way in which the four dimensions of social capital can lead to negative effects and impede the innovative performance of cluster firms. Table 5-4, below, summarises the negative effects of social capital on the innovation of cluster firms and their causes through the four dimensions of social capital. As this research reveals different effects of each social capital dimension on innovation performance, this informs the need for multiple dimensions of social capital and the clear distinctions between them, supporting the idea of taking a multidimensional approach to the study.

	Cost of maintenance	Decision-making constraint		Restriction to novelty or diverse information and unawareness of the necessity to change			Opportunistic behaviour
	Unnecessary obligation	Groupthink	Loss of objective	Inertia	Exclusion of outsiders	Redundancy	Opportunistic behaviour
Proximity							
Geographical proximity	X	X	X	X	X	X	X
Technological proximity	X	√	X	√	√	√	X
Organisational proximity	X	X	X	X	X	X	X
Institutional proximity	X	X	X	X	X	X	X
Structural							
Strength of ties	√	√	X	√	√	√	X
Density	X	X	X	X	√	√	X
Centrality	X	X	X	X	X	X	X
Relational							
Trust	√	√	X	√	√	X	√
Norms	√	√	X	√	√	X	X
Cognitive							
Shared vision	X	X	X	X	X	X	X

Table 5-4: The summary of the four dimensions of social capital and negative effect derived from the empirical finding

5.5.5 INTERRELATIONSHIP BETWEEN THE FOUR DIMENSIONS OF SOCIAL CAPITAL

Following the discussion of the four dimensions of social capital and the negative effects of social capital in which the participants illustrated clear understanding of the differences between the dimensions (as shown in the previous section), the interviews moved in the direction of the relationship between the four dimensions of social capital. Before the interview began, the participants were provided with details about the four dimensions to ensure a comprehensive understanding.

The participants were first questioned on the interrelationship between the four dimensions. Then, a pre-made diagram was presented to them and the researcher asked them to draw, and elaborate on, the relationships between the four dimensions of social capital (if any).

All participants reported a high degree of interrelationship. The role of proximity as the supporter for the three other dimensions of social capital was agreed by all participants. However, the relationships between the three original dimensions was described variously. The responses fall into two groups, with the participants identifying either the structural dimension or the cognitive dimension as the antecedent of the other two dimensions. They all agreed on the mutual relationship between the structural and relational dimensions.

Cognitive social capital was recognised as the cause of structural and relational social capital by more than half the participants, and the vision of the cluster was recognised as the initial motivation to participate in the cluster, as demonstrated by the following:

“We began with a group of firms who participated in a cluster because of a shared vision. I did not know anyone back then. We had ice-melting behaviour activities. But we needed to figure out which activities to use, as everyone is unique. The advisor (from the university) who assists in other clusters, says that we need to be able to sell our products together, have collaborative and collective action, sell at the booth together, product showcase.” (F5)

This demonstrates that cluster firms may join a cluster network purely based on the shared vision, without having prior connection to the other members of the network. The relationships are only initiated and begin to flourish after the participation, when the activity of the cluster

promotes interaction and the development of relationships between members, i.e. structural social capital.

Having a shared vision is identified as cultivating trusting relationships, as one participant affirmed:

“When you know that we all share the same vision and are gearing toward the same direction, there is no reason why they would want to sabotage the success of the vision. It may also damage their own businesses.” (F12)

This implies that a strong shared vision assures cluster firms that they will not be taken advantage of by other members, as they feel their fates are related. Thus, cluster firms develop trusting relationships when a certain level of cognitive social capital is present.

The participants who identified the structural dimensions as an antecedent of the other two were the minority, whose relationships included both informal and formal cooperative networks with other members prior to the start of the cluster network (F3 and F4). These cluster firms already used their inter-firm relationships to address problems and exchange information, knowledge and resources. A cluster was established to further the success of the vision:

“We have known each other for a while before and been working together before the cluster. We were all concerned about the scarcity of herb [raw material] and the possibility that firms can exchange the local herbs. Though, just few of us would not be that beneficial. It needs to be at the larger scale, and this is why we established this cluster.” (F1)

This is supported by another interviewee who referred back to the formalisation of his cluster which evolved from an informal group of firms with a shared vision:

“We were already doing it in our own way, but we wanted to formalise it. When the cluster is established, we have more formal routine, strategic planning and full support from the institutions.” (F8)

These statements implicitly show the close relationship between pioneer members. Through past interactions and close relationships, these cluster firms were able to establish a common vision. However, other firms, that join the cluster later, may not necessarily have these

interpersonal relationships but still manage to share the vision of the cluster. The cluster network in this context is perceived as primarily offering the opportunity to elevate and expand the network and gain support from institutions.

The interrelationship that all the participants agreed on was the simultaneous relationship between structural and relational social capital. The expressions of how trust develops included the themes of duration of the relationship, the frequency of interaction and closeness of the relationship. Past experience of interaction over a period of time allows trusting relationships to be maintained and strengthened, until something causes trust to be doubted. Conversely, the participants described preferring to interact with trusted members:

“Trust makes it much easier to build relationships with other members. You need to know what they’re telling you is accurate, and that there’s no secondary motive in play. Overall, cluster members generally recognise that the long-term value of these relationships is more important than any kind of short-term competitive advantage that could be gained from withholding or adapting useful information. But, obviously, trust takes time to build.”
(F14)

Personal experience and quality of past interaction often dictate which cluster members firms are likely to approach and engage.

The interaction also influences the collective norms of the cluster, as one interviewee said:

“Everyone has personal norms. But, when you’re in cluster over a period of time, these can be adjusted. You begin to observe how others behave. Eventually, all members just know automatically how they’re expected to behave and what kind of behaviour would be considered unacceptable.” (F23)

This is in line with another interviewee (F8) who mentioned setting an example of expected behaviour in the cluster network. Through repeated interaction, cluster firms observe the expected and unacceptable behaviour and slowly develop collective norms, while close relationships pressures cluster firms to act in accordance with those norms.

The relationship between proximity and the other three dimensions has some light shed upon it by the discussion of the four dimensions and the negative effects of social capital in the previous section, especially geographical and technological proximity.

Geographical proximity was identified by most participants who were in geographically orientated clusters as playing a role in facilitating frequent interaction and intensifying the relationship, i.e. structural social capital. Although, not all participants agreed (as discussed in Section 5.5.1.1).

Geographical proximity was described by two of the participants (F1 and F2) as facilitating cognitive social capital:

“As our raw material is cassava/tapioca, other firms within close distance experience the same weather, soil, plant diseases and have the same harvest season, whereas other places have these at different times of the year. We often face the same problems. I definitely contact firms nearby more because I feel more relevant to them and it is more convenient to share information and consult. I rarely communicate with firms that are further away as I do not think they are facing the same situation.” (F2)

This illustrates that being in the same environment increases the chances of encountering context-specific problems. The business of F1 and F2, who reported the relationship between geographical proximity and cognitive social capital, is agriculture-based and not all the members are co-located. Thus, firms in close physical proximity develop mutual understanding, value and possibly vision, i.e. cognitive social capital from shared experience and facing similar obstacles and opportunities.

Technological proximity was described as easing cognitive social capital. Similar to Section 5.5.1.2, the participants said that technological proximity can facilitate understanding and communication between cluster members. When there is close technological proximity, firms are able to develop shared vision and values more easily.

“There is definitely a coming together of values and interests that grows the more businesses work together in cluster networks. Over time, we end up sharing the same aims and goals. So, without needing to make formal arrangements, we will stand a better chance of staying on the same page in terms of our approach.” (F12)

This statement demonstrates that familiarity, from past interaction and/or collaboration, allows cluster firms to understand how other firms perceive, interpret and evaluate the world and thus cultivate shared reference, mutual understanding, value and vision.

Lastly, institutional proximity was said to influence relational social capital by some participants, as one pointed out:

“In my experience, being in a cluster makes it much easier to assume that everyone is subject to the same laws and regulations. We can be confident that they are operating by the same rules, so there is little chance of any error or inaccuracy that could end up affecting us.”
(F6)

This underlines how institutional proximity serves as an institution that ensures cluster firms behave according to laws and industry regulations, in addition to collective norms. When institutional proximity is in place, opportunistic behaviour is less likely to occur, so it facilitates an environment of trusting relationships.

5.6 COMPARISON BETWEEN CASE STUDIES

All of the clusters participating in this study receive support from the DIP under the same principle. Nevertheless, the findings regarding the four dimensions of social capital reveal that all have different levels of social capital and therefore are affected by negative effect of social capital differently. This section presents the factors that contribute to these different levels of social capital between the cluster networks, the different levels of embeddedness between members of the same cluster, and the different levels of negative effect of social capital between members of the same cluster network. Further detail on the cluster firms participated in the study can be found in Appendix E.

5.6.1 FACTORS THAT CONTRIBUTE TO DIFFERENT LEVELS OF EMBEDDEDNESS BETWEEN CLUSTERS

There are different factors that contribute to different levels of embeddedness between clusters in the study. However, the Bangkok fashion cluster is shown to have a significantly low level of social capital in comparison to the rest of the clusters in the study. F18 and F19 from this cluster were asked to elaborate on this and suggested a lack of understanding of the concept, the type of industry and leadership as problems.

5.6.1.1 UNDERSTANDING THE CLUSTER CONCEPT

In the previous section, a lack of understanding of the cluster concept is highlighted as a factor reducing the effectiveness of cluster networks, and it can also pose a challenge to the

development of social capital. Cluster members who do not understand the concept of clusters are often reluctant to develop intra-cluster relationships. The Bangkok textile cluster is recognised for its low level of communication and lack of relationships between members, according to the Thai cluster report of 2018. The quote below from F19 offers an explanation of why he saw his cluster as less successful and with a lower level of social capital than other clusters:

“All successful clusters have a good understanding of the general cluster concept, or at least the majority of members do. They fully comprehend what it takes to operate an effective cluster, and that they are all in it together. As such, these clusters are driven by positive attitudes and energy. Unfortunately, it is a different story in this cluster.” (F19)

This quote pointed out the same misunderstanding of the concept of the cluster as also mentioned in Section 5.2.1 on the lack of understanding of the cluster concept. The cluster largely operates based on networking, and the majority of the misunderstanding is that members expect to receive financial aid from the cluster’s supporting organisations and do not recognise the importance of intra-cluster relationships. Furthermore, when financial aid programmes stop or are reduced, they develop a negative perspective of the cluster and reduce their willingness to engage and cooperate in the network.

5.6.1.2 DIVERSITY OF MEMBERS

Another factor that affects social capital development in this cluster is pointed out by F18 and F19 to be the high level of diversity of cluster members:

“...the problem is the wide variety of members. Anyone whose product is involved with textiles – literally anything from fabric to clothing – can join this cluster. It can be any form of textile; silk to cotton. It does not matter about the quality, or which market you are focusing on. Everyone’s designs are different. It is all over the place, and you end up finding it quite difficult to directly relate to anyone.” (F18)

The quote above shows how high-level technological proximity can create obstacles to coordination and cooperation. However, this issue does not occur in the 1st craft cluster which is also in the design/creative industry. F9, F10 and F11 are shown to be able to develop and maintain social interactions. The difference between the Bangkok fashion cluster and the 1st craft cluster can be explained by the size of cluster, duration of the relationships, shared vision, and role of leadership. Firstly, a smaller number of members makes it easier to organise and

schedule cluster activities. Secondly, a longer duration relationship implies more opportunity for interaction and making the relationship closer. Lastly, stronger and more defined mutual vision provides a sense of direction and encourages collective action. The role of leadership is explored further in the following section.

5.6.1.3 LEADERSHIP SKILLS

The issue of leadership is mentioned by both F18 and F19, who refer to the previous president. The issues include internal conflict, poor communication and a lack of coordination:

“Whenever the last president went for meetings with DIP or other supporting organisations, he only took a very few members. Therefore, it was only a limited number of people who were in dialogue with DIP, and the rest of us did not really know about it much (unless someone asked about it). I don’t think he has the cluster’s best interests at heart.”
(F18)

The above quote shows how poor leadership can have a significantly negative effect on a cluster. It determines the level of trust and cohesiveness within the cluster and therefore its functionality. One participant from another cluster emphasised how good leadership contributes to the success of her cluster:

“Both the president and other active members play a vital role in guiding and bonding the cluster. If they stop being active, or don’t put the needs of the entire cluster first, then it is going to fail. It is very important to have someone that is both in charge and acting as a frame of reference for other cluster members.” (F13)

In the same vein, the DIP also stressed the important role of the cluster’s president:

“The president of a cluster is at the helm of the ship, steering members the right direction. They must constantly communicate with supporting organisations, develop good relationships, and coordinate all members of the cluster. We (DIP and supporting organisations) need to know what direction they are heading in so that we can provide the right support. These ingredients (a strong and fair president with 3-4 talented CDAs) can easily drive a cluster towards success.” (DIP)

This quote underlines the cluster president's coordination role within a cluster network. She or he must have good communication skills and be able to encourage others. Apart from these skills, she or he must have integrity act as a role model for other members.

The recent change of president is intended to improve the situation in the Bangkok fashion cluster, however, F19, as the new president, raised concern about the participation of members:

"I really want to change things around; to try to build a cohesive network where we can actually do something great together. However, this is not a one-person job. Everyone must be willing to change and be more active." (F19)

This quote shows that, even with good leadership, without involvement from other members the cluster still has a high chance of failure.

5.6.2 FACTORS CONTRIBUTING TO THE DIFFERENT LEVELS OF EMBEDDEDNESS BETWEEN MEMBERS OF THE SAME CLUSTER NETWORK

This section highlights the factors that may cause different levels of social capital between members within the same cluster network. Social capital, based on its four dimensions, shows that members of the same cluster do not necessarily have the same level of embeddedness, for example, F3 and F4 from the Maha Sarakham cow and dairy cluster and F12 and F14 from the Eastern Para wood product cluster (EPPC).

5.6.2.1 NETWORKS OUTSIDE CLUSTERS

While the study does not focus on networks outside the clusters (except the supporting organisations), during the interview, a few participants (F1, F4 F5, F7, F8 and F14) mentioned how networks outside the cluster help ease some of the negative effects of social capital and contribute to their innovation development.

"I receive information and knowledge from various network ties; from my own business, other cluster members and community enterprises. I am not exclusively embedded within one network." (F1)

The above quote shows that cluster members might not necessarily be exclusively embedded within a cluster network. This is similar to the statement from another participant:

“The cluster is one of many networks I have joined. I am also part of other associations, such as the Federation of Thai Industries (FTI), where I and other cluster members gain new information and knowledge. When you are dealing with others outside the network, you constantly exchange information. I am not restricting myself to just cluster membership alone.” (F14)

This reveals that participating in various networks can help increase the diversity of contacts and information, as it allows the exchange and transfer of knowledge beyond what is available in the cluster. Comparing F12 and F14, F12 has less interaction with outsiders and suffers greatly the negative effects of exclusion, redundancy and inertia. These members often introduce information and knowledge into the cluster which enhances the innovative capability of the cluster as a whole.

5.6.2.2 PERSONAL CHARACTERISTICS

Both F3 and F4 identify the same four dimensions of social capital covered in Section 5.5. However, F3 experiences the negative effect of over-embeddedness more significantly. This might be explained by personal characteristics. During the discussion on the non-identified negative effects of over-embeddedness, F4 explained how he suffers less significantly the effects of groupthink and inertia.

“I am a learner. When you stop learning and developing, you can be easily forced into irrelevance. I studied using books, websites and YouTube videos, as well as talking to specialists. I had an idea to improve cow feed. I have conducted all the required study myself. At that time, no one was interested or willing to test it. Therefore, I had to start a trial at my own farm. Then, with the help of one researcher from the university, we went on to develop the formula that most members of the cluster are now using.” (F4)

The above quote highlights the personal characteristics of F4 as innovative, open-minded, adventurous and with an unusual curiosity and enthusiasm for problems and their solutions. This is in line with F3’s description of F4, which identified him as the most innovative and advanced in the cluster. His characteristics have enhanced the development of personal knowledge beyond what is available in the cluster and therefore reduced the negative effects of groupthink and inertia that F3 suffers.

5.6.2.3 SENSE OF BELONGING

The lack of a sense of belonging is described by F15 as the reason for his low level of embeddedness in the ceramic (Lampang) cluster and his decision to remain in the cluster (as pointed out in Section 5.6).

“The rest of the members’ business is ceramic. It is only me whose business is papier-mâché in the whole cluster... I can’t really say I am all in. My business is not related to most of the cluster activities... I am in this cluster because it is the closet available.” (F15)

His business, papier-mâché, is different from the other members. Hence, he does not share the identity or version of the rest of the cluster. A sense of belonging cannot develop, reducing the possibility of embeddedness. This is also shown by the four dimensions of social capital, as he has more scattered and weaker ties, and a lower level of shared vision and technological proximity than other members of the cluster (e.g., F16 and F17).

5.7 DECISION TO REMAIN IN A CLUSTER

Given the discussion about the negative effects of social capital, it is crucial to evaluate their impact on the decision to participate or remain in cluster networks. The cluster firm participants were questioned about whether they would still participate in the cluster if they realised the potential dark side of being over-embedded in intra-cluster relationships beforehand.

The responses of the participants can be divided into four groups. The majority fall into the first three groups which reported they would continue to participate in the cluster network, though with different rationales.

