Brokerage Actors in Multinationals:
An Analysis of Four Practice Transfer Projects

Content

Abstract

This study contributes to our understanding of organisational practice transfer through networks. It specifically focuses on the transfer of organisational practices from Chinese owned firms headquartered in China to their subsidiary operations in the UK. The research proposes that in order to move our understanding of practice transfer in multinational firms forward, it is useful to use a network lens. The network lens allows us to consider knowledge exchange in a relational context which has traditionally focused on the structure of relationships between actors. People connecting these actors are known as brokerage actors, and such connecting activities are known as brokerage. This study extends the network perspective by examining the dynamics of networks and role of brokerage actors involved within networks during practice transfer. The overarching research question posed is: how do brokerage actors influence practice transfer outcomes in multinational companies? This overarching question is further broken into three sub-questions that are concerned with:

1) The dynamics within the network -the dynamics represent complex interactions among people during the process of practice transfer.

2) The structures which reveal the brokerage actors' roles within the network defined through their network position and the structure of their connections to others.

3) The performance outcomes associated with the brokerage actor roles – i.e. the influence of brokerage actors on the outcomes of the practice transfer project.

The underlying purpose and motivation behind this research is to improve our understanding of the role of brokerage actors in practice transfer by moving beyond the focus on network

structures as a whole and to look in detail at the structures between individuals in the network and how these might change as the demands of practice transfer change. Practice transfer refers to the transfer of understanding about a management policy or process from one part of an organisation to another. In the context of the work here the focus is on the transfer of Headquarters policies on staff relocation and product redistribution to UK subsidiaries in response to Brexit preparations. However, practice transfer is not merely a technical process, but involves people from different parts of the organisation working together to achieve it. Thus, these people can be understood as a network which represents the fabric of collaboration (i.e. relational collaborations) in practice transfer. Whilst, much of the existing work on networks has focused on their structural features, it is limited because it takes snapshots in time. This has meant we have a limited understanding of how network structures come into being and how the role of actors within the network may evolve over the course of practice transfer projects. By focusing on four practice transfer projects in two multinational firms, this work follows the development of the network structure from the outset to the conclusion of the project.

The research uses network theory and network analysis to scrutinize the research questions posed. Additionally, multi-source data from managers and employees was collected to measure practice transfer outcomes (success). The network data was used to generate additional data for regression modelling. The findings showed that, first, these practice transfer networks grew from simple structures through 'coupling' into complex structures. Second, three specific brokerage roles were identified, namely translating, bridging and embedding, and where undertaken by a wide number of network members. Third, the performance of these three network roles had a significant and substantial impact on the perceived measure of practice transfer success.

The research makes a key contribution to network theory by identifying how complex networks come into being through the roles undertaken by network members, who are the participants in the practice transfer projects including managers and staff from both headquarters and local subsidiaries. The research also makes a philosophical contribution to method. This research uses network analysis to analyse the collected data, then uses the network analysis results to test the regression modelling about the influences of brokerage actors on practice transfer outcomes. By doing this, network analysis is used as an extra layer of analysis to find out who are the brokerage actors in the practice transfer projects. Also, the differences between the brokerage actors' connections in the networks can be compared. Finally, the research makes a number of practice contributions by identifying the three types of roles required to support practice transfer, namely that of translating, bridging and embedding and suggests training and development to support employees would be helpful to ensure organisations are able to maximise their value from network collaborations. Further, the research showed that such roles are undertaken by a wider array of network members and not constrained to those in managerial positions demonstrating that the ability to collaborate through network relations is likely to be a key employee capability of value to firms.

Chapter 1 Introduction

1.1 Introduction

This research uses network analysis to investigate how brokerage actors help multinational companies to achieve practice transfer. The underlying purpose and motivation of this research are to advance knowledge in the area of how brokerage actors influence practice transfer outcomes. Practice transfer is defined as companies imitating the best internally existing practices in local sites at different locations through the recombination of internal knowledge (Szulanski, 1996; Jarrar and Zairi, 2000a). To achieve practice transfer, it requires some key actors to connect between headquarters and local sites (Rodan and Galunic, 2004; Mitchell and Boyle, 2015). These key actors connecting headquarters and local sites are brokerage actor, and these key actors and their collaborative connections are considered as networks (Burt, 2007 and 2015). In the existing theories, it is unclear how brokerage actors connect participants in practice transfer, how brokerage actors are connected with each other to work together, and what the brokerage actor roles and influences are. To find out this, it requires analysis to focus on networks at the inter-personal level, especially the connections between participants rather than the participants themselves. Thus, this study uses networks to represent the structures and dynamics of collaborations among people in practice transfer. In the later literature review, this research identifies three research questions as below.

Research Question 1: What are the dynamics of brokerage actors in practice transfer?

Research Question 2: What are the roles and structures of brokerage actors in practice transfer?

Research Question 3: To what extent can brokerage actors influence the results of practice transfer?

Through a network analysis of four recent practice transfer projects, this study explores the structures and dynamics of brokerage actors, and examines the relationship between brokerage actors and the practice transfer outcomes. In particular, this study analyses the network characteristics among people who participate in practice transfer projects. Thus, this network approach can be helpful to provide understandings about how to organise practice transfer activities, improve collaborations, and reshape the collaborative connections, also known as ties (Burt, 2007 and 2015) between participants.

1.2 Issues in practice transfer

This section provides a brief discussion about this study's context. This discussion includes what practice transfer is, the barriers to practice transfer, the teamwork and information exchange issues, and the roles of brokerage actors. This discussion begins with the barriers to practice transfer and suggests how they are related to the teamwork and information exchange. Then this study examines how brokerage actors can be used as a potential solution to improve the teamwork and information exchange in practice transfer. Although a more detailed discussion about the context will be provided in Chapter 2, this section highlights the general context of this research below.

Practice transfer is defined as companies imitating the best internally existing practices in local sites at different locations or sub-organisations (Szulanski, 1996; Jarrar and Zairi, 2000a; Fortwengel, 2017). It involves the sharing of information, and the mobilisation of the information to create new knowledge about how the organisation operates. This new knowledge may be embodied in new policies, management processes or frameworks, or may over time be captured within the informal norms of how an organisation operates. Thus, practice transfer does not happen without exchanging information (Rogers, 1995; Chiang et al., 2017; Geary et al., 2017). However, practice transfer is more than merely the exchange of information. The social process of information exchange means that new knowledge can be created, or combined in novel ways to create new solutions. Writers such as Drucker (1985) therefore see practice transfer as more than mimicking information. Instead he argues that practice transfer in multinational firms is concerned with the transfer of new products or services ideas from one country to another, but also creating new ways of production, finding new sources of supply, or even identifying new markets. Thus, practice transfer is different from copying existing practice (Badaracco, 1991; Krishnan and Ulrich, 2001; Harzing, et al., 2016) and instead can involve the creation of something new based upon the knowledge and learning from other parts of the business. In this way practice transfer is important since it is a way of achieving competitive success (Drucker, 1985; Haak-Saheem, et al., 2017) and enhancing organizational performance (Tsai and Ghoshal, 1998; Reagans and Zuckerman, 2001; Buchmann and Pyka, 2015). In sum, practice transfer is important because it creates knowledge to achieve competitive success.

Some barriers are inherent in practice transfer. Practice transfer is characterised by: (1) diverse professionals with different skills and knowledge (Burt, 2004; Rodan and Galunic, 2004; Hansen, 2005; Ling and Juan-ru, 2017), (2) hierarchical organisation structure (Levin

and Cross, 2004; Kianto et al., 2017), and (3) high risk in adopting new practices (Zaheer, et al. 2010; Björkman, and Welch, 2015). All these characteristics are central to organising teamwork and information exchange, a key issue in managing practice transfer. Management of teamwork and information exchange have become a key issue in practice transfer (Burt, 2007 and 2015). The analysis of teamwork and information exchange is crucial to understand the structures of business activities (Borgatti, 2011; Hollenbeck and Jamieson, 2015). Moreover, some research focused on analysing teamwork relations in practice transfer (Levin and Cross, 2004; Hansen, 2005), whereas other studies suggested that the greatest part of communication in practice transfer occurs when people from different organisations working together (Reagans and McEvily, 2003; Rodan and Galunic, 2004; Zaheer, et al. 2010; Kianto et al., 2017). Teamwork in practice transfer involves people with varying ideas, education backgrounds, and shared responsibility and credit. And information exchange is one of the common forms of interaction between people in teamwork (Rogers, 1962 and 1995). However, a question raised here, is how to organise information exchange and teamwork in practice transfer?

Information exchange and teamwork can be analysed in networks (Borgatti, 2011; Hollenbeck and Jamieson, 2015). Networks structure the flow of information exchange and teamwork among people. The effects of interpersonal networks on practice transfer have been widely observed. Between 2000 and 2010 (Borgatti, 2011), the number of papers relating to this topic published each year in ABS (Association of Business Schools) ranked journals had increased from 29 to 91. It is now well accepted that there is a strong relation between interpersonal networks and practice transfer outcomes (Hollenbeck and Jamieson, 2015). Owen-Smith and Powell (2004) conducted research on collaboration among 482 dedicated biotechnology firms for the period from 1988 to 1999. They found that there are strong

relations between the network patterns (such as centrality and density) and individual performance outcomes. However, networks with participants from different organisations as a whole have rarely been studied (Burt, 2007 and 2015).

The importance of brokerage actors in networks has been recognised by scholars (Burt, 1992 and 2004; Podolny et al., 1996; Reagans and Zuckerman, 2001; Tsai, 2001; Hollenbeck and Jamieson, 2015). A network consists of participants in a given practice transfer project as nodes, and teamwork and information exchange as relational ties between the nodes. Such networks represent the complex fabric of collaborations in practice transfer, especially the collaborations between different professionals. Practice transfer usually involves people from different organisations and with different skills. Collaborations crossing organisational and knowledge boundaries between people can help to achieve practice transfer (Rogers, 1995). However, there is a gap in the existing theories about how brokerage actors in networks influence practice transfer outcomes (Burt, 2007 and 2015). Thus, this research is to improve the understanding of brokerage actor influences on practice transfer outcomes. This research also aims to explore how people collaborate with each other in practice transfer. The lack of understanding about large-scale reliance on collaborations between headquarters and local subsidiaries reflects a fundamental and pervasive concern with managing practice transfer. Therefore, this study aims to develop a network approach for managing collaborations in practice transfer.