The first group perceived over-embeddedness as having an adverse effect on innovative performance, but the benefits of being in a cluster outweighed the negative effects, as one pointed out:

“I feel that these negative effects can harm innovative performance, but more the indirect effects and long-term effects. I feel the benefit is more prominent and visible. Therefore, these negative effects do not influence my decision to join and remain in the cluster.” (F6)

This statement shows that the negative effects of social capital are perceived to be indirect and not immediate in their effect on innovative performance. The benefits received from cluster networks outweigh the negative effects. This is emphasised in the literature on perceived usefulness. Whether relationships are dissolved or maintained over time is determined by the perceived usefulness of the relationship.

This is echoed in the statement of the DIP concerning this finding:

“SMEs are seekers for the business survival. Members who feel there is no benefit to be in the cluster, will eventually leave the cluster. I strongly believe that there must be some sort of benefit for them to remain in. They would not make a decision that harms their business.” (DIP)

The second group of participants reported seeing the costs and negative effects of social capital as inevitable, as one said:

“The negative effect seems to be inevitable; waste of time, resources and the difficulty in the relationship can be painful. But it is the usual cost and problem of having connection. I rather try to overcome these problems than leave the cluster.” (F23)

The statement above implicitly denotes an unwillingness to dissolve the relationships of cluster firms, when they are willing to undertake the costs and negative effects of social capital without an evaluation of the costs and benefits.

The third group consisted of two participants from the textile cluster (F18 and F19) who said that the decision to remain in the cluster was purely based on cost efficiency:

“I would not mind remaining in the cluster since it does not really cost anything. Though, I cannot say it has provided a lot of benefits or how I see the circumstance will be changed anytime soon... however, the president of the cluster is planning to recreate this cluster and only invite members who he knows will be active. I would consider joining that if he can actually make it happen.” (F18)

The demonstrates that a lack of intra-cluster relationships limits the source of advantage which is the support provided by the institutions. The absence of costs and legal obligations allows cluster firms to be flexible in the decision to remain or leave the cluster. When institutions no

longer provide support, or if there is a better network, cluster firms are likely to leave (as there is no relationship to uphold). The breakup of declining clusters may provide an opportunity for new clusters to form or be rejuvenated.

Finally, F15 was the only interviewee to fall into the last group, deciding not to join a cluster:

“Even though, it does not financially cost anything to stay in the cluster, but now to look at it, it does require some devotion such as attending the meeting or helping out others... I would rather be in another cluster that my business is more relevant to and is the priority of the cluster.” (F15)

Conversely, this quote shows that the costs and negative effects of social connections in cluster networks trade off against the benefits. F15 is in the ceramic cluster, hence his papier-mâché business is not the main priority of the cluster. The absence of common interests reduces shared identity and sense of belonging which can influence the decision to participate and remain in the cluster.

In conclusion, the decision to remain in a cluster largely depends on the perceived usefulness of the intra-cluster relationships. The perceived usefulness can come from either institutions or social capital, or both. As long as the negative effects of over-embeddedness do not outweigh the benefits, cluster members would remain in the network, unless the intra-cluster relationships hold the member back. The social relationships can play the role of a social glue that holds firms back. Even the understanding and identification of over-embeddedness does not significantly contribute to the decisions of cluster firms, but it raises awareness of the potential dark sides of embeddedness. It creates a ripple effect in the understanding of cluster policy and triggers cluster firms to be concerned about how to prevent and/or overcome these negative effects.

5.8 CHAPTER SUMMARY

This chapter presents the findings of the research, addressing the research question of how social capital can negatively affect the innovative performance of firms in cluster networks. The empirical evidence found by this research allows the researcher to draw conclusions from the inquiry.

The main conclusions gained from the empirical findings are summarised below:

- The findings reveal the situation of cluster networks in Thailand. The issues of lack of understanding of the cluster concept, bureaucratic systems, inaccurate and unsystematic evaluation of cluster performance and political instability contribute to how cluster networks in Thailand operate and the intra-cluster relationships.
- The understanding of social capital is found to be challenging when translated into different languages, and thus requires adjustment. The awareness and knowledge of the dark side of social capital is low, demonstrating the difficulty in identifying the negative effects of social capital. This echoes the literature regarding the problems of awareness, understanding and managing the negative effects of social capital. Nonetheless, explaining social capital and presenting a comprehensive lists of its negative effects enhanced the understanding of the participants and they were able to identify and confirm most of the proposed negative effects of social capital, except the loss of objective, and give the significance level of each negative effect of social capital.
- The findings also shed the light on the ripple effect between the negative effects of social capital identified in this study, where one negative effect can trigger another. The literature implicitly mentions this effect, but it is not emphasised.
- The significance of each negative effect is reported to be different between cluster networks and even for firms within the same cluster, similar to the significance of each of the four dimensions of social capital and its relationship to negative effects.
- As highlighted by the literature on clusters, the majority of cluster firms share close geographical, organisational and institutional proximity. However, almost one-third of participants reported low to fairly significant technological proximity. Geographical, organisational and institutional proximity are not revealed to directly influence the negative effect of social capital, but their effect on the other three dimensions of social capital is to provoke negative effects. Only technological proximity is shown to unequivocally cause the effects of knowledge redundancy, exclusion of outsiders, inertia and groupthink, when it surpasses a threshold level.
- Structural social capital: strong ties and a highly dense cluster network lead to the negative effects of unnecessary obligation, groupthink, inertia, exclusion of outsiders

and knowledge redundancy. Nevertheless, centrality is not identified as causing any negative effect; in fact, it is recognised to ease the significance of some negative effects.

- Both norms and trust, as part of the relational dimension, share the mutual negative effects of unnecessary obligation, groupthink, inertia and exclusion of outsiders. Only over-trust leads to opportunistic behaviour, whereas high shared norms strongly inhibit such behaviour.
- The cognitive dimension of social capital, through the lens of a shared vision, does not have any negative effects of social capital, unlike the other social capital dimensions.
- The four dimensions of social capital are identified as having an interrelationship. The original three dimensions of social capital are highly interrelated whereas proximity plays a supporting role and strengthens all three dimensions of social capital.
- Taken together, these results suggest an inverted u-shaped relationship between social capital and innovative performance as depicted in the conceptual model. Social capital is a necessary condition for innovation, although, once social capital reaches a threshold, it can provoke adverse effects and impede innovation.
- Even with awareness of the dark side of social capital, the majority of participants would remain in cluster networks, where the perceived usefulness and intra-cluster relationships serve as glue to hold cluster members together. However, cluster firms expressed concern about how to minimise the negative effects. The current implementation plan of the DIP is in its very early stages and thus does not yet include a rigorous process for managing the dark side of social capital. This demonstrates that it is crucial to implement a plan for how to minimise the negative effects of social capital.

The points illustrated above are in keeping with the research proposition of this research. The discussion and revision of the proposed model of the four dimensions of social capital and its negative effects, based on the empirical evidence presented in this chapter, is continued in the following chapter.

Chapter 6 : DISCUSSION AND RECONCEPTUALISE CONCEPTUAL MODEL

6.1 INTRODUCTION

In this chapter, the conceptual framework proposed in Chapter 3 is revisited and reconceptualised in accordance with the empirical findings and analysis presented in Chapter 5. This enhances the use of the conceptual framework and lays the foundation for demonstrating the research objective achievement, novel contribution and identification of the research gaps in the next chapter.

The chapter begins with an overview of clusters in Thailand, with Section 6.2 elaborating on the characteristics and challenges of clusters in Thailand, and Section 6.3 presenting the revised negative effects of the four dimensions of social capital and their effect on innovative performance of firms in cluster networks and the interrelationship between the four dimensions based on the empirical findings in the previous chapter. The relationship between the four dimensions of social capital and innovative performance is summarised in Section 6.4. Section 6.5 presents the negative effects of the characteristics of clusters and cluster members on social capital. Finally, Section 6.6 summarises the chapter.

6.2 CLUSTERS IN THAILAND

The definition and principle of the cluster concept in Thailand parallels advanced economic countries. The involvement of Michael Porter at the initial stage of cluster development set a strong foundation. However, in practice, the concept has been shown to be dissimilar and has encountered several context-specific issues.

In practice, the characteristics of geographical orientation are compromised. Contrary to Porter's (2000) original definition of a cluster network as geographically proximate, there is another type of cluster network in Thailand called the 'commercial cluster', in which cluster firms do not operate at close distances or focus on the agglomeration of economic externalities. The motivation of the cluster is solely focused on the inter-organisational relationship. This exemplifies the unclear requirements for what constitutes a cluster network and how to define a network as a cluster, covered by Dijk and Sverrisson (2003) and Martin and Sunley (2003).

The challenges of cluster networks, taken from the interviews, can be divided into three categories, agenda setting and cluster policy formulation, implementation of policy, and

evaluation of cluster performance. In the interviews, cluster firms expressed a lack of involvement in *agenda setting and cluster policy formulation*. The strong bureaucratic system in Thailand stresses that cluster development takes a top-down approach, where the hierarchy and formalised bureaucracy restrict the engagement between cluster policy-makers and cluster firms during the agenda setting and policy formulation. Correspondingly, it widens the 'middle gap' between the private and public sectors (Shakya, 2009). Giuliani (2013) notes this issue to be more severe in clusters in emerging countries.

This leads to the issue of *implementation of policy*, as cluster firms feel that the activities of the cluster and the support provided by the government agency do not meet their requirements or address the issues they face, making them less likely to participate. The issue of implementation of the cluster concept is also contributed to by the lack of understanding of the concept by the cluster members. As reflected in the comments of the participants on the initial stages of the clusters, there were a large proportion of cluster firms that misunderstood the concept of the cluster, with cluster firms viewing the benefit of the cluster network as receiving aid from the government agency. This finding resonates with Sternberg and Muller (2005) who found that Asian entrepreneurs depend heavily on government-run investment institutions for financial support. Correspondingly, they do not access social capital as a resource, and low cohesion cooperative networks are responsible for the failure of clusters.

This issue is reported by third party researchers as occurring at institutional operational level. Table 5.1 shows that there are various governmental organisations responsible for clusters. In each cluster, there are sub-government organisations which play various roles in supporting cluster networks. The lack of mutual understanding between operational units poses difficulty for the coordination and coherence of policy implementation. This effects the implementation at firm level and makes the implementation of policy ineffective. Furthermore, the instability of the government restricts the continuity of budgets and the support policy may be slowed or suspended, leading to obstacles for projects that require long-term collaboration. These findings support Vongpichet (2011) who notes the loose policy coordination and communication between institutions' operational units and a lack of budget continuity as major drawbacks to cluster development in Thailand.

The analysis of third parties shows that the *evaluation of cluster performance* is unsystematic, inaccurate and outdated. This contributes to a failure to reflect on the actual performance or capability issues that cluster firms experience, making it difficult to provide appropriate

support to cluster firms (Vongpichet, 2011) and creating a situation of a vicious cycle where cluster firms feel under supported.

Hence, it is unsurprising that the issue of over-embeddedness is not well addressed by the government agency, as the most complete investigation into clusters in Thailand was undertaken a decade ago at the early stages of cluster development. Correspondingly, the implementation plan for managing and minimising the effect of over-embeddedness in clusters is described as being in the early stages, and does not receive much attention. The current policy still prioritises encouraging strong engagement between cluster firms.

These challenges, which stem from the context of Thailand, foster the negative effects of social capital, and cluster firms rely heavily on personal relationships. The definition of the social capital is shown to be lack of consensus similar to the literature. This is similar to what Dudwick et al. (2006) and Woolcock (2001) identify as an issue in the empirical study of social capital. Nevertheless, it is generally agreed that social capital is argued in this research to be the mechanism that cluster firms use to access resources and as a source of innovation. Therefore, echoes the resource-based view of social capital where the resource is inherent in the relationship (Adler and Kwon, 2002; Lin, 2002; Nahapiet and Ghoshal, 1998).

6.3 THE REVISED FOUR DIMENSIONS OF SOCIAL CAPITAL AND THEIR NEGATIVE EFFECTS BASED ON THE EMPIRICAL FINDINGS

The previous chapter presents the data collected to validate the conceptual model proposed in Chapter 3. This section aims to confirm or contradict the research findings using the existing literature and provide a broader understanding of the relationship between social capital and the innovative performance of firms in cluster networks, particularly the dark side of social capital.

Correspondingly, Figure 6.1, below, shows a refinement of the model presented in Figure 3.1 in Chapter 3, taking into account the empirical findings.

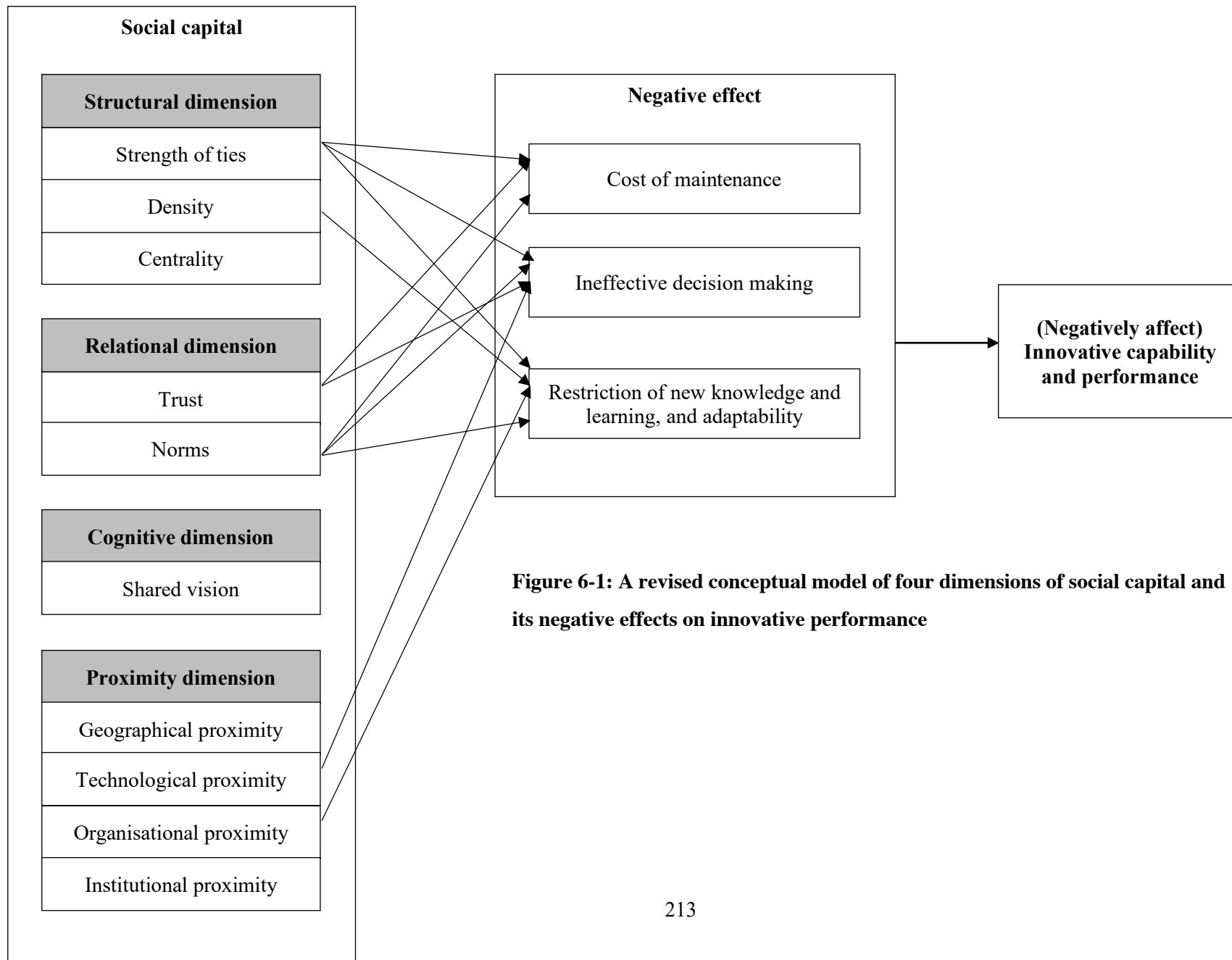


Figure 6-1: A revised conceptual model of four dimensions of social capital and its negative effects on innovative performance

This section begins by revisiting the negative effects of social capital, followed by the revised four dimensions of social capital, and their sub-dimensions, in relation to the negative effects, their relationship to innovative performance, and lastly the revised interrelationship between the four dimensions of social capital.

6.3.1 REVISED FOUR DIMENSIONS OF SOCIAL CAPITAL AND ITS NEGATIVE EFFECTS BASED ON THE EMPIRICAL FINDINGS

This section presents the identification of the negative effect and the ripple effect between them. The findings reveal that loss of objective and opportunistic behaviour are the negative effects that are not identified in the study.