As the discussion above indicates, practice transfer is complex and difficult to manage. Managing teamwork and information exchange between participants from different organisations is crucial to the success of practice transfer projects. However, this area has

rarely been studied (Burt, 2007 and 2015). Therefore, it requires new theories, models, tools and techniques for managing practice transfer.

1.3 Theoretical gap

This study fills the gap in how brokerage actors in networks have impacts on practice transfer outcomes. A network represents collaborations at the inter-personal level. At this level, there is a lack of understanding of what the network patterns are and how the inter-personal level collaborations affect practice transfer outcomes (Borgatti, 2011). The inter-personal level analysis is defined as analysis using the connections among individuals as the analysis unit, rather than the individuals themselves (Borgatti, 2011; Hollenbeck and Jamieson, 2015). The inter-personal level analysis is important, since it can provide understandings about the complex fabric of collaborations in practice transfer, especially the collaborations between different professionals (Hollenbeck and Jamieson, 2015). Managing the collaborations between people from different organisations is a challenge in practice transfer (Burt, 2007 and 2014; Aalbers, et al., 2016; Iacobucci and Hoeffler, 2016). As mentioned in the last section, practice transfer has large-scale reliance on collaborations between headquarters and local subsidiaries. In the context of this research, headquarter and local subsidiaries need to work together to achieve practice transfer. Previous studies argued that the ability of practice transfer depends on not simply budget, previous experience, and access to the required resources, but rather how practice transfer projects are organised as networks (Burt, 1992 and 2004; Podolny et al., 1996; Reagans and Zuckerman, 2001; Tsai, 2001; Hollenbeck and

Jamieson, 2015). Thus, the gap in the theories is how these collaborations are organised between people from different organisations. This gap is elaborated in details in Chapter 2.

Previous research in practice transfer networks has mainly focused on the types and characteristics of network relations among people that facilitate or impede practice transfer. This body of research has focused on varying subsets of relations in networks. Some research has focused on analysing inter-organisational relationships (Powell et al., 1996; Hansen, 1999; Tsai, 2001; Ling and Juan-ru, 2017), whereas other studies have focused on analysing the properties and nature of relations (Gulati, 1999; Levin and Cross, 2004; Hollenbeck and Jamieson, 2015). However, this body of research has not fully analysed the various structures of networks at the inter-personal level. This yielded an incomplete understanding of what particular network structures at inter-personal level can affect practice transfer.

Although previous research has demonstrated some relationships between network structures and practice transfer outcomes, few studies have explicitly examined the relationship between network structures and practice transfer outcomes. The distinctive characteristic of this research area lies in how it draws on the structures of networks in explaining outcomes. For example, the connectivity of a given individual, is the structural property most often associated with power (Brass, 1984), decision making (Friedkin, 1993), and creativity (Ibarra, 1993, Burt, 2007). From this perspective, each individuals' network connection structures can be advantages (Burt, 2007), or disadvantages (Krackhardt and Porter, 1986). However, few studies have examined the relationship between the overall network structures and outcomes in practice transfer projects.

As discussed above, a gap in the theories is how brokerage actors' network structures can influence practice transfer outcomes. Burt (2007) suggested that people who occupy central network positions can act as brokers to allow participants to get access to the information and resources particular to their needs. Other studies suggested that fully connected networks are more efficient in getting access to information and resources in practice (Uzzi, 1996 and 1999). It is not clear what kind of network structures fit practice transfer. Also, to what extent these network structures can influence practice transfer outcomes, is not clear yet (Burt, 2007).

Thus, this study investigates how brokerage actors in networks influence practice transfer outcomes. Network analysis enables the analysis of the fabrics of collaborations between the participants in practice transfer and the quantification of network structures. This can help to find out who the brokerage actors are. Data from four practice transfer projects are analysed to explore that 1) what are the patterns of network dynamics in practice transfer, 2) what are the patterns of network structures in practice transfer, and 3) the relationship between networks and practice transfer outcomes. The result of this research demonstrates the importance of brokerage actors in practice transfer, meanwhile, contributes to the literature on networks.

1.4 Aim of the study

The last section pointed out the gap in the theories about brokerage actors in practice transfer. This study aims to fill the gap, which is how brokerage actors in networks have impacts on

practice transfer outcomes. To achieve this aim, this study develops three questions in the later literature review: 1) What are the network dynamics patterns in practice transfer? 2) What are the network structure patterns in practice transfer? And 3) how the network structures influence practice transfer outcomes? These three questions are based on network theories (Burt, 2006 and 2015 and Uzzi, 1996 and 1999), which covers three objectives as below. First, there may be various network changes in the dynamics that exist in practice transfer processes, which need to be explored. Second, the structures of networks may be associated with providing new information, proposing, and supporting and confirming new practices, which need to be confirmed. Third, the better-balanced network structures (bridging and also bonding people together) in practice transfer processes may be associated with the outcomes, which need to be tested.

This study is to explore how practice transfer processes at the inter-personal level are organised and how they affect the outcomes. As mentioned in section 1.2 and 1.3, the implications of studying practice transfer processes at the inter-personal level has been widely recognised, as it can improve understandings in how practice transfer can be better organised. Current research has only focused how budget, previous experience, individual characteristics, and access to resources influence practice transfer outcomes, rather than the inter-personal level influences of practice transfer processes on the outcomes. Also, traditional analysis approaches are incapable of analysing the processes of practice transfer. Network analysis has been suggested as a better tool to understand about how practice transfer activities are organised. Thus, this study employs this approach to explore the processes of practice transfer.

1.5 Contributions

The area of inquiry is of great significance for how practice transfer can be achieved through brokerage actors in networks. This research contributes to both the theories of brokerage actors and managing practice transfer in multi-national companies. As mentioned in Section 1.2 and 1.3, the importance of practice transfer has been recognised by scholars (Drucker, 1985; Tsai and Ghoshal, 1998; Reagans and Zuckerman, 2001; Buchmann and Pyka, 2015; Haak-Saheem, et al., 2017). However, scholars do not know much about how practice transfer projects are organised, especially the structures of teamwork and information exchange in practice transfer. Previous research has only focused on the effect of innovative work behaviour in explaining practice transfer outcomes. Moreover, previous research in this area has not identified the details about brokerage actors connecting headquarters and local subsidiaries in practice transfer. Practice transfer is complex since the participants are from different organisations and have various skills and knowledge backgrounds (Coleman et al., 1966; Webster, 2006; Burt, 2007; Ling and Juan-ru, 2017). The importance of managing the collaborations among them has been recognised by scholars (Burt, 1992 and 2004; Podolny et al., 1996; Reagans and Zuckerman, 2001; Tsai, 2001; Kianto et al., 2017). As a result, ineffective communication in practice transfer activities can lead to misunderstanding of information and terms about new practices (Burt, 2007). In order to analyse this, this study adopts network analysis to investigate the patterns of interpersonal-level collaboration network in practice transfer projects. By doing this, this study contributes to theories about how to organise practice transfer at the inter-personal level.

This study also contributes to management practices. The results of this study can be used as guidance for managing practice transfer projects. The difficulties of achieving practice

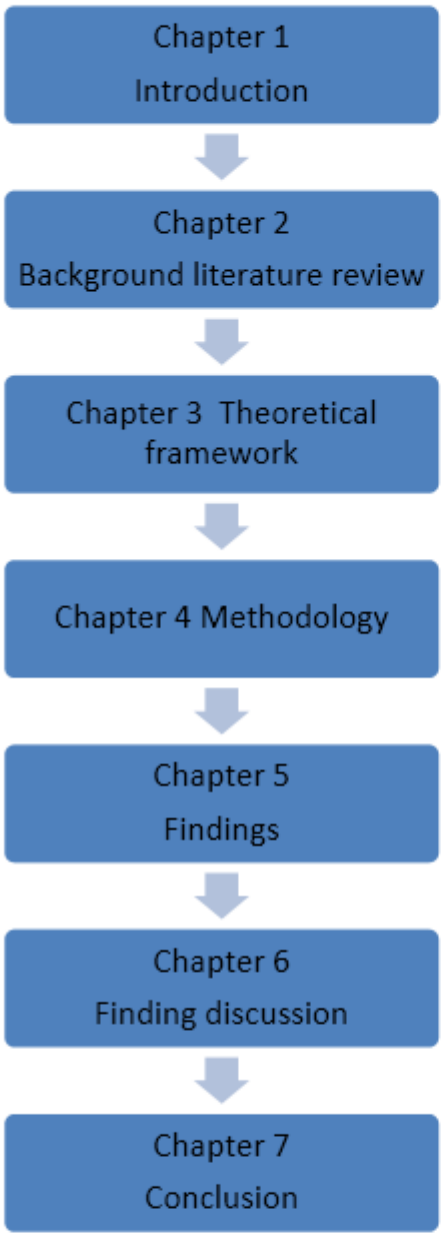
transfer have been widely recognised. Especially, how do managers organise people from different organisations to work together? How to manage information exchange between those two professional groups in practice transfer? And how do managers organise the structure of practice transfer teams? Networks represent the structure of interpersonal level information exchange and teamwork. Allen and Cohen (1969) reported that about 40 percent of the ideas considered as potential solutions stemmed from interpersonal level information exchange and teamwork. Network analysis as a management tool provides analysis on the interpersonal level interactions and complexity of network structures in practice transfer projects (Borgatti, 2011; Hollenbeck and Jamieson, 2015). This approach can provide significant benefits to management practices. Thus, this study contributes to management practices by proposing an approach for the analysis and visualisation of practice transfer networks.

1.6 Structure of thesis

The structure of the thesis is presented in Figure 1.1 and organised as follows. Chapter One reports the background, the significance of brokerage actors in practice transfer networks, an overview of underlying theories, and the overall purpose of the study. In general, Chapter One provides an outline of the thesis and aim of this study. Chapter Two provides a more detailed literature review about practice transfer and brokerage actors. This chapter covers what practice transfer and brokerage actors are by definitions. And it also focuses on the

characteristics of practice transfer and brokerage actor. It then highlights the arguments about practice transfer and brokerage actors in the previous literatures, and how this study may respond to these arguments by conducting an analysis on networks. Chapter Three is to provide a theoretical framework as a link between the earlier contextual chapters and the later primary research chapters. This Chapter discusses how brokerage actors in practice transfer networks have an impact on the outcomes. The discussion focuses on network theories and argues that the variety of brokerage actor's connections results in three roles of brokerage actors, which can influence practice transfer outcomes. The Chapter Three also explains the theoretical position of this research, which consists of theories about network dynamics, structures and influences. Chapter Four discusses why this study adopts network analysis as a methodological choice and then discusses the approaches that are adopted. This chapter covers the research design, data collection, research instruments, the selection of measurements, and data analysis. It then outlines the methodological issues which likely arise in the data collection and analysis and how to respond. The research findings are shown in Chapter Five. This chapter presents and analyses the primary research findings. Practice transfer projects are analysed by using network analysis. Then, this chapter provides network snapshots at each stage of practice transfer to show the network dynamics, the results of network analysis to show brokerage actor's network structures, and the regression modelling results to show the influences of brokerage actors on practice transfer outcomes. Chapter Six provides a discussion relating to the finding and previous theories. Finally, Chapter Seven summarises the study and provides the implications, limitations and future research directions.