- Loss of objective:

As referred to in the existing literature, loss of objective is considered to be one of the constraining factors impacting decision-making within cluster networks (Hagedoorn and Franfort, 2008; Lechner et al., 2010; Li et al., 2013; Tsai and Ghoshal, 1998). Loss of objective occurs when efforts to achieve the original goals are derailed due to self-interest, the self-interest of others or the setting of collective goals resulting from concern about other actors' benefits and feelings (Lechner et al., 2010; Tsai and Ghoshal, 1998). However, within the cluster network under consideration, all participants agreed that these negative effects were in no way present. The point was raised by all participants in Section 5.4.1.2. The underlying explanation is that firms that participate in cluster networks have personal objectives that separate them from the objective of the cluster; they pursue both personal and cluster-related objectives simultaneously. This also explains why no negative effects were found in relation to the cognitive dimension of social capital. Here, there is strong shared vision amongst cluster firms, though this does not result in the negative effects identified in the literature.

- Opportunistic behaviour:

Revisiting the extant literature, opportunistic behaviour is seen to negatively affect innovative performance as firms can be subject to dishonest and unscrupulous malfeasance by other parties (Noordhoff et al., 2011). Networks with overly trusting or confident members tend to reduce the level of safeguarding and monitoring against opportunistic behaviour (Molina-Morales and Martinez-Fernandez, 2009; Villena et al., 2011, 2016). In fact, Granovetter (1985) cites the notion that firms which are embedded in a relationship are more vulnerable

to opportunism than firms without any relationship. However, the practical experience of most participants disputed this notion; only two of the participants claimed to have experienced opportunistic behaviour due to the overly trusting nature of their cluster network (in Section 5.5.3.1). This aligns with the findings of Goel et al., (2005), who noted that the effects of an overly trusting business relationship are not easily or automatically realised. Only in hindsight, after participants have experienced a relationship in which too much trust is present, is this aspect likely to be detected.

In addition, the study reveals another insight into the mechanism by which the negative effects of social capital ripple out and aggravate the situation. The cost of maintenance or unnecessary obligations can exclude outsiders, produce inertia, sap energy and resources, and impose time constraints that limit the capacity of firms in clusters to develop new relationships; therefore, firms tend to have linkages with existing connections. In contrast, the exclusion of outsiders and avoidance of inertia leads to knowledge redundancy as it reduces the opportunity for novel or wide-ranging knowledge from outsiders to emerge within the cluster. Firms in clusters are exposed to an exclusive knowledge flow extracted from existing members, which can result in a degree of groupthink. This underlines the dispersion of the negative effects and how vital it is to manage and minimise the negative effects of social capital.

6.3.2 REVISION OF THE PROXIMITY DIMENSION OF SOCIAL CAPITAL

6.3.2.1 GEOGRAPHICAL PROXIMITY

The findings reveal the various geographical distances between members within cluster networks. Most clusters are situated in a geographically similar position, with a smaller number operating from a significant distance. This is reflected in the prolonged critique of many scholars regarding the unclear spatial scale of geographical distance in the definition of clusters, and the effect of distance on practice conceptual practices (Dijk and Sverrisson, 2003; Martin and Sunley, 2003). However, in line with the literature relating to the cluster, the findings confirm the role of geographical proximity in providing agglomeration externalities and opportunities for social interaction between cluster members (Inkpen and Tsang, 2005). Clusters in which members operate from large geographical distances do not depend on agglomeration economic externalities (Hansen, 2015), as is the case for the clusters included within this study.

Geographical proximity is expected to facilitate the development of ties, trust and norms of reciprocity through personal, face-to-face, and frequent interactions (Balland, 2012; Hervas-

Pliver et al., 2018; Todo et al., 2016). Nonetheless, the findings indicate that close geographical proximity does not automatically generate social interaction or synergy among clustered firms (Letaifa and Rabeau, 2013; Torre and Rallet, 2005). It only acts to provide opportunities for social interaction and other dimensions of social capital. Without social links, clustered firms based closed together act as a group of nodes without any connection between them.

The literature that highlights the negative effects of geographical proximity describes how this factor encourages a tendency to prioritise relationships in nearby locations (Boschma, 2005), generating an inward-looking culture or spatial lock-in effect (Boschma, 2005; Giuliani and Bell, 2005; Molina-Morales et al., 2014), thus impeding the innovative performance of the firms (Capone and Lazzeretti, 2018; Gebreeyesus and Mohnen, 2013; Knobens and Oerlemans, 2012). Nevertheless, when closely investigating the mechanisms by which the negative effects of cluster networks, it is indicated that geographical proximity does not directly foster these negative effects as suggested by other scholars. However, its role as a facilitator of other social capital dimensions indirectly fosters negative effects. Thus, geographical proximity does not directly cause the negative effects of inertia, the exclusion of outsiders and knowledge redundancy (as proposed in the conceptual model).

This demonstrates that geographical proximity cannot fully explain either innovative performance of firms or the negative effects of social capital. Merely belonging to a cluster is not sufficient to exploit its full innovation potential; clustered firms must develop social connections (García-villaverde et al. 2017; Gebreeyesus and Mohnen, 2013; Letaifa and Rabeau, 2013; Molina-Morales et al., 2014; Rutten et al., 2010; Staber, 2007).

Moreover, recent study shows that clustered firms might not always value geographical distance as they have typically done in the past. When close geographical proximity does not provide information and knowledge, clustered firms tend to seek the knowledge and information from non-local ties (Capone and Lazzeretti, 2018). Despite this, the participants argued that face-to-face interaction still plays a vital role in knowledge transfer (particularly in relation to tacit knowledge) (Andersson et al., 2004; le Duc and Lindeque, 2017; Porter, 2000). However, geographical proximity is more important in the emergent stage, where clustered firms initiate the relationship, rather than in the development stage (Lazzeretti and Capone, 2016). After that, firms can interact further via technologically mediated forms of communication without the need of face-to-face meetings to maintain a personal relationship (Huber, 2012). The development of globalisation has profoundly lessened the importance of

geographical proximity (Jespersen et al., 2017). ICT is rapidly compensating for geographical distance, while temporary proximity (Rychen and Zimmermann, 2008; Torre, 2008) serves to compensate for the lack of benefits derived from face-to-face interaction (Bell and Zaheer, 2007).

6.3.2.2 *TECHNOLOGICAL PROXIMITY*

Each cluster has a unique level of technological proximity, while firms within the same cluster can have different levels of technological proximity. Cluster in which members are OEM or manufacturing-focused reported close technological proximity, whereas members of clusters involved in creative and design-related activities reported sparse technological proximity. Both demonstrate endurance of different negative effects.

The literature highlights that firms with large technological distance are more willing to share knowledge and initiate the process of innovation (Jespersen et al., 2017; Phelps, 2010). Nonetheless, to take advantage of the diverse information and knowledge of clusters, firms must develop the capacity to absorb information (Yu, 2013), understand, process and communicate it. Lack of a knowledge base reduces absorptive capability, making it more difficult to absorb unfamiliar knowledge (Giuliani, 2013; Singh et al., 2011) and resulting in a lack of collective action (Eklinder-Frick et al., 2011). This restricts the information and knowledge that can be shared and absorbed in the network (Hansen, 2015).

On the other hand, close technological proximity is reported to cause the negative effects of knowledge redundancy (Cantu, 2010; Hervas-Oliver et al., 2012; Huber, 2012; Lazzarretti and Capone, 2016; Nooteboom, 2000) and groupthink (De Clercq et al., 2009), where shared information and knowledge is already utilised by other members. This can result in a lack of innovation and diversity of knowledge that can trap clustered firms in a state of groupthink.

In addition to the literature, the negative effects of inertia and the exclusion of outsiders are identified in this study. Clustered firms prefer to establish relationships with members who share similar experience and knowledge, which implies they share the same understanding, interpretation and language. This strongly overlaps with the characterisation of cognitive social capital, which postulates shared representations, interpretations and systems of meaning among parties (Nahapiet and Ghoshal, 1998). The overlap between technological proximity and the cognitive dimension of social capital indicates the difficulty inherent in efforts towards empirical study.

This finding confirms the observation derived from the literature review; that there is an inverted u-shaped relationship between technological proximity and innovative performance (Broekel and Boschma, 2012; Fafchamps et al., 2010; Nooteboom et al., 2007; Vlaisavljevic et al., 2016). Moderate levels of technological proximity can provide the most benefits in terms of innovative performance (Knoben and Oerlemans, 2006; Vlaisavljevic et al., 2016). A certain level of technological proximity is necessary for the information and knowledge to be absorbed effectively, although there should be sufficient distance to allow firms to acquire new information and knowledge from elsewhere. Excessive technological proximity also results in groupthink, redundancy, inertia and the exclusion of outsiders.

6.3.2.3 ORGANISATIONAL PROXIMITY

Clustered firms are found to have close organisational proximity, where they share similar routines and incentives. This study attempts to empirically investigate the relationship between organisational proximity and innovation; however, the findings do not reveal any negative effects of organisational proximity as denoted by the literature, where close organisational proximity is assumed to encourage repeated interactions, evolve into inward-looking relationships, and undermine learning and innovation (Boschma, 2005). The reason established by the study is that organisational proximity is not seen to significantly increase collaboration as there are other factors such as structural, relational and cognitive dimensions of social capital that are more severe. This is aligned with Broekel and Boschma (2011), who posit that organisational proximity does not have a strong impact on the likelihood of cooperation, and does not have a significant effect on innovative performance.

6.3.2.4 INSTITUTIONAL PROXIMITY

The findings fail to provide compelling evidence for the negative effects of inertia as envisioned by the literature (Boshma, 2005; Molina-Morales et al., 2015). All clustered firms are reported to be compliant in terms of the law and industry regulations, although cluster networks themselves do not have formal rules and regulations. This is the reason for the separation soft and hard institutions in the definition of institutional proximity (to avoid overlapping with norms of reciprocity) may not be most suitable to the investigate the negative effect in context of cluster network due to its nature of informality.

Close institutional proximity has been found to reduce the likelihood of opportunistic behaviour and foster a stable condition for interactive learning and knowledge transfer therefore contributing to the innovative performance of firms in cluster networks (Boschma, 2005; Molina-Morales et al., 2015).

6.3.3 REVISION OF STRUCTURAL DIMENSION OF SOCIAL CAPITAL

6.3.3.1 STRENGTH OF TIES

Before discussing the effects of the strength of ties on innovative performance of firms in cluster networks, the adjustment of the construct of strength of ties needs to be addressed. In a manner similar to other studies, this research initially utilised frequency of meetings and intensity of relationships to evaluate the strength of ties (Stam et al., 2014). Although, after the participants described how the duration of their relationship significantly influenced the strength of ties, it has been included as a separate construct of the strength of ties. This is in line with the proposition of Alguezaui and Filieri (2010) to adopt Capaldo's (2007) three constructs of strength of ties, including; a temporal dimension (relationship duration), resource dimension or intensity of collaboration (resource commitment or relationship-specific investment) and social dimension (frequency of interaction).

All three constructs are manifested in the findings as highly interrelated, whereby the cluster network is characterised by the intimacy of personal relationships, duration of relationships and frequency of interaction. This indicates that there are strong ties of the type identified in previous literature on cluster networks (Felzensztein et al., 2014; Molina-Morales and Martinez-Fernandez, 2009; Ruiz-Ortega et al., 2016). Moreover, personal relationships can become part of inter-organisational relationships (Huber and Fitjar, 2016).

There are large numbers of studies into the relationship between strong ties and innovation. Although, the results are mixed; positive, negative and non-linear relationships were all witnessed. However, only a few of those who underline the negative outcome of strong ties provide specific examples of negative outcomes that impede innovation. Therefore, the findings of this study not only confirm the inverted-u shaped relationship between strong ties and innovation (Lowik et al., 2012; Molina-Morales and Martinez-Fernandez, 2009; Pirolo and Presutti, 2010; Ruiz-Ortega et al., 2016), but also answer the question surrounding which specific negative outcome of strong ties harms innovation. These outcomes are unnecessary obligations, groupthink, inertia, the exclusion of outsiders and redundancy. Only loss of objective is not found, as suggest by Lechner et al. (2010) (the explanation for this is provided in section 6.3.1).

The empirical results indicate that strength of ties, as the sub-construct of structural social capital, contributes most of the negative effects of social capital. Intimate personal

relationships come with pressure to reciprocate and create an unnecessary obligation to maintain and further the relationship (Li et al., 2013).

Exclusion of outsiders and inertia are not purely described as caused by strong ties; however, the cost of maintaining relationships also works to restrict firms' ability and capacity to form new relationships (Gulati et al., 2002). Firms with strong ties tend to accept non-contentious ideas to reach unanimity and maintain relationships (Jeffries and Reed, 2000; Janis, 1972). The cohesive and cooperative network fostered by strong ties in clusters, in addition to the exclusion of outsiders and inertia, increases the risk of groupthink and knowledge redundancy, where clustered firms are restricted to overlapping knowledge (therefore limiting innovative capability) (Molina-Morales and Martinez-Fernandez, 2009).

6.3.3.2 DENSITY

The cluster network is described as having a dense structure in which the members are highly connected (Molina-Morales et al., 2012; Rutten et al., 2010), where those closest to the core are more closely related than those at the periphery. The duration of the relationship (Inkpen and Tsang, 2005; Musteen et al., 2014) and network size are reported to significantly contribute to the dense structure of the network. The dense structure is found to benefit from the knowledge transfer and flow inside the cluster, where the information and knowledge can move freely through network in a faster and more effective manner.

However, this positive effect can turn into the problem of knowledge redundancy, as envisioned in the literature (Berliant and Fujita, 2011; Gilsing et al., 2008; Tan et al., 2015; Todo et al., 2016; Rowley et al., 2000), where participants expressed that they already shared the same information and knowledge. The finding supports Molina-Morales and Exposito-Langa (2012), who provide empirical evidence of the inverted u-shaped relationship between density and Spanish textile cluster firms' innovative performance.

Nevertheless, exclusion of outsiders and inertia are not found in the empirical findings. Two arguments could offer theoretical justification for these outcomes. Firstly, the existing literature, which establishes that the issue of inertia and the exclusion of outsiders in relation to density may not exclusively lead to increased coalescence within the network. Density is often described in relation to its effect on relational and cognitive dimensions; for example, strong ties (e.g. Perry-Smith, 2006 and Todo et al., 2016), trust (e.g. Gilsing et al., 2008), and norms (e.g. Coleman, 1988). Therefore, there is only a vague separation between dimensions

of social capital, and the effect of inertia and the exclusion of outsiders might be caused by other factors in place of density.

Secondly, the negative effect of density on the restriction of novel and/or diverse information and knowledge is caused by overly dense cluster network structures (Alguezau and Filieri, 2010; Gilsing et al., 2008; Staber, 2007; Todo et al., 2016). The qualitative nature of the study aims to uncover the mechanism by which the negative effects manifest. It shows that dense networks only foster knowledge redundancy and not inertia or the exclusion of outsiders. Inertia and the exclusion of outsiders contributes to knowledge redundancy as it prevents the injection of novel and/or diverse information and knowledge from those outside the cluster network. Therefore, the findings denote an inverted-u shaped relationship between density and innovative performance in which overly dense networks are exposed to knowledge redundancy.

6.3.3.3 CENTRALITY

This study adopts both degree centrality and betweenness centrality in order to determine the core and peripheral positions within the cluster network. Including betweenness centrality allows the role of structural brokerage to be revealed, in addition to the number of direct ties facilitated by degree centrality (Borgatti et al., 2013; Gilsing et al., 2008; Scott, 2013). In contrast to McFadyen and Cannella (2004), who established an inverted u-shaped relationship in which the excessive number of ties emerging from close proximity can impede innovativeness of firms, this study reveals findings of an opposing nature.

Betweenness centrality advances the explanation of the negative effects of exclusion of outsiders and redundancy. Clustered firms in core position describe large number of ties and play the role of gatekeeper and structural broker (i.e. they connect individual cluster members, as well as clusters and related institutions). In contrast to the study of Eklinder-Frick et al. (2014), which highlights that firms in regional strategic networks express unwillingness to interact with those outside the network, this position allows them to establish the relationship both internally and externally, to diversify ties, and to occupy a central position in which information and knowledge flow, all while escaping from the negative effects of outsider exclusion and redundancy. In fact, firms occupying a core position in the network enjoy the advantage of being able to access a diverse array of information and knowledge (Koka and Prescott, 2008; Tsai, 2001). Correspondingly, centrality is also recognised as alleviating knowledge redundancy caused by other dimensions of social capital. Betweenness centrality

as a measurement might be the most appropriate for studies that touch on the field of knowledge and information flow, as also suggested by Gilsing et al. (2008).

Literature underlines the concern surrounding cognitive consideration, where centrality can be overwhelming due to an overload of information and the cost of maintaining the position (Dong and Yang, 2016; Ferriani and MacMillan, 2017; Glising et al., 2008; Karamanous, 2016; Li et al., 2013; Paruchuri, 2010). Although, this is found to be largely dependent on the absorptive capability of firms. The absorptive capability of firms determines their capacity for recognising the value of new external knowledge, assimilating it and applying it to commercial ends (Cohen and Levinthal, 1990). The absorptive capacity is highly related to the shared knowledge base that exists between members. Firms central to this study that have strong absorptive capacity and shared knowledge base reported benefiting from the knowledge flow and transfer in cluster networks, and vice versa.

High visibility and accessibility make them the recipients of many request, as pointed out in the literature (Ferriani and Macmillan, 2017; Giuliani and Bell, 2005). However, the cost is reported to be outweighed by the benefits of occupying a core position in the network.