Figure 1.1 Structure of the thesis



1.7 Summary

This chapter has provided an overview of this study. This overview will be expanded into details in the following chapters. The brief discussions in this chapter will be expanded into debates between different theories. And then this study's findings will provide supports and arguments to these theories and suggests further developments in theory and practice.

This chapter emphasised the importance of this study. This study is important to the future development of theory and practice. This chapter has also marked the direction of this research. In this research, brokerage actors in practice transfer networks will be explored. The next chapter will turn the attention to the context of this study.

Chapter 2 Literature review: the context of practice transfer and brokerage actors

2.1 Introduction

This research aims to examine the relations between brokerage actors and practice transfer outcomes in multinational companies. To do so, it requires combining understanding of the practice transfer process from the field of project management in practice transfer with work from the field of knowledge management which focuses on the role of key actors in practice transfer (Rodan and Galunic, 2004; Mitchell and Boyle, 2015). Project management in practice transfer has led to the development of stage models mapping out the flow of work activities, and the resources input required and allocation of resources (Gulati, 1999; Kianto et al., 2017). However, less attention has focused on the knowledge management roles performed by key actors, or the structure of the relationships between key actors engaged in the work of practice transfer (Hollenbeck and Jamieson, 2015; Ling and Juan-ru, 2017). By contrast, the knowledge management literature focuses on these precise issues. Because this research combines evidence and arguments from two different bodies of work, namely,

knowledge management and project management, this chapter aims to connect the related discussions. Thus, this chapter begins with a discussion about the context of practice transfer. Then, the discussion will move to look more specifically at brokerage actors in practice transfer activities. As the research is focused on practice transfer in a multinational firm context, then it is important to understand the opportunities and challenges associated with knowledge transfer across national borders. As such, the chapter mobilises the international human resource management perspective of practice transfer and argues how the considerations of brokerage actors can improve our understanding of practice transfer related issues.

2.2 What is practice transfer and why is it important

In order to discuss the definition of practice transfer further, Table 2.1 summarises the previous practice transfer research conducted in different countries and industrial sectors. Table 2.1 shows that research in the area of practice transfer covered various sectors including information technology, telecommunication, mining, energy, healthcare, banking, manufacturing, and service sectors. Previous research (Chiang and Birtch, 2010 and 2012; Geary et al., 2017; Davies, et al., 2019) suggested that there is no big differences between practice transfer in different sectors. Chiang et al. (2017) suggested that the contextual influences in practice transfer is overrated, in addition, the contextual influences is what practice transfer is dealing with rather than a factor deciding what practice transfer is. Thus,

in terms of the nature of practice transfer, there is no significant difference between different sectors.

Table 2.1 Practice transfer research in different sectors

Practice transfer research	**Sector and method**	**The definition of practice transfer/Suggestions about the meaning of practice transfer**
Szulanski (1996)	Information technology sector. Questionnaire survey and regression modelling conducted with 122 practice transfers projects in eight companies.	Practice transfer is companies imitating the internally existing best practices in local sites at different locations.
Edwards (1998)	Manufacturing sector Single case study with a multinational company operating in the UK	Practice transfer is a diffusion process, which is not only from domestic to overseas subsidiaries, but also from the overseas to the domestic plants.
Tayeb (1998)	Manufacturing sector Single case study with a US company operating in Scotland	Practice transfer is to transfer the best-fit practice, which is more prone to local business environmental influences than the overall company's policies and strategies.
Purcell et al. (1999)	Manufacturing and service sectors Questionnaire survey and regression modelling with 69 Japanese subsidiaries operating in Australia	Practice transfer is companies imitating the internally existing best practices in local sites at different locations.
Jarrar and Zairi (2000a and 2000b)	Cross different sectors Questionnaire survey and regression modelling with 227 companies from 32 countries	Practice transfer is not only about imitating the proven best practice, but also good practices and ideas.
Hayden and Edwards (2001)	Manufacturing sector Single case study with a Swedish multinational company	Practice transfer is to introduce the best-fit practices, which are decided by managerial perceptions of the strengths and weaknesses

		of different national business systems.
Tempel (2001)	Cross different sectors Multiple case studies with British and German multinational companies	Practice transfer is about converting the best practice to fit to the local business environment.
Gamble (2003)	Retail sector Single case study with a UK retail company operating in China	Practice transfer is to combine the best and the best-fit practice.
Schmitt and Sadowski (2003)	Cross different sectors Questionnaire survey and regression modelling with 297 employees in US and British subsidiaries operating in Germany	Practice transfer is to minimize the costs of centralisation and decentralisation of cross-country practices.
Myloni et al. (2004 and 2007)	Cross different sectors. Questionnaire survey and regression modelling with 80 European and US multinational companies	Practice transfer is that subsidiaries (as the local actors) change practices to the parent company's global standard.
Saka (2004)	Cross different sectors. Multiple case studies with 3 Japanese multinational companies in the UK	Practice transfer is about the interplay between headquarters and subsidiaries to bridge the institutional differences.
Edwards et al. (2005)	Cross different sectors. Multiple case studies	Practice transfer is not only from headquarters to subsidiaries, but also between subsidiaries of the same firm.
Rose and Kumar (2007)	Manufacturing sector. Mixed method, an analysis of the policies and practices in 69 Japanese subsidiaries	Practice transfer can be "opportunist" management which takes account of the contextual limits and seeks to control the subsidiaries' operations.
Ross (2008)	Telecommunications sector. Multiple case studies in Czech	Practice transfer is a strategic movement to improve productivity by transferring the best practice in the multinational company.
Thory (2008)	Energy sector Multiple case studies with 2 French companies in Scotland	Practice transfer is not only from headquarters to subsidiaries, but also between subsidiaries of the same firm.
Al-Husan et al. (2009)	Manufacturing sector. Single case study	Practice transfer is to bridge the differences in the

		understandings of new practices between headquarters and subsidiaries.
Meardi et al., (2009)	Manufacturing sector. Multiple case studies	Practice transfer is to adopt the best-fit practice rather than imitate the best practice.
Chiang and Birtch (2010 and 2012)	Banking sector Questionnaire survey and regression modelling with 1749 employees in multinational companies from seven countries across Europe, Asia, and North America	Practice transfer is to bridge the differences in organisational, institutional, and economic factors between headquarters and subsidiaries, and culture differences in assertiveness, uncertainty avoidance, collectivism, and power distance are not important.
Edwards et al. (2010)	Cross different sectors. Questionnaire survey and regression modelling with 500 employees worldwide.	In practice transfer, foreign subsidiaries can also be the origins for practices subsequently transferred across the multinational company.
Edwards and Tempel (2010)	Manufacturing sector. Multiple case studies	Practice transfer is a diffusion process including both 'between headquarter and subsidiary' and 'between subsidiaries of the same firm'.
Kahancová (2010)	Manufacturing sector. Single case study	Practice transfer is about organising communications between the headquarters and local actors while implementing new practices.
Sippola (2011)	Manufacturing sector. Multiple case studies with 4 multinational companies	Practice transfer is to localise the best-fit practices rather than the best practice in multinational companies.
Vo and Stanton (2011)	Cross different sectors. Multiple case studies with eight multinational companies for Japan and the US	Practice transfer is to localise practices in their subsidiaries abroad.
Lertxundi and Landeta (2012)	Manufacturing sector. Questionnaire survey and regression modelling with 58 Spanish multinational companies	Practice transfer is that companies export their practices to their subsidiaries abroad, and culture differences are not important.
Chung et al. (2014)	Cross different sectors.	Practice transfer is about

	Multiple case studies with nine South Korean multinational companies	localisation and global standardisation of new practices.
Edwards et al. (2015)	Cross different sectors. Questionnaire survey and regression modelling with 883 multinational companies	In practice transfer, subsidiaries play the key roles and share practices with the rest of the company.
Ahlvik et al. (2016)	Cross different sectors. Questionnaire survey and regression modelling with 105 subsidiaries from 12 Nordic multinational companies	Practice transfer is to align subsidiary-headquarter relations in three aspects: the extent of formal control from headquarter, interpersonal communication, and subsidiary's strategic capabilities.
Harzing et al. (2016)	Manufacturing sector. Questionnaire survey and regression modelling conducted with 800 multinational company subsidiaries in thirteen countries	Practice transfer is to bridge the knowledge flow between headquarters and subsidiaries.
Haddock-millar et al. (2016)	Service sector. Single case study with a US restaurant chain multinational corporation	Practice transfer is to localise the best-fit practices in different contexts.
Chiang et al. (2017)	Conceptual study	Practice transfer is to introduce new practices which can improve the competitiveness and performance of multinational companies and their subsidiaries.
Danese et al. (2017)	Energy sector. Multiple case studies with six practice transfer projects	Practice transfer is to introduce new practices and overcome the stickiness to the old practices.
Fortwengel (2017)	Manufacturing sector. Multiple case studies, 67 semi-structured interviews in two companies	Practice transfer is to implement the internal and external fit practice. Internal fit describes that the practice is aligned with organisational goals and supported internally. External fit refers to that practice can gain support and legitimacy in the subsidiary's local business environment.
Geary et al. (2017)	Mining sector.	Company imposes the best

	Single case study	practice on all of its subsidiaries, however, the best practice should be selected from a contingency perspective to fit to subsidiaries' context.
Haak-Saheem et al. (2017)	Cross different sectors. Questionnaire survey and regression modelling with 815 employees in the UAE	Practice transfer is about knowledge sharing behaviours at the individual level.
Ling and Juan-ru (2017)	Manufacturing sector. Secondary data and simulation	Practice transfer consists of people with different roles providing complementary knowledge to each other in the process.
Kianto et al. (2017)	Cross different sectors. Questionnaire survey and regression modelling with 180 randomly selected employees in multinational companies	Practice transfer is about knowledge sharing and the result is decided by participants' intelligence and knowledge.
Stone (2017)	Conceptual study	Practice transfer's focus is the translation and localisation process.
Oppong (2018)	Conceptual study	Practice transfer's is about finding the best-fit practice which favours headquarters' policies and practices.
Davies, et al. (2019)	Healthcare sector. Single case study	Practice transfer is about rigorously assessing the new practice's potential.
Nadayama (2019)	Information technology sector. Single case study	Practice transfer is to initiate internal knowledge transfer within the multinational company and overcome subsidiary isolation.