In conclusion, an inverted u-shaped relationship between centrality and innovative performance is not supported as envisioned by Dong and Yang (2016); Eklinder-Frick et al. (2014); Ferriani and MacMillan (2017) and Parachuri (2010). Instead, the findings support the positive relationship between centrality and innovation (Ahuja, 2000; Bell, 2005; Casanueva et al., 2013; Chiu, 2009; Del-Corte-Lora et al., 2015; Koka and Prescott, 2008; Powell et al., 1996; Tsai, 2001; Whittington et al., 2009). Future research that investigates social capital in relation to knowledge and innovation should consider utilising betweenness centrality or implementing betweenness centrality with a degree of centrality as the measurement is also proposed by Casanueva et al. (2013) and Li et al. (2013).

6.3.4 REVISION OF THE RELATIONAL DIMENSION OF SOCIAL CAPITAL

6.3.4.1 TRUST

Cluster networks are found to operate on trust and mutual expectation rather than formalisation of contracts, exemplifying the characteristics of cluster networks found in other studies. For example, the study of Molina-Morales et al. (2011) within the context of the Spanish industrial network and the study of Presutti and Boari (2008) into the Italian

technology industry cluster network, where intra-cluster relations are reliant on trust and personal relationships based on an accumulation of past interactions.

Trust fosters an environment of confidence in which firms are willing to share and exchange knowledge without fear of being taken advantage of. Correspondingly, as envisioned by other scholars, this facilitates a cohesive network and increases the opportunities to access valuable information, knowledge and resources (Coleman, 1990; Landry et al., 2002; Meeus et al., 2001; Moran, 2005; Tsai and Ghoshal, 1998; Wu, 2008), thus enhancing the likelihood of innovation (Li et al., 2013(b); Pérez-Luño et al., 2011; Ruiz-Ortega et al., 2016). This is in contrast to the lack of trust at the initial stage of cluster formation, where clustered firms found it challenging to engage and cooperate.

In a manner similar to that outlined in the literature that underlines the negative effects of trust, firms prefer to prioritise existing trust-based relationship and are reluctant to develop new relationships, resulting in the exclusion of outsiders and inertia (Wu, 2008; Molina-Morales et al., 2011 Bargiulo and Benassi, 2000; Shi et al., 2015). Besides this, the cost of constructing and nurturing trust restricts the capacity of clustered firms to nurture new relationships. Firms are willing to carry unnecessary obligations to maintain relationships, avoid being recognised as unreliable and disrupt trusting relationships (Day et al., 2013; Villena et al., 2011).

In addition to the proposition of the conceptual model, groupthink is found as an extra negative effect of over-trust. Participants described overly trusting firms that have more experience, knowledge and capacity to make to decisions on behalf of the cluster, taking their advice and becoming trapped in groupthink. According to Zhong et al.'s (2017) meta-analytic integration study of trust in interorganisational relationships, this can be explained through the literature of dependency and concept of power. Firms with less power (those that depend on others) are more likely to trust more powerful firms to make decisions as they believe it will help them achieve their goals.

The literature highlights that over-trust can reduce monitoring, vigilance and safeguarding, leaving them more exposed to malfeasance by others (Granovetter, 1985; Molina-Morales and Martinez-Fernandez, 2009; Molina-Morales et al., 2011; Villena et al., 2011: 2016), but only two participants reported experiencing this. The justification of this contradiction is provided in Section 6.3.1. When firms experience opportunistic behaviour, they become more alert of being taking advantage of and lose trust in other parties. However, the finding shows that trust can be rebuilt, though this will be more difficult and take longer than in the first instance.

Future research might consider investigating what factors influence firms to rebuild formerly trusting relationship. The observations from the findings support Molina-Morales et al. (2011), who underline that only an optimal level of trust positively affects innovative performance.

6.3.4.2 NORMS

Norms is the only sub-dimension that does not require revision; here, the empirical findings are in accordance with the conceptual model and existing literature. The findings regarding norms supports an inverted-u shaped relationship between norms and the innovative performance of firms in cluster (Ayers et al., 2001; Molina-Morales and Martinez-Fernandez, 2009). The existence of shared norms serves as to guide the expected and acceptable behaviour of cluster members, as well as preventing undesirable behaviour, such as the opportunistic behaviour reported by the participants (Yu et al., 2013; Wang et al., 2018). However, similar to the view of Coleman (1990), strong shared norms can constrain certain behaviours. It is found that norms place an unnecessary obligation (Molina-Morales and Martinez-Fernandez, 2009; Villena et al., 2011) and foster groupthink (Ayers et al., 2001), inertia and the exclusion of outsiders (Boschma, 2005).

In addition, the negative effects of excessive norms revealed above may be explained through the literature of identification. According to Nahapiet and Ghoshal (1998), identification is “*the process whereby individuals see themselves as one with another person or group of people*” (p.256). This is similar to the participants’ description of how collective norms develop in a cluster. The strong sense of shared identification between members can lead it to develop into a social group (Dutton et al., 1994). This can result in unnecessary obligations that clustered firms carry out in order to meet the expectations of fellow members and avoid being recognised as ‘non-reciprocate’, which can risk the development of groupthink due to fear of being different or upsetting fellow members. The strong social capital and norms generate the similar effect of separating between ‘us’ and ‘them’, where firms exclusively choose to establish relationships with others who share the same norms, thus creating the effect of inertia and excluding outsiders.

Yet, while in line with previous empirical research, the findings contribute to the desire to treat norms as an individual sub-dimension of the relationship (Zheng, 2010). Most studies that empirically investigate norms in the context of social capital (except Wang et al. (2018)) considered norms as a relational dimension and failed to distinguish norms from trust (e.g. Villena et al., 2011), or treat norms as a cognitive dimension of social capital (Zheng, 2010).

Furthermore, this study contributes to the limited number of empirical studies on the negative effects of shared norms (Zheng, 2010).

6.3.5 REVISION OF COGNITIVE DIMENSION OF SOCIAL CAPITAL

6.3.5.1 SHARED VISION

The conceptual model proposed that there would be strong shared vision in clustered firms, as these firms are commonly recognised to have greater shared vision and value in comparison to non-clustered firms (Parra-Requena et al., 2010), and therefore may face the negative effect of decision-making constraints (i.e. groupthink and loss of objective). Most of the participants identified a significant to extreme shared vision within the cluster; however, none of the participants identified the negative effects of shared vision. In fact, the findings demonstrate that shared vision provides a sense of direction, drives collective action and has a positive effect on innovative performance (Exposito-Langa et al., 2015; Molina-Morales and Martinez-Fernandez, 2010; Tsai and Ghoshal, 1998).

The revision of shared vision is proposed. The rationalisation is evident in the findings. The participants expressed that they maintained a personal vision that may or may not relate to the vision of the cluster, and pursued both personal and cluster-related visions simultaneously. This further rationalises the findings of Villena et al. (2011), which fails to provide empirical evidence to support an inverted curvilinear relationship of shared vision and firm performance. The explanation provided in their study is that the firms that took part in the study have not yet exceeded the threshold level of shared vision that would enable them to experience the negative effect. Although, as discussed in the findings, when a personal vision is maintained in addition to a shared vision, an inverted u-shaped of shared vision is more enduring and sustaining than social capital dimensions.

Furthermore, the findings also reveal the overlap between shared vision and technological proximity. The researcher avoids the overlap by using different terminology and measurements; however, the technological proximity was described as assisting with the communication, shared interpretation and understanding (refer to Section 5.5.1.2 in Chapter 5), which is closely related to the definition of the cognitive dimension of social capital. This underlines the issue of defining and measuring cognitive social capital. In a review of Walsh (1995) over 10 years on from the research of cognition, it was revealed that almost 80 terminologies are used to represent cognition (e.g. “*managerial perception*”, “*frames of reference*” and “*world view*”). Lately, more terminologies have been adopted to represent

cognitive dimensions including shared vision, shared culture (Molina-Morales et al., 2014) and cognitive frameworks (Phipps et al., 2013).

Aligning with Zheng (2010), the findings suggest an issue with the definition of cognitive dimension and a difficulty in investigating the relationship between cognitive dimension and innovation. Future study is required to revisit cognitive dimension with a renewed definition in addition to multiplicity and dynamism constructs (e.g. it may include shared experience and knowledge base borrowing from technological proximity).

6.3.6 REVISE OF INTERRELATIONSHIP BETWEEN FOUR DIMENSIONS OF SOCIAL CAPITAL

Most interrelationships depicted in the conceptual model (Figure 3.7 in Chapter 3) are supported by the empirical evidence, except the relational dimension being a cause of the cognitive dimension.

According to the findings, the cognitive dimension is shown to be a source of both the structural and relational dimensions. Aligning with Li et al. (2013(b)) and Muniady et al. (2015), the findings suggest shared vision as the basis for cluster firms initiating relationships with others. The advantages, concepts and visions of clusters are recognised as motivational factors for firms participating in cluster networks (whether they decide to join based on personal interest or government invitation). After being part of a network, the routine meetings and activities of the cluster offer opportunities for social interaction, whereby cluster firms can develop relationships (structural dimension). This finding supports the minority of studies that treat cognitive social capital as a prerequisite for structural social capital (Li et al., 2013(b); Muniady et al., 2015) and exemplifies the unique characteristics of cluster networks. When cluster firms all aim to achieve one vision, they develop trusting relationships and feel confident that they will not be taken advantage of. This aligns with the literature that claims collective goals can erase actors' pursuit of self-interest (Carey et al., 2011; Lefebvre et al., 2016; Li et al., 2013(b); Tsai and Ghoshal, 1998; Van den Hooff and de Winter, 2011).

However, a few scholars suggest the possibility of a reciprocal relationship between cognitive social capital and relational social capital (Li et al. 2014; Zheng et al., 2010), but the findings pinpoint only a one way relationship. Relational social capital is not shown to influence the cognitive dimension. This may be explained, based on Coleman (1990), as actors not needing to have personal relationships in order to establish a shared vision.

Structural social capital is recognised as leading to cognitive and relational social capital, where the relationship between the structural and relational dimensions is reciprocal. Clusters in which the members initiated the network are shown to already have social links prior to the creation of the cluster network. As the literature on cognition underlines, through frequent social interaction, actors share their interests, cultures, values and practices, which shapes a common set of goals and a mutual understanding between them (Camps and Marques, 2014; Lefebvre et al., 2016; Li et al., 2014; Van den Hooff and de Winter, 2011; Van den Hoff and Huysman, 2009).

Trust and norms are developed simultaneously with network ties (Camps and Marques, 2014; Carey et al., 2011; Li et al., 2013(b); Van den Hooff and de Winter, 2011; Van den Hooff and Huysman, 2009; Tsai and Ghoshal, 1998). On the one hand, past interaction experience determines trusting relationships and helps set guidance for acceptable and unacceptable behaviour within the network. On the other hand, cluster firms want to bond with members they trust and who share the same behavioural norms.

The proximity dimension is included in the study to represent the spatial dimension of social capital which is often neglected in empirical studies (Huber and Fitjar, 2016; Rutten et al., 2010). The study considers the spatial element of social capital by incorporating the proximity dimension and establishing the relationship between social capital and proximity to outline the role of proximity in defining social capital (Di Vincenzo et al., 2014; Kwon and Adler, 2014). Most of the relationships depicted in Figure 3.3 are supported, only the relationships between geographical proximity and the relational dimension, and organisational and institutional proximity and the structural dimension are not supported.

The revision is proposed on the influence of the proximity dimension on the other three dimensions of social capital as follows. Geographical proximity is shown to influence both the structural and cognitive dimensions of social capital. The assumption that geographical proximity influences the structure of social capital by facilitating the development of strength of ties (as it permits the opportunity for face-to-face interaction) (Molina-Morales et al., 2013) is found to be accurate. Nevertheless, the findings highlight that not all co-located firms are able to establish social links, whether co-located cluster firms establish relationships also depends on relational and cognitive social capital (Pirolo and Presutti, 2010). The influence of geographical proximity on cognitive social capital can be attributed to the context-specific environment. Giuliani (2013) notes, in her study of wine clusters in Chile, that co-located cluster firms which are likely to encounter context-specific problems, particularly those that

depend on their environmental surroundings (e.g., the agriculture sector), develop network ties to resolve these problems. These efforts, in turn, cultivate shared understanding, and mutual goals and interests.

Technological proximity is demonstrated to impact structural and cognitive social capital. The findings reveal that cluster firms prefer to interact and develop relationships with members with close technological proximity. This can be explained by referring to absorptive capacity, as close technological proximity allows cluster firms to communicate, understand each other, and share and process information and knowledge effectively (Yu, 2013). This is evident in the study of Geldes et al. (2017) which underlines how technological proximity can determine inter-organisational cooperation between cluster firms. The way they share (technological proximity) can determine how they interact (cognitive social capital). This highlights the issue of the difficulty separating between technological proximity and cognitive social capital (Knoben and Oerlemans, 2006). In Section 5.5.4.1, the findings illustrate that the gap in technological proximity between advanced and less advanced firms in clusters is the cause of some of members developing their own visions and objectives in addition to the vision of the cluster network, leading to an issue for the supporting institution offering support that meets all the members' needs. When cluster firms have close technological proximity, the knowledge, experience, ability and capacity of the members are similar, and therefore it is easier to develop a shared cognition.

The influence of organisational proximity on cognitive social capital is positive, but not significant, as only a few participants reported this relationship. Familiarity, from past interaction and/or collaboration, allows cluster firms to understand how other firms perceive, interpret and evaluate the world, cultivating shared references, and mutual understanding, value and vision. This is similar to the observation of Exposito-Langa et al. (2015) about the role of organisational proximity in sharing goals and building common values between cluster members.

Similarly, the relationship between institutional proximity and relational social capital is positive but not significant. This echoes the issue about the definition of institutional proximity described in Section 6.3.2.4. The findings reveal that close institutional proximity reduces opportunistic behaviour and can facilitate an environment of trusting relationships. This is in agreement with Balland et al. (2015) who propose that institutional proximity promotes trust within network ties.

Nonetheless, the findings of the current study do not demonstrate a clear relationship between geographical proximity and relational social capital, organisational proximity and structural social capital or institutional proximity and structural social capital. This is because, between these relationships, other dimensions of social capital serve as intermediaries. The structural dimension comes between geographical proximity and relational social capital, the cognitive dimension between organisational proximity and the structural dimension, and the relational dimension between institutional proximity and the structural dimension.

In conclusion, the four dimensions of social capital demonstrate a high level of interrelationship. This highlights the importance of the study of multidimensional interrelationships of social capital, as one dimension of social capital may not be able to fully explain the negative effects which are the combination of two or three dimensions. Also, some dimensions can reduce the negative effects, while the combination of some dimensions can aggravate them.

6.4 THE RELATIONSHIP BETWEEN SOCIAL CAPITAL AND INNOVATIVE PERFORMANCE IN CLUSTER NETWORKS

Table 6-1 summarises the relationship between each dimension of social capital and innovative performance based on the findings presented in Chapter 5 and discussed in comparison to the literature in the previous section.

Social capital dimension	Negative effect	Supporting the findings of	Relationship to innovation	Supporting the findings of
Structural dimension				
Strength of ties	• Unnecessary obligation	Duysters and Lokshin (2011); Li et al. (2013(b))	Inverted u-shaped	Lowik et al. (2012); Molina-Morales and Martinez-Fernandez (2009); Pirolo and Presutti (2010); Ruiz-Ortega et al. (2016)
	• Groupthink	Li et al. (2013(b))		
	• Inertia	Gulati et al. (2002)		
	• Exclusion of outsiders	Gulati et al. (2002); Pirolo and Presutti (2010)		
	• Redundancy	Molina-Morales and Martinez-Fernandez (2009); Villena et al. (2011)		
Density	• Redundancy	Berliant and Fujita (2011); Gilsing et al. (2008); Tan et al. (2015); Todo et al. (2016); Rowley et al. (2000)	Inverted u-shaped	Molina-Morales and Exposito-Langa (2012)
Centrality			Positive	Ahuja (2000); Bell (2005) Casanueva et al. (2013); Chiu (2009); Del-Cortelora et al. (2015); Koka and Prescott (2008); Powell et al. (1996); Tsai (2001); Whittington et al. (2009)
Relational dimension				

Trust	• Unnecessary obligation	Day et al. (2013); Villena et al. (2011)	Inverted u-shaped	Granovetter (1985); Molina-Morales and Martinez-Fernandez (2009); Molina-Morales et al. (2011); Villena et al. (2011; 2016)
	• Groupthink	New finding		
	• Exclusion of outsiders	Wu (2008); Molina-Morales et al. (2011); Bargiulo and Benassi (2000);		
	• Inertia	Shi et al. (2015)		
Norms	• Unnecessary obligation	Molina-Morales and Martinez-Fernandez (2009); Villena et al. (2011)	Inverted u-shaped	Ayers et al. (2001); Molina-Morales and Martinez-Fernandez (2009)
	• Groupthink	Ayers et al. (2001)		
	• Exclusion of outsider	Boschma (2005)		
	• Inertia			
Cognitive dimension				
Shared vision			Positive	Krause et al. (2007); Molina-Morales et al. (2010)
Proximity dimension				
Geographical proximity			Cannot fully explain	García-villaverde et al. (2017); Gebreyesus and Mohnen (2013); Letaifa and Rabeau (2013); Molina-

				Morales et al. (2014); Rutten et al. (2010); Stabe (2007)
Technological proximity	• Redundancy	Cantu (2010); Hervas-Oliver et al. (2012); Huber (2012); Lazzeretti and Capone (2016); Nootboom (2000)	Inverted u-shaped	Balland et al. (2015); Broekel and Boschma (2012); Fafchamps et al. (2010); Knobens and Oerlemans (2006); Nootboom et al. (2007); Todo et al. (2016); Vlasisavljevic et al. (2016)
	• Groupthink	De Clercq et al. (2009)		
Organisational proximity			Not significant	Broekel and Boschma (2011)
Institutional proximity			Positive	Boschma (2005); Molina-Morales et al. (2015)

Table 6-1: Relationship between the dimensions of social capital and the innovative performance of firms in cluster networks

6.5 THE EFFECT OF UNIQUE CHARACTERISTICS OF CLUSTERS AND CLUSTER MEMBERS ON THE NEGATIVE EFFECT OF SOCIAL CAPITAL

Comparison between case studies allows for investigation of the unique characteristics of clusters and cluster members that contribute to social capital development and its negative effects. The findings show that each cluster network has unique constructs that contribute to the dynamics of intra-cluster relationships. Moreover, members of the same cluster might not always have the same level of social capital, or experience identical negative effects of over-embeddedness. This supports the view that there are no two actors or organisations with identical social networks (Molina-Morales et al., 2013). The heterogeneous characteristics of clusters and members implies that different networks and actors may occupy different structures and have different qualities of social capital (Camps and Marques, 2014).

This section discusses the factors that contribute to different levels of social capital between cluster networks and different levels of over-embeddedness and innovation of members within the same cluster network.

6.5.1 DIFFERENT LEVELS OF SOCIAL CAPITAL BETWEEN CLUSTER NETWORKS

6.5.1.1 UNDERSTANDING THE CLUSTER CONCEPT

Understanding the cluster concept is recognised to have a significant effect on the perspectives of cluster members on the concept as a whole and the dynamics of intra-cluster relationships. The findings show that a poor understanding of cluster concept leads to incorrect expectations and the cluster being perceived as not providing benefit. Consequently, cluster members are less likely to participate in cluster activities. There is very limited research into the understanding of the cluster concept or investigating its effect on intra-cluster relationships. This might be because, firstly, studying the relationship between social capital and innovation mostly requires a quantitative research approach (Carpenter et al., 2012; Payne et al., 2011). This restricts the data collection to certain types of questionnaire in terms of the depth of questions asked and answered. Secondly, as addresses previously when discussing the challenges of clusters in Thailand, there is confusion at the institutional level which does not contribute to a better understanding at member level. Lastly, the nature of smaller firms can make them overlook the formal and theoretical aspects of the cluster concept. Future research may consider the understanding of the cluster concept as an explanatory factor of non-active cluster members and the failure of cluster networks.

6.5.1.2 DIVERSITY OF CLUSTER MEMBERS

The findings underline the effect of diversity of cluster members on social capital development. On one hand, extreme differences between cluster members can pose a challenge, as cluster members prefer to initiate interactions with other members who have a mutual understanding and similar interests (Li et al., 2013(b); Muaniady et al., 2015). Without this similarity, they may find it difficult to establish connections. On the other hand, high similarity, especially in a highly competitive environment, is shown to restrict the willingness to engage and exchange confidential or sensitive information (Kuhne et al., 2013). This supports the importance of the role of diversity and similarity of cluster members for the social capital and innovation performance of firms in cluster networks (Faerman et al., 2011; Vlasisavljevic et al., 2016).

Comparison of two, highly-diverse, cluster networks reveals that not all experience such issues. Similarly, in clusters with high similarity, social capital can develop more smoothly, especially if the cluster is small in size and long in duration, with clearly defined mutual vision and strength of leadership. The effect of extreme diversity or similarity might be eased by such factors.

6.5.1.3 LEADERSHIP SKILL

The findings reveal that an effective leader can have a significant impact on social capital and the success of cluster. The idea of an effective leader described by the participants is in accordance with existing research. He or she must have the ability to develop and maintain relationships with network members and others beyond the network. In other words, the leader should be recognised as both a ‘weaver’ of intra-cluster relationships and a ‘broker’ to outsiders (Maak, 2007). He or she must be a role model for members, be able to motivate and inspire others, cultivate trusting relationships and build a cohesive network (Balkundi and Kilduff, 2006; Henley et al., 2017; Maak, 2007; McCallum and O’Connell, 2009; Tansley and Newell, 2007). Hence, strong leadership can enhance the development of social capital in a cluster network (Jackson and Murphy, 2006). In contrast, the poor leadership seen in clusters in this study shows that poor communication and organisational skills and prioritising the leader’s self-interest can have diverse effects including a lack of guidance or sense of direction, the creation of an untrustworthy environment which reduces cohesiveness, and a reduction in the enthusiasm of cluster member to participate in cluster activities.

6.5.2 DIFFERENT LEVELS OF OVER-EMBEDDEDNESS AND/OR INNOVATION OF MEMBERS WITHIN THE SAME CLUSTER NETWORK

6.5.2.1 NETWORKS OUTSIDE THE CLUSTER

A large amount of research suggests that contacts outside the network are critical for innovation development (Bell, 2005; Elkinder-Frick et al., 2012; Pirolo and Presutti, 2010; Stam et al., 2014). The findings show that cluster members who establish relationships outside the cluster network experience fewer negative effects of redundancy, inertia and exclusion of outsiders. This is because the connection with various and distant actors offers greater access to heterogeneous sources of knowledge and information which help overcome negative effects (Bradley et al., 2012; Burt, 1997; Elkinder-Frick et al., 2012; Pirolo and Presutti, 2010; Rowley et al., 2000; Stam et al., 2014; Villena et al., 2015). Furthermore, the findings reveal that members with connections outside the cluster tend to import new information and knowledge to the cluster. This is what Obstfeld (2005), amongst other scholars (e.g. Hung, 2017; Ter Wal et al., 2017), describes as being a gatekeeper. A gatekeeper is recognised as improving the information exchange and transfer within a cluster network, and the cluster shifts from a fixed to a static social network with the injection of new information and knowledge. This, consequently, enhances the whole cluster's innovative capability and performance (Etxabe and Valdaliso, 2016; Hung, 2017; Ter Wal et al., 2017).

6.5.2.2 PERSONAL CHARACTERISTICS

Comparison of the case studies shows that the personal characteristics of cluster members can reduce the negative effects of social capital. This finding echoes the literature on innovative entrepreneurship and innovation adoption, that entrepreneurs' innovativeness is significantly related to their base personality traits and entrepreneurs have different tendencies to innovate. This highlights how socio-demographic, occupational and psychological characteristics can influence the process of innovative opportunity identification and exploitation (Block et al., 2017; Koellinger, 2008; Marcati et al., 2008; Root-Bernstein, 1989; Shane, 2000; Shane and Venkataraman, 2000).

Personality traits such as a high level of open-mindedness, extroversion, being emotionally stable, having a predisposition to change, an enthusiasm for problem-solving and being self-confident are characteristic of innovative entrepreneurs (Koellinger, 2008; Marcati et al., 2008; Obstfeld, 2005; Root-Bernstein, 1989). The findings show that cluster members with these characteristics suffer less from the negative effects of groupthink and inertia and have a higher ability to generate innovative ideas. This is because such characteristics encourage

cluster members to seek out and obtain novel and diverse information and knowledge from both inside and outside the cluster network and are self-motivated for learning and development. They increase their openness to experience, levels of flexibility and willingness to embrace change (Marcati et al., 2008; Obstfeld, 2005). Ruef (2002) points out that innovative entrepreneurs are associated with non-redundancy. However, the findings in this study do not reveal such an effect. This might be because it overlaps with the effect of centrality which can reduce redundancy. Nevertheless, this requires further research as the number of participants from each cluster is too small to generalise this finding. Moreover, future research may consider other socio-economic and personality traits such as academic education and technical background (Block et al., 2017; Koellinger, 2008; Shane, 2000) in investigating the relationship between innovation and social capital at the actor level.

6.5.2.3 SENSE OF BELONGING

Becattini (1990) articulates the concept of sense of belonging as the extent to which participants in the local industrial community identify themselves with the network. The findings present one negative case of a participant who expressed a significantly low sense of belonging and low level of social capital. This supports scholars who suggest that a sense of belonging can be used as a determinant of social capital (Daly and Cobb, 1989; Wilson, 1997). Similar to the research into the sense of belonging in Spanish clusters by Molina-Morales et al. (2013), the extreme level of heterogeneity places a difficulty on social interaction and social capital development. Firms with a low sense of belonging tend to have weaker ties and a more scattered network structure. Further to their suggestion of adopting a cognitive perspective, this study reveals that shared vision can also have an effect on sense of belonging.

Likewise with the study of Pezoa-Fuentes and Vidal-Sune (2017), sense of belonging can have a significant influence on the decision to remain in the network. A few researchers suggest that local intermediaries play an important role in ensuring a certain level of sense of belonging (Breschi and Lissoni 2001a; 2001b), however, an excessive level of sense of belonging can lead to the negative effect of over-embeddedness.

6.6 CHAPTER SUMMARY

This chapter presents a careful interpretation of the findings from Chapter 5 in keeping with the proposition and conceptual model proposed in Chapter 3. The findings largely support the proposition and conceptual model, with some amendments leading to a revised conceptual model. The central premise of this research is that being embedded in a cluster network can

have both positive and negative effects on the innovative performance of cluster firms. However, there are specific details to be taken from the findings:

- The negative effects of loss of objective and opportunistic behaviour in the taxonomy table (Table 2-10 in Chapter 2) are not found, although the negative ripple effect does emerge from the findings.
- In contrast to the conceptual model, centrality, shared vision and institutional proximity are found to have a positive relationship to innovative performance. Geographical proximity's effect on innovative performance is partially explained through its effect on structural and cognitive social capital, whereas the effect of organisational proximity is not significant enough to draw any conclusion (as presented in Table 6-1).
- The interrelationship between the four dimensions of social capital is amended, as relational social capital is not shown to influence cognitive social capital. Furthermore, some of the effects of proximity on social capital outlined in the conceptual model are not supported; geographical proximity on relational social capital, and organisational and institutional proximity on structural social capital, as other dimensions of social capital serve as intermediaries.

The next and final chapter presents the conclusions, and further reflects on the findings and the contribution of the findings discussed in this chapter. It provides recommendations for future research and offers managerial implications.

Chapter 7 CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

The final chapter of this thesis begins by revisiting the research aim, objectives and questions outlined in the first chapter (Section 7.2). A discussion of the theoretical and empirical contributions of the study follows. Finally, it concludes the study by underlining the limitations of the research and offering directions for future research (Section 7.3).

7.2 REVISITING THE RESEARCH AIM, OBJECTIVES AND QUESTIONS

This study advances the knowledge and understanding of the relationship between social capital and the innovative performance of firms in cluster networks. The overall aim of the study is as follows:

“To investigate the relationship between social capital and innovative performance of firms within cluster networks and identify the causes of the negative effects of social capital. This enhances the understanding of over-embeddedness among cluster members and provides recommendations for policymakers on mitigating the effects of over-embeddedness in cluster networks.”

This study builds upon the gaps identified from the review of the literature surrounding the three areas of study, innovation, social capital and cluster networks (examined in Chapter 2). Merging these three areas, the conceptual model of the four dimensions of social capital is developed in order to address the main research question, ‘how can social capital have a negative effect on the innovative performance of firms within cluster networks?’ (presented in Chapter 3).

In Chapter 4, the methodology and research design for data gathering to validate the proposed conceptual model are presented. Chapter 5 offers the findings from the data collection, which are briefly discussed. The conceptual model is revised and discussed in light of extant literature in Chapter 6. Lastly, in Chapter 7, the conclusions of the research, its theoretical and practical contribution, the limitations of the study and suggested future research are provided.

In order to address the aim, five research objectives and related research questions were formulated in the first chapter. Table 7-1, below, restates the research objectives and the chapters in which the objectives were achieved.

Research objective	Location in thesis
1	Chapter 2, 3, 5, 6
2	Chapter 2, 3, 5, 6
3	Chapter 2, 3, 5, 6
4	Chapter 2, 3, 5, 6
5	Chapter 7

Table 7-1: Research objectives and locations

The sections below address each research objective and research question with a brief overview of the key findings.

7.2.1 FIRST OBJECTIVE

“To examine social capital in the context of cluster networks.”

The associated research questions below were formulated:

RQ1: What is the level of structural, relational, cognitive and proximity-related social capital within a cluster network?

An unusual level of embeddedness is a prominent characteristic of cluster networks (Huber, 2009; Inkpen and Tsang, 2005; Lin, 2002; Molina-Morales and Martinez-Fernandez, 2010; Ruiz-Ortega et al., 2016), where the source of innovation depends on the intra-cluster relationships. The empirical findings for the four dimensions of social capital reveal that different clusters and different members of clusters have different levels of social capital. This confirms the notion of heterogeneous characteristics of social capital where different firms occupy different structures and have different qualities of social capital (Camps and Marques, 2014).

Overall, it is possible to separate cluster firms into two groups based on the level of embeddedness in the cluster network. The majority of firms in cluster networks report being highly embedded in them, where the characteristic is intimate relationships with frequent

interaction (strong ties) in dense networks, and trusting relationships where members share norms of reciprocity. Cluster firms contribute to the shared vision of cluster networks. The proximity dimension can be different for different members. This applies to the majority of firms who experience the negative effects of over-embeddedness.

In contrast, in low embeddedness cluster networks where the relationships between the members is weak, there are not strong ties, but also not weak ties, and it does not provide the advantage of weak ties. Cluster firms are loosely connected to other members, and the lack of social interaction implies a low level of trust and shared norms within the network, i.e. they do not benefit from social capital.

RQ2: How can proximity influence the other dimensions of social capital?

This research question addresses the call for empirical study of the role of proximity in defining social capital (Adler and Kwon, 2014; Di Vincenzo et al., 2014). In addition to geographical proximity which is a prominent characteristic of cluster networks, this study also includes non-spatial proximities, technological, organisational and institutional proximity (Boschma, 2005) in order to extend the idea of proximity from a purely physical phenomenon to a social phenomenon (Giuliani, 2007, 2008).

Section 6.3.6 of Chapter 6 offers a summary of the influence of the proximity dimension on the other three dimensions of social capital. *Geographical proximity* provides an opportunity for frequent face-to-face interaction (structural social capital) (but for it to actually influence structural social capital, the relational and cognitive dimensions of social capital are required) and the context-specific environment of co-located firms cultivates shared understanding and mutual interests and goals (cognitive social capital). Cluster firms prefer to interact and bond (structural social capital) with members who have similar experience and knowledge bases (technological proximity). This is shown to play a strong role in developing shared cognition (cognitive social capital). *Organisational proximity* is recognised as assisting with sharing goals and building common values (cognitive social capital) between cluster members, and *institutional proximity* conveys trust in network ties (relational social capital). For the latter two the effect is positive but not significant.

This finding emphasises the impact of proximity on social capital and thus responds to the call for empirical studies on the territorial dimension of social capital (Huber and Fitjar, 2016; Rutten et al., 2010).

7.2.2 SECOND OBJECTIVE

“To investigate the interrelationship between the four dimensions of social capital.”

The associated research question below was formulated:

RQ3: How are the four dimensions of social capital interrelated?

By incorporating multidimensional social capital into the study, this research allows the interrelation of the multiple dimensions of social capital to be addressed (Echebarria and Barrutia, 2013; Lefebvre et al., 2016; Li et al., 2016; Ruiz-Ortega et al., 2016; Castro and Roldan et al., 2013; Villena et al., 2011; Wang et al., 2018). Figure 6-2 in Chapter 6 depicts how the four dimensions of social capital are highly interrelated. The cognitive dimension of social capital is a prerequisite for both structural and relational social capital. The structural dimension is recognised as leading to cognitive social capital, whereas the relationship between the structural and relational dimensions is reciprocal. Hence, it can be concluded that each dimension of social capital builds on the effect of the other dimensions (Bulter and Purchase, 2008). Proximity, as addresses in the second research question, has a positive impact on all three original dimensions of social capital.

7.2.3 THIRD OBJECTIVE

“To identify the causes and mechanisms of the negative effects of social capital.”

The associated research question below was formulated:

RQ4: How do the negative effects of social capital emerge and by what mechanism do they operate?

Based on the critical analysis of the literature, Table 2-10 in Chapter 2 presents a comprehensive literature review related to innovation and the negative effects of social capital and over-embeddedness within cluster networks. Thus, the research identifies and formulates a comprehensive set of negative effects of social capital and divides the negative effects of social capital based on the negative mechanism for innovative performance (Table 3-1). This research uncovers the role of the four dimensions of social capital in fostering the negative

effects of social capital and the mechanisms of the negative effects on innovative performance (Figure 6-1 and Section 6.3). This opens the ‘black box’ of the mechanism of social capital and offers an explanation of the roles the respective mechanisms play in the outcomes (Camps and Marques, 2014; Huber, 2009; Rutten et al., 2010).

7.2.4 FOURTH OBJECTIVE

“To investigate the relationship between social capital and the innovative performance of firms in cluster networks.”