At the beginning of Table 2.1, Szulanski (1996) defined practice transfer as companies imitating the internally existing best practices in local sites at different locations (such as branches) or sub-organisations (such as functional departments like human resource, finance, logistics and so on). The same definition of practice transfer was confirmed by Purcell et al. (1999), they used questionnaire survey and regression modelling with 69 Japanese subsidiaries operating in Australia in both of the manufacturing and service sectors.

Nevertheless, Jarrar and Zairi (2000a and 2000b) argued that the best internally existing practices are ambiguous and suggested using the proven best practice based on analysis of performance data in the definition. Later research (Kianto et al., 2017) argued this definition only including imitating the best practice within a multinational organisation, however, not including the critical aspects of organisational knowledge identification and diffusion. They suggested that practice transfer is benchmarking the best practice within a multinational organisation through organisational knowledge identification and diffusion (Kianto et al., 2017). Kianto et al. (2017) used questionnaire survey and regression modelling with 180 randomly selected employees in multinational companies cross different sectors, they argued that practice transfer is about knowledge sharing and the result is decided by participants' intelligence. Ling and Juan-ru (2017) also argued that practice transfer is multinational organisations imitating the proven best practice through the recombination of internal knowledge between headquarters and local sites (Ling and Juan-ru, 2017). In these definitions, it is clear that practice transfer is imitating the best practice through recombining the internal knowledge. However, it is not clear what the best practice and recombining the internal knowledge is. Thus, the following paragraphs focuses on these two unclear points in the definition of practice transfer, 1) the best practice and 2) recombining the internal knowledge in practice transfer.

The definition of practice transfer highlights imitating the best practice at different locations (Szulanski, 1996; Jarrar and Zairi, 2000a and 2000b). However, as Table 2.1 shows, this was argued by scholars, whether the best practices identified by multinational companies are the best (Kianto et al., 2017). In order to find out the meaning of best practice, seven case studies were conducted by Jarrar and Zairi (2000a) in large multinational companies including Texas

Instruments, Chevron, Rank Xerox Corporation, Hues Space and Communications, Hewlett Packard, Royal Mail, and Nationwide Building Society. The results suggested that practices articulated as the best or exemplary rarely existed in these companies. They suggested the multi-level meaning of best practice as follows. 1) Unproven good idea: makes sense intuitively and have a positive impact on business performance potentially, but not supported by data yet. Once it is supported by evidences or data, it could be implemented in the company. 2) Good practice: technique, procedure, or policy that has been used and improved business performance, for example, increasing financial returns, reducing the operational costs, increasing the scale of production, and increasingly satisfying customers and stakeholders' needs, but not compared with other good practices yet to determine which one is better. 3) Proven best practice: a good practice (as defined in the point 2 above) that has been compared and determined to be better than the other good practices, based on comparison of business performance data. To further confirm this multi-level meaning of best practice, a questionnaire survey was conducted by Jarrar and Zairi (2000b) with 227 companies from 32 countries. The results confirmed the multi-level meaning of best practice, as that practice transfer is not only about imitating the proven best practice, but also good practices and ideas.

Nevertheless, these definitions of practice transfer in Table 2.1 (Szulanski, 1996; Jarrar and Zairi, 2000a and 2000b) were argued by scholars (Haddock-millar et al., 2016; Fortwengel, 2017; Geary et al., 2017; Stone, 2017; Oppong, 2018; Davies, et al., 2019; Nadayama, 2019), which suggested practice transfer is contextual. Geary et al. (2017) used a case study to argue that the company imposes the best practice on all of its subsidiaries, however, the best practice should be selected from a contingency perspective to fit to local subsidiaries' context.

Also, in the previous research, Tayeb (1998) suggested that practice transfer is to transfer the best-fit practice to the local context. Tayeb (1998) conducted a case study with a US company operating in Scotland and found that the company's practice transfer from the US to Scotland is more prone to local business environmental influences than the overall company's policies and strategies. Similarly, Hayden and Edwards (2001) conducted a case study with a Swedish multinational company operating overseas and found that the company's practice transfer is to introduce the best-fit practices to the local business environment, which are decided by the strengths and weaknesses of different national business systems. Furthermore, Tempel (2001) conducted multiple case studies with British and German multinational companies cross different sectors, and suggested that practice transfer is about converting the best practice to fit to the local business environment. Similarly, Gamble (2003) conducted a case study with a UK retail company operating in China, and the results suggested that practice transfer is to combine the best practice with the best-fit practice, otherwise, the best practice alone can rarely work. Meardi et al. (2009) and Sippola (2011) confirmed this by multiple case studies, they suggested that practice transfer is to covert and adopt the best-fit practice rather than only imitate the best practice. Similarly, Vo and Stanton (2011) used multiple case studies with eight multinational companies for Japan and the US across different sectors, they suggested that practice transfer is to localise practices in their subsidiaries abroad. Haddock-millar et al. (2016)'s conducted a case study about how a US chain of restaurants transfer its practices overseas, they also argued that practice transfer is to localise the best-fit practices in different contexts, rather than imitate the best practice. Similarly, Stone (2017) argued that practice transfer's focus is the translation and localisation process. Fortwengel (2017) conducted multiple case studies with 67 semi-structured interviews in two companies in the manufacturing sector, the results described practice transfer as implementing the internal and external fit practice. Internal fit describes that the