The associated research question below was formulated:

RQ5: What is the relationship between social capital and the innovative performance of firms in cluster networks?

Table 6.12 presents a summary of the relationships between the four dimensions of social capital and the innovative performance of firms in cluster networks. Most of the four dimensions of social capital have an inverted u-shaped relationship with innovative performance. Initially, social capital has a positive influence on innovative performance. However, when clustered firms become too deeply embedded in the cluster, the positive effects turn to negative effects. This excludes centrality (structural social capital), shared vision (cognitive social capital) and institutional proximity (the proximity dimension of social capital) that have positive impacts on innovation (and possibly reduce the negative effects of the other social capital dimensions). Geographical proximity is unable to fully explain the negative effects on innovative performance as it does not have a direct negative effect on innovative performance. However, its strong influence on the other dimensions of social capital indirectly explain the outcome. The effect of organisational proximity is fragmentary, such that it is difficult to draw a conclusion.

7.2.5 FIFTH OBJECTIVE

“To list the theoretical and practical implications of the key findings and the recommendations for future research.”

This chapter, after summarising the thesis and offering conclusions draws from both the literature and empirical evidence, presents the theoretical and practical implications of the key findings (Section 7.3) and offers recommendations for future research (Section 7.4).

In conclusion, this study addresses all five objectives and all five research questions. The investigation of the relationship between social capital and innovative performance of firms within cluster networks and the identification of the causes of the negative effects of social capital have been successfully fulfilled. The following section highlight the way in which the findings contribute to the community of academics and practitioners, and provides direction for further academic research.

7.3 RESEARCH NOVELTY AND CONTRIBUTION

The primarily purpose of any thesis is to advance knowledge of specific issues and contribute to practice. From the theoretical perspective, this thesis extends the boundaries of knowledge in the fields of social capital, innovation, cluster networks and proximity. The practical contribution of this research is spreading awareness of the potential dark side of social capital and providing guidance for cluster policymakers that reflects the issues of cluster development and over-embeddedness in cluster networks.

7.3.1 THEORETICAL CONTRIBUTION

On a theoretical level: The primary theoretical motivation for this study is addressing a gap in the research literature on the dark side of social capital, which has received less comprehensive exploration (Adler and Kwon, 2014; Galunic et al., 2012; Gedajlovic et al., 2013; Li et al., 2013(b); Li et al., 2016), and the ongoing debate on the relationship between social capital and innovative performance (Li et al., 2016; Molina-Morales and Martinez-Fernandez, 2009; Molina-Morales et al., 2011; Ozer and Zhang, 2014; Weber and Weber, 2011; Yu, 2013) in the context of cluster networks (Huber, 2009; Molina-Morales and Martinez-Fernandez, 2010; Noordhoff et al., 2011).The research contributes to the current literature on social capital, innovation and cluster networks in several ways. Firstly, the findings offer a comprehensive understanding of the impacts of social capital on innovation in cluster networks. In contrast to the dominant view found in the literature, social capital has an inverted u-shaped relationship with innovative performance, in which social capital produces a positive effect on innovative performance until it reaches a threshold level, after which it can produce an adverse effect. The researcher argues that the more-is-better approach to social capital is inappropriate for innovation and deserves re-examination. The relationship

of social capital and innovation is an inverted u-shaped relationship which implies a too-much-can-hurt approach.

The second strand of academic literature to which this research contributes is the mechanism of the negative effects of social capital. In the extant literature, the negative effects of social capital are largely used to explain non-positive outcomes rather than as an investigating factor, thus the explanation of the interplay of mechanisms of social capital is very limited (Huber, 2009; Rutten et al., 2010). The studies that attempt to open this black box often restrict it to one or two negative effects (e.g. Noordhoff et al., 2011; Wang et al., 2018). This study investigates the negative effects of cost of maintenance, decision-making constraints, restriction of novelty and/or diverse information and knowledge, unnecessary obligation, groupthink, loss of objective, inertia, exclusion of outsiders, redundancy and opportunistic behaviour drawn from the literature of social capital, innovation and cluster networks (Table 2-10). This opens the black box by identifying the causes and providing details of the mechanisms of these negative effects in relation to innovative performance. Hence, this deepens the understanding of the potentially deleterious outcomes of social capital on cluster firms' innovative performance.

The third strand of the theoretical contribution is the proposed four dimensions of social capital, structural, relational, cognitive and proximal. The study investigates Nahapiet and Ghoshal's (1998) the three original dimensions of social capital in a single model with an addition of the proximity dimension. The results of the study emphasise the different effects on innovative performance of each dimension and sub-dimension of social capital. Ignoring or failing to take multidimensional social capital into consideration risks jeopardising a comprehensive understanding of the whole picture of social capital (Echebarria and Barrutia, 2013; Lefebvre et al., 2016; Li et al., 2016; Ruiz-Ortega et al., 2016; Castro and Roldan et al., 2013; Villena et al., 2011; Wang et al., 2018). This study offers a comprehensive understanding of social capital and innovative performance not only from a structural perspective but also from a relational point of view within a cognitive framework.

Furthermore, in a departure from previous literature, this research is among the first to take into consideration the spatial or territory dimension of social capital by adding the dimension of proximity from the literature. This underlines the role of proximity in defining social capital (Adler and Kwon, 2014; Di Vincenzo et al., 2014; Huber and Fitjar, 2016; Molina-Morales et al., 2014; Rutten et al., 2010). Rather than emphasising only geographical proximity, this research extends the idea to include non-geographical proximity and thereby extends

proximity from a purely physical phenomenon to a social phenomenon. The results confirm the role of proximity in defining social capital where proximity, both geographical and non-geographical, determines intra-cluster cooperation, intensifies the other three dimensions of social capital and contributes to over-embeddedness. This result stresses the importance of integrating the spatial dimension of social capital into the study, especially where close proximity between actors in the networks is presented.

Another strand of the theoretical contribution is the empirical investigation of the interrelationship between the four dimensions of social capital. Similar to multidimensional social capital, the interrelationship between the dimensions of social capital is often neglected in empirical studies (Castro and Roldan et al., 2013; Echebarria and Barrutia, 2013; Lefebvre et al., 2016; Li et al., 2016; Ruiz-Ortega et al., 2016; Villena et al., 2011; Wang et al., 2018). The study shows that the four dimensions of social capital are strongly interrelated, and some dimensions can offset the negative effects of other dimensions. The interrelationship arguably presents another insight into the effects of social capital on innovative performance.

The last theoretical contribution is highlighting the literature on proximity. By empirically investigating the relationship between proximity and innovation, this study unintentionally addresses the current debate about the ‘paradox of proximity’ (Broekel and Boschma, 2012; Fitjar et al., 2016; Nooteboom et al., 2007). The findings provide strong support for the paradox of technological proximity, where only the optimal level of technological proximity between actors can provide a positive effect on innovation, not the other proximities.

On a methodological level: The research aim, objectives and questions presented in Section 7.2 justify the researcher’s decision to embrace a qualitative approach to investigating the phenomenon of social capital. This approach offers a new perspective on social capital by elucidating the relational content and what actually occurs between connections, the study of which is limited in the field of social capital which is dominated by quantitative studies (Alguezaui and Filieri, 2010; Camps and Marques, 2014; Huggins, 2000). This allows the study to complement, supplement and even challenge existing research (Jack, 2010). Moreover, the multiple case study approach allows for comparison between cluster networks and cluster members from the same industry. This sheds light on the factors that affect social capital development and that reduce the negative effect of over-embeddedness in cluster networks.

In line with Li et al. (2015) who advocate future research that integrates the perspectives of government and institutions in network study. The perspectives of the government agency and trade association included in this study provide the overall situation of cluster networks in Thailand and concerns about over-embeddedness from an institutional perspective. They also offer a valuable explanation of the cluster firms' underlying perspectives on intra-cluster relationships.

7.3.2 PRACTICAL CONTRIBUTION

On a practical level: The results of the study firstly underline that cluster firms need to be fully aware of the negative effects of over-embeddedness in clusters. Over-embeddedness can impose an excessive cost of maintenance, decision-making constraints and restrictions on novel and/or diverse information and knowledge, which can negatively affect cluster firms' innovative performance. To have close ties exclusively with members who have intimate and trusting relationships and shared norms does not necessarily provide positive effects. This is not to suggest dissolving existing relationships, though cluster firms should actively contemplate strategies of capturing the benefits of social capital while simultaneously mitigating the potential risks of over-embeddedness (Gao et al., 2017).

Secondly, the results of the study illustrate how a central position in the cluster is most beneficial. Connection to actors internal and external to the cluster network makes central firms conduits of information and knowledge flow, and helps them reduce the negative effects of over-embeddedness. Therefore, cluster firms are strongly suggested to strategically position themselves at the centre of networks (Kim et al., 2014). This can be achieved by occupying a role in the cluster, acting as a resource, or developing relationships with members at the core positions of the network.

Thirdly, while cluster firms pursue the collective vision of the cluster, they should also have their own visions and pursue them simultaneously in order to evade the negative effects of over-embeddedness. This will ease the likelihood of decision-making constraints, e.g. groupthink and loss of objective.

Lastly, the insights into the challenges of cluster development gained from cluster firms feature in the recommendations and guidance this study offers to cluster policymakers. This has the potential to bring about more nuanced agenda setting and cluster policy.

On the policy level: This study offers insight into the issue of over-embeddedness that cluster firms face. The primary goal of the government agency for intra-cluster relationships is to strengthen those relationships, while over-embeddedness is presumed not to occur in cluster networks and has therefore received less attention. Nevertheless, the results of this study reveal the opposite and confirm the deleterious effect of over-embeddedness. This outcome may trigger policymakers to tighten implementation plans in order to minimise and manage over-embeddedness.

This study provides first-hand information about the existing challenge of cluster development from the perspective of cluster firms. The top-down approach and the problem of cluster performance evaluation barricade communication and realisation of the actual issues of cluster development, where the problems and needs of cluster firms may not be addressed promptly by the institutions. This study helps practitioners and policymakers by playing the role of ‘middle man’ to report issues of cluster development.

Drawing from the results and the aim of the study, the following recommendations are provided to policymakers to foster cluster development and manage the over-embeddedness of firms within cluster networks. As the findings reveal other issues in cluster networks, the guidance borrows from the concept of the ‘life cycle’, proposing recommendations for the formation, growth, maturity and decline stages of cluster networks.

- *Establish a comprehensive understanding of the cluster concept among the cluster firms and relevant institutions.*

One of the issues identified at the early stage of cluster networks is a lack of understanding of the concept among cluster firms and the relevant institutions themselves, which undeniably reduces efficiency. Cluster firms that do not fully appreciate the concept of the cluster are inclined to rely on financial aids from the government organisation and neglect building intra-cluster relationships. Similarly, at the institutional level, different government organisations have different understandings of the functionality of the cluster and their role. This leads to difficulty in the coordination between government organisations. The government agency must improve its understanding of the cluster concept and facilitate greater inter-departmental cohesion across affiliated departments of government organisations in order to provide the necessary information. This would help lessen the misunderstanding among cluster members and ensure successful coordination between government organisations.

- *Facilitate opportunities for interaction.*

At the initial stage, cluster members may have not known each other prior to the cluster. In order for cluster firms to share information, knowledge and resources and foster innovation, they must develop and maintain relationships (Gao et al., 2017). The government agency can facilitate this interaction by firstly establishing routine meetings and organising activities that provide opportunities for face-to-face interaction including activities that favour the development of shared vision (Molina-Morales et al., 2014). Secondly, while in-person meetings still comprise a vital part of the equation and should be arranged periodically, the use of ICT (e.g. telecommunications, email, videoconferencing, social network applications and other techniques) enables cluster members to interact remotely on an ad-hoc basis and develop cohesive and cooperative networks which strengthen the relationships and overcome the issue of physical distance in some clusters.

- *Encourage a bottom-top approach.*

The issue of having a top-bottom approach can be alleviated by government adopting a proactive approach to opening communication channels with cluster firms in order to determine how best to allocate the available resources to optimise the cluster model. Cluster members typically have first-hand, contemporary and universally-applicable knowledge that could be used to guide the steps the government puts in place. By making this membrane porous and seeking advice directly from business owners, the government can maximise the impact of its investment, and minimise instances of cluster members failing to utilise available resources due to a perception of irrelevance. Secondly, the government may consider setting intermediary agents (either representatives of the government agency or cluster network firms, or both) to communicate and translate the needs of one party to the other, and vice versa.

- *Ensure a diversity of members.*

Prior to establishing a cluster network, the government agency could put controls on the diversity of cluster members to ensure the success of the network. Diversity within cluster networks is a necessary condition of ensuring all members gain added value from the variety of expertise, information and resources on offer. This technological distance increases the likelihood of cluster members being able to provide mutually beneficial services, or share knowledge about a sector, process or market outside of a specialist area of expertise. While

technological distance is integral, the distance should not be so significant as to remove the relevancy of one cluster member to another (Eklinder-Frick et al., 2011).

At the *growth stage*, institutions need to provide support for continuous growth of the cluster and mitigate the negative effects of over-embeddedness.

- *Employ a 'triple helix'.*

To boost the innovative activities of cluster firms, coordination between government organisations, universities or research and development centres and cluster firms, in other words the 'triple helix', needs to take place (Fitjar et al., 2014; Kim et al., 2014; Sarpong et al., 2017). All three must act in unison to support the continued utility and development of the cluster, which implies:

- The government sets out policies that determine cluster operations, opens avenues for funding and provides advisory resources for universities and businesses.
- Universities provide a high-calibre educated workforce and research applicable to supporting the government and cluster firms.
- Cluster firms use the available resources to support cluster development and innovation and promote the role of educational institutions while putting their insights into action.

This model is already in force, to an extent, in Thailand. However, a more concerted focus from all three parties, led by the government agency, towards optimising best-practice around cluster membership would illicit significant benefits for firms participating in cluster networks.

- *Develop a standardised approach to the evaluation and tracking of the performance of clusters and cluster firms.*

In order for the cluster model to be brought fully to fruition, a systematic evaluation that tracks the performance of cluster and firms within cluster networks needs to be established. This includes the establishment of a standardised set of metrics that are suitably illustrative of key performance indicators and the updating of the cluster database. This process of benchmarking is expected to facilitate an iterative process of improvement in which the evaluation provides

information that reflects the current situation and the actual needs and issues of the cluster, allowing the institutions to provide the most appropriate aid.

- *Evaluate the over-embeddedness of cluster networks.*

The government agency could develop self-assessment questionnaires to assess the level of embeddedness of cluster firms in cluster networks. This could increase awareness of the negative effects of over-embeddedness in the early stages. Furthermore, awareness should encourage cluster firms to engage in activities and understand the policy related to mitigating over-embeddedness.

At the *maturity stage*, the cluster development slows and begins to decline. Cluster firms share structural and cognitive homogeneity (Staber, 2007). The advantage provided by social capital in the past begins to weaken and eventually the cost of maintenance outweighs the benefit, and negative effects emerge. At this stage, it is vital to increase diversity in the cluster network.

- *Institutions strengthen their role as structural brokers and gatekeepers, and encourage cluster firms to become gatekeepers.*

At the formation and growth stages, institutions play a major role in establishing intra-cluster relationships. Strengthening the intimate intra-cluster relationships provides support for the existing network structure (Eklinder-Frick et al., 2011). However, at the maturity stage, institutions should adopt the position of gatekeepers and structural brokers to ensure cluster members are connected with external actors and able to access new and relevant knowledge (García-Villaverde et al., 2017; Todo et al., 2016) escaping the limitations of restricted novel and diverse information and knowledge (Molina-Morales et al., 2014).

- *Revise the vision and objectives of the cluster network.*

Revising the vision and objectives of the cluster allows cluster firms to renew their focus and seek new information and knowledge, possibly forming new relationships as part of the process. This could include expanding the market, i.e. connecting with non-local ties (Molina-Morales and Exposito-Langa, 2013) or developing new products, i.e. collaborating with other members of the cluster or members of different cluster networks. Government organisations can act as intermediary agents to help achieve this.

At the *decline stage*:

- *Decide whether ending or renewing a cluster would be more beneficial.*

A decision must be made whether to terminate a cluster or seek a renewed cluster. To rejuvenate a cluster network, the identity and functionality of the cluster needs to be re-defined (Ostergarrd et al., 2015; Martin and Sunley, 2011) to ensure that all members have a coherent perception. The rejuvenation process should maintain the advantages already accrued while addressing any outstanding issues in terms of membership, participation or orientation. The government agency could aid this process by providing clear guidance on how to audit and improve cluster relations, focusing on proven means of rejuvenation.

7.4 RESEARCH LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

This research presents a number of strengths, but is not free from limitations. Firstly, at the methodological level, the majority of the empirical data used in the research is subjective in nature, as the data is obtained from self-report based on the memory, experience and perception of the participants. This includes measures of innovative performance and negative effects of social capital. However, this is recognised as imperative to obtaining insight into intra-cluster relationships (Molina-Morales et al., 2015) and adopted by other scholars (e.g. Pirolo and Presutti, 2010; Pucci et al., 2017 and others). Memory errors and omission may exist, but this is a common problem with cross-sectional design (Yli-Renko et al., 2011). While the research ensures its reliability and validity by crossing check with the perspective of institutional representatives and reports, although, it may not be sufficient to claim perfect reliability. Future studies might consider incorporating objective measurements and developing specific measurement scales that capture the dark side of cluster ties. The research extensively reviews the available reports related to cluster networks in Thailand, but the reports and documents available are mostly outdated and have restricted information on clusters. Nevertheless, this issue is addressed by obtaining reports and documents directly from the DIP, which participated in the study.

Secondly, the aim of the study is to investigate intra-cluster relationships, however, it neglects the relationships that cluster firms have with outsiders, so does not represent the whole picture of the multiplicity of firms' networks. This makes it difficult to define an accurate level of embeddedness in cluster networks.

Thirdly, the study addresses the role of proximity in social capital, however it does not investigate how social capital influences proximity. According to Balland et al. (2015) and Padgett and Powell (2012), there is likelihood that, in the short run, proximity drives the formation of networks. In the long run however, network ties increase proximity. Due to time constraints, it has not been possible to examine this relationship. Future research may consider investigating this relationship longitudinally.

Fourthly, there are ripple effects of the negative effects of social capital. This opens up an unrevealed mechanism of the dark side of social capital and underlines the relationship between the negative effects of social capital and how difficult they are to manage. This study sheds light on this effect, but future research may further verify this and explore the relationships between other negative effects that have not be addressed in this study, thereby broadening the insight into the negative effects of social capital on innovative performance.

Fifthly, due to time constraints of this PhD, a longitudinal study has not been possible. Social capital (Presutti et al., 2016) and proximity (Davids and Frenken, 2018; Letaifa and Rabeau, 2013) are not static and therefore evolve over time. However, there are many fruitful avenues for future research to conduct longitudinal studies. Future research could propose longitudinal studies that precisely identify the relationships between social capital and innovative performance (as suggested by various researchers including Casanueva et al., 2013; Laursen et al., 2012; Hsu and Hung, 2013; Presutti et al., 2016; Vlaisavljevic et al., 2016 and others). Such studies could investigate whether static positive relationships of centrality and shared vision truly escape the inverted u-shaped relationship and provide positive effects on innovative performance, and whether the interrelationship between the four dimensions of social capital remains unchanged. Furthermore, such studies could investigate whether the negative effects are strengthened or weakened over time and explore the negative effects unfound by this study, i.e. opportunistic behaviour and loss of objective, over time. Longitudinal study could also offer insight into the paradox of proximity.

Sixthly, while this study emphasises the importance of awareness of over-embeddedness and contributes to increasing awareness of the negative effects of over-embeddedness in cluster networks though the process of interview, there is still a need to spread awareness on a larger scale. Future research and policymaking may consider developing a self-assessment test for cluster firms to evaluate the level of embeddedness in cluster networks in order to increase awareness of over-embeddedness.

Lastly, this study examines the context of cluster networks in Thailand, and the results of the study might not be generalisable to other countries or inter-organisational networks. The results show that the context in which cluster firms operate influences their social capital (i.e. the macro environment) and politics and culture have a significant impact on cluster networks. In Thailand, cluster firms are strongly embedded in personal relationships, so applying the results of the study to other contexts requires context specific needs to be taken into consideration.

7.5 CHAPTER SUMMARY

To conclude this research, this chapter shows how the research aim, objectives and questions identified in Chapter 1 have been addressed, along with an overview of the research findings, the novel contribution of the research, the limitations and recommendations for future research. This concludes the ‘journey’ of the PhD.

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APPENDIX

APPENDIX A: COMPLETED RESEARCH ETHICS FORMS



College of Business, Arts and Social Sciences Research Ethics Committee
Brunel University London
Kingston Lane
Uxbridge
UB8 3PH
United Kingdom
www.brunel.ac.uk

9 February 2017

LETTER OF APPROVAL

Applicant: Miss Theenida Buntornwon

Project Title: Interview agenda

Reference: 5211-LR-Feb/2017- 5911-2

Dear Miss Theenida Buntornwon

The Research Ethics Committee has considered the above application recently submitted by you.

The Chair, acting under delegated authority has agreed that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that the conditions of approval set out below are followed:

- The agreed protocol must be followed. Any changes to the protocol will require prior approval from the Committee by way of an application for an amendment.

Please note that:

- Research Participant Information Sheets and (where relevant) flyers, posters, and consent forms should include a clear statement that research ethics approval has been obtained from the relevant Research Ethics Committee.
- The Research Participant Information Sheets should include a clear statement that queries should be directed, in the first instance, to the Supervisor (where relevant), or the researcher. Complaints, on the other hand, should be directed, in the first instance, to the Chair of the relevant Research Ethics Committee.
- Approval to proceed with the study is granted subject to receipt by the Committee of satisfactory responses to any conditions that may appear above, in addition to any subsequent changes to the protocol.
- The Research Ethics Committee reserves the right to sample and review documentation, including raw data, relevant to the study.
- You may not undertake any research activity if you are not a registered student of Brunel University or if you cease to become registered, including abeyance or temporary withdrawal. As a deregistered student you would not be insured to undertake research activity. Research activity includes the recruitment of participants, undertaking consent procedures and collection of data. Breach of this requirement constitutes research misconduct and is a disciplinary offence.

A handwritten signature in black ink that reads 'James Knowles'.

Professor James Knowles

Chair

College of Business, Arts and Social Sciences Research Ethics Committee
Brunel University London

APPENDIX B: PARTICIPANT INFORMATION SHEET



PARTICIPANT INFORMATION SHEET

Title of study: An investigation of the negative effects of social capital in clusters, in the context of small and medium sized enterprises in Thailand

Dear participants,

My name is Theenida Buntornwon. I am a PhD candidate at the Brunel University, United Kingdom in the Brunel Business school. I would like to invite you to take part in my research study as part of the requirement to fulfil my postgraduate study. The purpose of the study is to develop a conceptual model that assist in overcoming the potential deleterious effects of small and medium sized enterprises that choose to coalesce in clustering network.

Before you decide, it is important for you to understand why the research is being done and what your participation will involve. Please take time to read the following information carefully. Please do not hesitate to ask question if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Procedure

If you are agreed to participate in my research, I will conduct an interview with you at a time and location of your choice. The interview will conduct through semi-structure, involves questions about your relationship within a cluster network. It should last no longer than 120 minutes. With your permission, I will audiotape and take notes during the interview. The recording is to accurately record the information you provide, and will be used for transcription purposes only. If you choose not to be audiotaped, I will take notes instead. If you agree to being audiotaped but feel uncomfortable at any time during the interview, I can turn off the recorder at your request. Or if you don't wish to continue, you can stop the interview at any time.

I expect to conduct only one interview; however, follow-ups may be needed for added clarification. If so, I will contact you by mail/phone to request this.

Benefits

There is no direct benefit to you from taking part in this study. However, it is hoped that the research will provide a guidance for the owners or managers of small and medium sized enterprises that participate in cluster to overcome the negative effects of social capital in order to maximise their innovation capability, and the government and relevant institution to provide the needed support to small and medium sized enterprises cluster. You can request a copy of the published results at the end of the study.

Confidentially

Your study data will be available only to the researcher for academic purpose only and data will be handled as confidentially as possible. If results of this study are published or presented, individual names, and other personally identifiable information will not be used, unless you give explicit permission for this.

Rights

Participation in this research project is *completely voluntary*. You are free to decline to take participant in the project. You can decline to answer any questions and are free to withdraw from the project without giving a reason and any negative consequences.

Review of the study

This research project has been approved by Brunel University Research Ethics Committee, if you have any comments or concerns about the ethics procedures employed in this study, please contact, Professor James Knowles, who is the chair of College of Business, Arts and Social Science Research Ethics Committee and can be contact via this email address: cbass-ethics@brunel.ac.uk

Contact for Further Information

If you have any question about this research, please feel free to contact me.

Your participation is greatly appreciated.

Yours sincerely,

Theenida Buntornwon

PhD candidate, Brunel Business School

Brunel University, Uxbridge, Middlesex

UB8 3PH, United Kingdom

Email: Theenida.buntornwon@brunel.ac.uk

APPENDIX C: INTERVIEW AGENDA FOR FIRMS PARTICIPATE IN CLUSTER

Interview agenda A

The interview aims to address the following issues:

- To develop a comprehensive understanding of social capital theory of firm within cluster network
- To identify the negative effects on individual firm that comprise part of a cluster and how it affects innovative capability and therefore innovation performance through social capital theory as theoretical lens
- To investigate the assistance that firm within cluster need from the cluster and institutional
- To establish mechanisms and strategy to minimise or mitigating the negative effects of social capital in order for SMEs to maximise their innovative capability and therefore innovation performance
- To investigate whether four dimensions of social capital are interrelated

The interview is divided into 5 parts.

Section A: General participant and cluster information

Section B: Innovative capability and innovation performance

Section C: Relationship within cluster network (Social capital theory)

Section D: Identification of negative effects of cluster networking

Section E: Management of negative effects of cluster networking

Section A: General participant and cluster information

1. What were the criteria and motivation of choosing this particular cluster network?

2. How long have you participated within this cluster network?

3. How many people and who are involving in this cluster network?

4. How important is networking to you? Why did you feel the need to network within a cluster? How does it different from other relationship?

Section B: Innovation capability and innovation performance

1. What kind of benefit(s) do you get by being a member of this cluster networks?

a. Has your innovative capability and innovation performance improve after participating in cluster networks?

b. If yes, why is that the case?

c. If no, what is the problem that might impede your innovative capability and innovation performance?

2. Within cluster network, what might help/ further help to improve your innovative capability and innovation performance?

3. Are there any other support that you need (i.e. from government or institutions)?

Section C: Relationship within cluster network

1. Can you please explain about the relationship you have with others in cluster networks and the significant of the relationship?

Social capital dimension	Not Significant	Less significant	Fairly significant	Moderately significant	Significant	Highly significant	Extremely significant
	1	2	3	4	5	6	7
Structural social capital							
Network ties <i>(The strength of the relationship)</i>							
Density <i>(The degree of mutual connection between members in clusters)</i>							
Centrality <i>(Degree centrality and betweenness centrality)</i>							
Relational social capital							
Trust <i>(The extent a firm is reliable and would act in another firm's best interest)</i>							
Norms of reciprocity <i>(The consensus of what should be avoid and what is considered to be appropriate in the social system)</i>							
Cognitive social capital							
Shared vision <i>(The similarity in the vision)</i>							
Proximity							
Geographical proximity <i>(The geographical distance between members)</i>							
Technological proximity <i>(The extent to which members share the same knowledge base)</i>							
Organisational proximity <i>(The extent to which relations are shared in organisational arrangement between cluster members)</i>							
Institutional proximity <i>(The extent to which clustered firms operate under the same formal institutions)</i>							

2. Do you think structural, relational, cognitive dimensions of social capital and proximity influence on another? If so, how?
-

Section D: Identification of negative effects of cluster networking

1. Are you aware of any negative effects caused by participating in cluster network? If so, what are these effects?

-
2. Literature indicates the potential negative effects of social capital from over-embeddedness in network (as illustrated in the following table); do you recognise any of these negative effects in your cluster network and how you do understand them?

Negative effects	Descriptions
Cost of maintenance	
Unnecessary obligation <i>(Unnecessary obligation that require continuous investment of time and resources)</i>	
Decision-making constraints	
Loss of objective <i>(Failing to pursue self-interest because making concessions to other individuals' interests or to the collective goals)</i>	
Groupthink <i>(A mode of thinking of a highly cohesive group, occurs when the group is under pressure toward uniformity, consequently, the group would not be able to assess alternative courses of action)</i>	
Restriction of novelty or diverse knowledge and unawareness of the necessity to change	
Inertia <i>(A persistent organisational resistance to changing inter-organisational ties or difficulties that an organisational face when it attempts to dissolve old relationships and from new network ties as a result of high level of attachment between members)</i>	
Exclusion of outsiders <i>(Exclusion of the new actor or the actor that is not a part of cluster)</i>	
Knowledge redundancy <i>(Repeated information and knowledge)</i>	
Opportunistic behaviour	
Opportunistic behaviour <i>(Self-interest seeking with guile)</i>	
Other:	

- a. Can you indicate the significance of such negative effects occurring in your cluster networks?

Negative effects	Is this negative effect incurred in your business?	Not significant	Less significant	Fairly significant	Moderate significant	Significant	Highly significant	Extremely significant
		1	2	3	4	5	6	7
Cost of maintenance								
Unnecessary of obligation <i>(Unnecessary obligation that require continuous investment of time and resources)</i>								
Decision-making constraints								
Loss of objective <i>(Failing to pursue self-interest because making concessions to other individuals' interests or to the collective goals)</i>								
Groupthink <i>(A mode of thinking of a highly cohesive group, occurs when the group is under pressure toward uniformity, consequently, the group would not be able to assess alternative courses of action)</i>								
Restriction of novelty or diverse knowledge and unawareness of the necessity to change								
Inertia <i>(Resistance or difficulty to change i.e. network ties as a result of high level of attachment between members)</i>								
Exclusion of outsiders <i>(Exclusion of the new actor or the actor that is not a part of cluster)</i>								
Knowledge redundancy <i>(Repeated information and knowledge)</i>								
Opportunistic behaviour								
Opportunistic behaviour <i>(Self-interest seeking with guile)</i>								
Other:								

- a. If you recognise any of the other negative effects from the table (above), please elaborate on the factor(s)

- b. To what extent do these negative effects impact your innovative capability and innovation performance?

Negative effects	Not significant	Less significant	Fairly significant	Moderate significant	Significant	Highly significant	Extremely significant
	1	2	3	4	5	6	7
Cost of maintenance							
Unnecessary of obligation <i>(Unnecessary obligation that require continuous investment of time and resources)</i>							
Decision-making constraints							
Loss of objective <i>(Failing to pursue self-interest because making concessions to other individuals' interests or to the collective goals)</i>							
Groupthink <i>(A mode of thinking of a highly cohesive group, occurs when the group is under pressure toward uniformity, consequently, the group would not be able to assess alternative courses of action)</i>							
Restriction of novelty or diverse knowledge and unawareness of the necessity to change							
Inertia <i>(Resistance or difficulty to change i.e. network ties as a result of high level of attachment between members)</i>							
Exclusion of outsiders <i>(Exclusion of the new actor or the actor that is not a part of cluster)</i>							
Knowledge redundancy <i>(Repeated information and knowledge)</i>							
Opportunistic behaviour							
Opportunistic behaviour <i>(Self-interest seeking with guile)</i>							
Other:							

3. As a result of recognising the potential negative effects of participating in a cluster network, would you reconsider your decision to participate?
-

4. Literature indicates that social capital theory/ over-embedded might be the antecedent of the negative effects; can you give your opinion on the potential cause of these negative effects?

Section E: Management of negative effects of cluster networking

1. Can you explain why some of the negative mentioned in the previous section, does not occur in your cluster network? How did you manage to minimise or mitigating such negative effects?

Negative effects	Why does it not occur in the firm?	Management strategies/ Policies/ Mechanisms to reduce impact

2. What strategies your management might adapt to manage and control these negative effects?

Negative effects	Management strategies/ Policies/ Mechanisms to reduce impact
Cost of maintenance	
Unnecessary obligation <i>(Unnecessary obligation that require continuous investment of time and resources)</i>	
Decision-making constraints	
Loss of objective <i>(Failing to pursue self-interest because making concessions to other individuals' interests or to the collective goals)</i>	
Groupthink <i>(A mode of thinking of a highly cohesive group, occurs when the group is under pressure toward uniformity, consequently, the group would not be able to assess alternative courses of action)</i>	
Restriction of novelty or diverse knowledge and unawareness of the necessity to change	
Inertia <i>(Resistance or difficulty to change i.e. network ties as a result of high level of attachment between members)</i>	
Exclusion of outsiders <i>(Exclusion of the new actor or the actor that is not a part of cluster)</i>	
Knowledge redundancy <i>(Repeated information and knowledge)</i>	
Opportunistic behaviour	
Opportunistic behaviour <i>(Self-interest seeking with guile)</i>	
Other:	

APPENDIX D: INTERVIEW AGENDA FOR INSTITUTIONS REPRESENTATIVES

Interview agenda B

The interview aims to address the following issues:

- To develop a comprehensive understanding of cluster network in Thailand from institutional perspective
- To identify the negative effects on individual firm that comprise part of a cluster and how it affects innovative capability and therefore innovation performance through social capital theory as theoretical lens
- To investigate the assistance that firm within cluster need from the cluster and institutional
- To establish mechanisms and strategy to minimise or mitigating the negative effects of social capital in order for cluster members to maximise their innovative capability and therefore innovation performance

The interview is divided into 4 parts.

Section A: General information of interviewee

Section B: Perception of cluster network

Section C: Identification of negative effects of cluster networking

Section D: Management of negative effects of cluster networking

Section A: General information of interviewee

1. What is your role in your organisation?

2. What is your organisation responsibility on cluster development?

Section B: Perception cluster network

1. What is definition of cluster?

2. What is the purpose of cluster network?

3. How cluster network can help cluster members?

4. Is there any issue of cluster development?

5. Can you describe intra-cluster relationship?

6. Are you aware of over-embeddedness and its negative effect?

Section C: Identification of negative effects of cluster networking

1. Are you aware of any negative effects caused by participating in cluster network? If so, what are these effects?

2. Literature indicates the potential negative effects of social capital from over-embeddedness in network (as illustrated in the following table); do you recognise any of these negative effects in cluster network and how you do understand them?

Negative effects	Descriptions
Cost of maintenance	
Unnecessary obligation <i>(Unnecessary obligation that require continuous investment of time and resources)</i>	
Decision-making constraints	
Loss of objective <i>(Failing to pursue self-interest because making concessions to other individuals' interests or to the collective goals)</i>	
Groupthink <i>(A mode of thinking of a highly cohesive group, occurs when the group is under pressure toward uniformity, consequently, the group would not be able to assess alternative courses of action)</i>	
Restriction of novelty or diverse knowledge and unawareness of the necessity to change	
Inertia <i>(A persistent organisational resistance to changing inter-organisational ties or difficulties that an organisational face when it attempts to dissolve old relationships and from new network ties as a result of high level of attachment between members)</i>	
Exclusion of outsiders <i>(Exclusion of the new actor or the actor that is not a part of cluster)</i>	
Knowledge redundancy <i>(Repeated information and knowledge)</i>	
Opportunistic behaviour	
Opportunistic behaviour <i>(Self-interest seeking with guile)</i>	
Other:	

- a. Can you indicate the significance of such negative effects occurring in cluster networks?

Negative effects	Is this negative effect incurred in your business?	Not significant	Less significant	Fairly significant	Moderate significant	Significant	Highly significant	Extremely significant
		1	2	3	4	5	6	7
Cost of maintenance								
Unnecessary of obligation <i>(Unnecessary obligation that require continuous investment of time and resources)</i>								
Decision-making constraints								
Loss of objective <i>(Failing to pursue self-interest because making concessions to other individuals' interests or to the collective goals)</i>								
Groupthink <i>(A mode of thinking of a highly cohesive group, occurs when the group is under pressure toward uniformity, consequently, the group would not be able to assess alternative courses of action)</i>								
Restriction of novelty or diverse knowledge and unawareness of the necessity to change								
Inertia <i>(Resistance or difficulty to change i.e. network ties as a result of high level of attachment between members)</i>								
Exclusion of outsiders <i>(Exclusion of the new actor or the actor that is not a part of cluster)</i>								
Knowledge redundancy <i>(Repeated information and knowledge)</i>								
Opportunistic behaviour								
Opportunistic behaviour <i>(Self-interest seeking with guile)</i>								
Other:								

- a. If you recognise any of the other negative effects from the table (above), please elaborate on the factor(s)

- b. To what extent do these negative effects impact your innovative capability and innovation performance?

Negative effects	Not significant	Less significant	Fairly significant	Moderate significant	Significant	Highly significant	Extremely significant
	1	2	3	4	5	6	7
Cost of maintenance							
Unnecessary of obligation <i>(Unnecessary obligation that require continuous investment of time and resources)</i>							
Decision-making constraints							
Loss of objective <i>(Failing to pursue self-interest because making concessions to other individuals' interests or to the collective goals)</i>							
Groupthink <i>(A mode of thinking of a highly cohesive group, occurs when the group is under pressure toward uniformity, consequently, the group would not be able to assess alternative courses of action)</i>							
Restriction of novelty or diverse knowledge and unawareness of the necessity to change							
Inertia <i>(Resistance or difficulty to change i.e. network ties as a result of high level of attachment between members)</i>							
Exclusion of outsiders <i>(Exclusion of the new actor or the actor that is not a part of cluster)</i>							
Knowledge redundancy <i>(Repeated information and knowledge)</i>							
Opportunistic behaviour							
Opportunistic behaviour <i>(Self-interest seeking with guile)</i>							

Section D: Management of negative effects of cluster networking

What strategies your organisation adapt to manage and control these negative effects?


Negative effects	Management strategies/ Policies/ Mechanisms to reduce impact
Cost of maintenance	
Unnecessary obligation <i>(Unnecessary obligation that require continuous investment of time and resources)</i>	
Decision-making constraints	
Loss of objective <i>(Failing to pursue self-interest because making concessions to other individuals' interests or to the collective goals)</i>	
Groupthink <i>(A mode of thinking of a highly cohesive group, occurs when the group is under pressure toward uniformity, consequently, the group would not be able to assess alternative courses of action)</i>	
Restriction of novelty or diverse knowledge and unawareness of the necessity to change	
Inertia <i>(Resistance or difficulty to change i.e. network ties as a result of high level of attachment between members)</i>	
Exclusion of outsiders <i>(Exclusion of the new actor or the actor that is not a part of cluster)</i>	
Knowledge redundancy <i>(Repeated information and knowledge)</i>	
Opportunistic behaviour	
Opportunistic behaviour <i>(Self-interest seeking with guile)</i>	
Other:	


APPENDIX E: DESCRIPTION OF EACH CASE STUDY AND CLUSTER NETWORK


The description of each case study is gathered from a combination of secondary data and interviewee testimony. The description of each participant is derived from the interview. This provides a brief background to support the findings, discussion and understanding of the context (Gustafsson, 2017).

<p>National Herbal cluster:</p> <p>The National Herbal cluster officially formed in 2016, though a small group of associated entrepreneurs have been networking since 2011. Currently, the cluster consists of 26 entrepreneurs based across north eastern Thailand, although not all are active members. The aim of the cluster is to reduce the cost of production and improve production efficiency through the development of innovations, by adding value to products, and through expansion into international markets.</p>	
F1:	<p>F1 is the president of the National Herbal cluster. His company is medium-sized and situated relatively close to other members. He knew large numbers of members prior to the official establishment of the cluster, and continues to play a significant role in recruiting new members. He describes his contribution as providing new ideas, information and knowledge for the cluster, and has a close relationship with other cluster members.</p>
<p>Tapioca Starch cluster:</p> <p>Tapioca Starch cluster formed in 2009. It consists of 21 members situated across the country in locations selected by government agency invitation. The aim of the cluster is to increase industry competitiveness on the international market. The cluster has helped members to improve production efficiency and reduce the cost of production (including associated utility costs). However, the cluster is facing issues surrounding product diversity, production efficiency and competitive pricing of raw materials.</p>	
F2:	<p>F2 is a member of the Tapioca Starch cluster. His company was founded less than 10 years ago. The cluster has been operational for a similar time; however, F2 only became a member five years ago on receipt of an invitation from DIP. His company is situated in a more distant location than the majority of the members, but is still within an acceptable travel time. He occasionally attends meetings and participates in seminars/workshops. His company is technically medium-sized, though it is smaller than other members. He cites close relationships with certain</p>

	<p>cluster members, specifically those situated nearby. His motivation for participating is to obtain exclusive information, knowledge and support from government/supporting institutions, and to network with others in the industry.</p>
<p>Maha Sarakham Beef & Dairy Cattle cluster:</p> <p>The cluster is located in Maha Sarakham province, which is in the north eastern region of Thailand. The cluster comprises of two cooperative networks. There are 132 members in total, including all parties involved in the value chain (e.g. upstream, mainstream and downstream). The achievements of this cluster include the development of new dairy products, and of a feed ingredient that significantly improves the quality of dairy products while also reducing costs.</p>	
F3	<p>F3 is the new president of the Maha Sarakham Beef & Dairy Cattle cluster. His company is medium-sized, though is larger than the majority of other members. He described having close relationships with other members.</p>
F4	<p>F4 is a member and former president of the Maha Sarakham Beef & Dairy Cattle cluster. His company is medium-sized, though is larger than the majority of other members. He has been a member since the cluster was formed. He is described by others (F3) as having a comprehensive knowledge of the cluster, innovative new ideas and a useful knowledge-set. Other members tend to seek advice and assistance from him. He is therefore well-connected with other members. Furthermore, he described having a strong connection with researchers at a university, where many cluster innovations were co-developed.</p>
<div> </div> <p>Thai Leather cluster:</p> <p>The Thai Leather cluster was founded in 2006, and includes 24 companies invited by government agencies. The cluster is based primarily in Bangkok/Bangkok metropolitan district.</p> <p>The cluster was initially set up to help this sector recover from the financial crisis (i.e. Tom Yum Goong crisis). It encourages cooperation and collective action among members. Members of cluster include the entire value chain (e.g. upstream, mainstream and downstream). Initially, the cluster focused solely on traditional leather goods, later expanding to cover exotic skins (e.g. lizard, snake, stingray). Cluster activities</p>	

	include developing brand assets, and reducing the costs of production.
F5	F5 is a member of the cluster and ex-president of the Thai Leather cluster. His company is medium-sized, and situated in Bangkok (close to the majority of other members). He is an original cluster member, and introduced the concept directly from DIP. Therefore, he has a comprehensive understanding of the history and concept of the cluster network. He is described by other participants within the same cluster as playing a significant role in coordination between members, as well as between the cluster and supporting institutions. He described being well-connected with other members, and using this network to provide advice, information, knowledge and support on a consistent basis.
F6	F6 is a relatively new member of the Thai Leather cluster, having only joined three years ago. His business is small-sized, and is situated in Bangkok. He described having close relationships with some, but not all of the other members. He wishes to change some cluster activities (e.g. how the cluster showcases products), although he does not receive sufficient support from other members in order to implement these changes.
F7	F7 is a pioneering member, and is the current president of the Thai Leather cluster. Her business is small-sized, though her product range extends to exotic leather. Her business is located further away than other cluster members. Therefore, she often travels to attend meetings. She described having close relationships with other cluster members, as well as those from other small and medium-sized clusters.
 <p>Cancluster Cancluster was officially founded in 2008, though unofficial networking began in 2006. There are 28 members in total, including representatives from the entire value chain (e.g. upstream, mainstream and downstream). The cluster was formed by eight original members with the aim of reducing production costs. These companies later contacted a government agency (DIP) for further support. DIP saw the potential, establishing them as an official cluster in order to provide a higher calibre of consultancy and support. The aim of the cluster is to acquire competitive advantage, and to</p>	

	<p>develop the capability to respond to changing market demands (leveraging new technology). Cluster activities include agreements on raw material co-purchasing, and the sharing of raw materials and machinery. In terms of innovation, this cluster focuses primarily on processes that aim to reduce production costs or improve logistics.</p>
F8	<p>F8 is the president of the Cancluster. He is one of eight pioneering members that were networked prior to the official formation of the cluster. His business is medium-sized and situated very close to other cluster members. He described having close relationships with representatives from DIP, and contributing widely to the community (e.g. through hosting guest lectures and business seminars).</p>
	<p>1st Craft cluster</p> <p>1st Craft cluster was founded in 2009, with 30 initial members from various arts and handcraft companies across the country. Currently, there are 20 members. This reduced over time because of the geographical distance between members, and communication difficulties during the early stages of cluster formation. Cluster activities include the exchange of raw materials, increased collaboration between members, development of environmentally-friendly products, etc. The weaknesses of the cluster include the lack of expertise surrounding marketing, increased labour costs, lack of capital flow, and limited knowledge surrounding intellectual property.</p>
F9	<p>F9 has been president of 1st Craft cluster since it was founded. Her business is classified as small-sized. Her business is situated in a different region from other members. Nevertheless, she has played a coordinating role among members, as well as between the cluster and supporting institutions. She has collaborated with other members on several occasions, and described having close relationships with all members of the cluster.</p>
F10	<p>F10 is one of the pioneering members of 1st Craft cluster. Her business is classified as small-sized. Her business is situated in a different region from other members. She described having close relationships with other cluster members.</p>

F11	F11 joined 1 st Craft cluster three years ago. She knew a few other members beforehand, which enabled her to receive an invitation and recommendation with which to join this cluster. Her business is classified as small-sized and located in a different region from other cluster members. She described having close relationships with a limited number of other members.
<p style="text-align: center;">Eastern Parawood Product Cluster (EPPC):</p> <div style="display: flex; align-items: flex-start;">  <div> <p>EPPC was founded in 2004, containing 20 members based across the eastern region of Thailand. Members of the cluster include companies that use Heave Brasiliense (commonly referred to as the ‘rubber plant’) as a raw material. This cluster features members from across the entire value chain (e.g. rubber goods, particle board and furniture). The cluster focuses on initiating innovations surrounding product and process development.</p> </div> </div>	
F12	F12 has been a member of EPPC for nearly 10 years. His business is small-sized, and produces furniture made from Heave Brasiliense. He is situated close to the majority of other members. He described having close relationships with certain members (the longest-serving), and good relationships with other members.
F13	F13 has been a member of EPPC for over six years. She joined the cluster on the formation of her business. Her father is also a member of this cluster. Her business is located further from other cluster members. Her business is small-sized, and produces furniture from Heave Brasiliense. She described being resourceful in terms of assisting other members with design-related elements, which is a common weakness among cluster members.
F14	F14 is the president of EPPC. He has been a cluster member since it was formed. His business is medium-sized, and produces both floor boards and furniture goods derived from Heave Brasiliense. As president of cluster, he coordinates between members, and often assists other members in resolving a variety of issues. He described having close relationships with certain members, and good relationships with the rest of the cluster.




Lampang Ceracluster:

The Lampang Ceracluster was founded in 2004, and is recognised as one of the 20 most highly-competitive clusters in Thailand. Currently, there are over 200 members across the province of Lampang in the north of Thailand, where the raw material (white clay) is found. Ceramics manufactured in Lampang are well-known by foreign traders due to the high level of skill involved in the manufacturing process, and the low production costs. However, a change in the global economy and the entry of new competitors (e.g. China and Vietnam) into the ceramic market has pushed ceramic manufacturers to coalesce as a cluster. Cluster activities include co-innovation with a view to improving quality of raw materials, reducing production costs, and product showcasing.

F15	F15 has been a member of the Lampang Ceracluster for over three years. His business is small-sized. Unlike the majority of other cluster members, his business utilises paper mâché as a raw material. He stated that he chose to join this cluster based on his close proximity to other members. He described a minimal sense of belonging to the cluster, as he feels cluster activities are not relevant to his business. He described having close relationships with very few other members.
F16	F16 has been a member of the Lampang Ceracluster for nearly 10 years. Her business is a small-sized ceramic company located in Lampang. She described having good relationships with the majority of cluster members.
F17	F17 is the president of the Lampang Ceracluster. His business is a medium-sized ceramics company located in Lampang. He demonstrated a comprehensive understanding of the cluster concept. This is due to the company joining the cluster during the initial introduction programme. He coordinates between cluster members, as well as between the cluster and supporting institutions. He described having good or close relationships with all members, and is well connected with these members.

Bangkok Fashion Cluster:

This cluster is located in Bangkok and the Bangkok metropolitan region. There are 51 members in total. Members of the cluster include various brands with different designs

<p>and quality. There is limited communication, interaction and cooperation between members. Only a small group of members are still active within the cluster.</p>	
F18	<p>F18 is a member of the Bangkok Fashion Cluster. He joined the cluster less than five years ago. His business is small sized and locates in Bangkok. Due to the high level of diversity among cluster member, he described having close relationships only a few other participants (though, these members tended to cooperate). He described making a significant contribution to the provision of advice for retailers, where he has more experience than other members.</p>
F19	<p>F19 is the president of the Bangkok Fashion Cluster. His business is small-sized, and is located in Bangkok. He described having a close relationship with only a small number of cluster members. Similar to F18, he pointed out the issue with some members' willingness to participate in cluster-related activities. Though, he has a close relationship with other cluster members.</p>
<div style="display: flex; align-items: center;">  <div> <p>Thai Food Cluster:</p> <p>The Thai Food cluster was founded in 2003, and comprised one of the first group of clusters. It consists of 44 members from the food processing industry located in Bangkok and the Bangkok metropolitan area. The cluster helps to ensure all the products of members are internationally certified to global standards, such as HACCP, GMP, IFOAM, Organic, Halal, etc. The diversity of the product range makes it difficult for members or cooperate and coordinate efficiently, and to ensure that members gain an equal proportion of the benefits associated with cluster membership.</p> </div> </div>	
F20	<p>F20 has been the president of the Thai Food Cluster since its formation. His business is medium-sized, and is located in Bangkok (close to other members). His company is more advanced than other members' in terms of machinery and equipment, and has already begun exporting to an international market. He shares his business knowledge and expertise within the cluster. He described having close relationships with most other members.</p>
F21	<p>F20 has been a member of the Thai Food Cluster since the formation of the cluster. Her business is medium-sized, and is located in Bangkok (close to other members). She described having close relationships with only a few cluster members.</p>

Thailand Tea Cluster

Thailand Tea Cluster (TTC):

Thailand tea cluster (TTC) was officially founded in 2017. It was formed based on the well-established tea networks situated across two provinces: Chiang Mai and Chiang Rai (both in the northern region of Thailand). Currently, there are 20 members. The establishment of this cluster aimed to enable government agencies and other relevant institutions to provide better support to the industry. The aims of the cluster include the development of product and process innovation, exchange of information/knowledge between members, and expansion of the overall market.

F22	F22 is a member of TTC. While the official formation of TTC took place one year ago, he has been part of an unofficial network for nearly five years. His business is small-sized, and is located in Chiang Mai, alongside more than half of the other cluster members. His relationship with fellow members was described as being both close and personal.
F23	F23 is the president of TTC. He plays a significant role in the initial formation of this cluster network. Other members have endorsed him for the presidency. His business is small-sized, and is also located in Chiang Mai. As the president, he coordinates between clusters and supporting institutions, and is an organiser of activities within the cluster. He is well connected with all the members.