practice is aligned with organisational goals and supported internally. External fit refers to that practice, which can gain support and legitimacy in the subsidiary's local business environment. In addition, Oppong (2018) suggested that practice transfer is about transferring the best-fit practice to the local business environment, which also favours headquarters' policies and practices. Thus, practice transfer is not only about imitating the best practice, but also to localise the practice to be the best-fit.

At the beginning of this section, this study highlighted two key points in the definition of practice transfer, 1) the best practice and 2) recombining the internal knowledge in practice transfer. The last few paragraphs discussed the first point, the following paragraphs focus on the second point. Practice transfer is to recombine the internal knowledge in practice transfer, however, it is not clear about 'whose' internal knowledge to recombine, namely, the origin and host (Edwards, 1998). Some studies (Schmitt and Sadowski, 2003; Rose and Kumar, 2007; Ross, 2008; Lertxundi and Landeta, 2012) suggested the recombination of internal knowledge is mainly based on the headquarters' knowledge. Schmitt and Sadowski (2003) conducted questionnaire survey and regression modelling with 297 employees in US and British subsidiaries operating in Germany, their results showed that practice transfer is headquarters controlling the costs of centralisation and decentralisation through cross-country practices. Similarly, Rose and Kumar (2007) conducted an analysis of the policies and practices in 69 Japanese manufacturing subsidiaries by using mixed methods, their results suggested that practice transfer can be "opportunist" management which takes account of the contextual limits and seeks to control the subsidiaries' operations. Ross (2008) conducted multiple case studies in the Czech telecommunications sector, the results suggested that practice transfer is headquarters' strategic movement to improve productivity by transferring

the best practice. This is also supported by Lertxundi and Landeta (2012) by conducting a questionnaire survey and regression modelling with 58 Spanish multinational companies in the manufacturing sector, their results suggested that practice transfer is when companies export their practices to their subsidiaries abroad. Similarly, Chung et al. (2014) used multiple case studies with nine South Korean multinational companies cross different sectors, their findings suggested that practice transfer is headquarters' movement about localisation and global standardisation of new practices. Chiang et al. (2017) suggested that practice transfer is headquarters' strategic movement to introduce new practices which can improve the competitiveness and performance of multinational companies and their subsidiaries. Davies et al. (2019) conducted a case study in the healthcare sector, they suggested that practice transfer is about headquarters rigorously assessing the new practice's potential. In addition, Nadayama (2019) used a case study in the information technology sector to show that practice transfer is about headquarter initiating internal knowledge transfer within the multinational company and overcoming subsidiary isolation. Thus, practice transfer can be a strategic movement initiated by headquarters.

In contrast to headquarter-led practice transfer, some studies suggested that the recombination of internal knowledge in practice transfer is not only based on the headquarters' knowledge, instead, subsidiaries can play key roles (Edwards, 1998; Myloni et al., 2004 and 2007; Edwards et al., 2005; Edwards et al. 2010). Edwards (1998) conducted a case study with a multinational company operating in the UK and suggested that practice transfer is not only from domestic headquarters to overseas subsidiaries, but also from the overseas to the domestic plants, which is a diffusion process instead. This is supported by other studies, Myloni et al. (2004 and 2007) conducted questionnaire survey with 80 European and US

multinational companies, their results showed that subsidiaries as the local actors change practices to the parent company's global standard in practice transfer. Edwards et al. (2005) also conducted multiple case studies to show that practice transfer is not only from headquarters to local subsidiaries, but also between subsidiaries of the same firm. Similarly result was found by Thory (2008), who conducted case studies with two French companies in Scotland's energy sector. Also, Edwards and Tempel's (2010) multiple case studies showed that practice transfer is a diffusion process including both 'between headquarter and subsidiary' and 'between subsidiaries of the same firm'. Edwards et al. (2015) used questionnaire survey and regression modelling with 883 multinational companies cross different sectors, they suggested that subsidiaries play the key roles and share practices with the rest of the company in practice transfer. In addition, Edwards et al. (2010) conducted questionnaire survey with 500 employees worldwide, the results showed that foreign subsidiaries can also be the origins for practices subsequently transferred across the multinational company in practice transfer. Practice transfer is a diffusion process, which is not only from domestic to overseas subsidiaries, but also from the overseas to the domestic plants, namely reverse diffusion. Thus, practice transfer is a diffusion process and the origins for subsequently transferred practices can be either headquarters or subsidiaries.

Previous research also considered practice transfer as the interplay between headquarters and subsidiaries (Saka, 2004). Saka (2004) conducted multiple case studies with 3 Japanese multinational companies in the UK, the results showed that practice transfer is about the interactions between headquarters and subsidiaries to bridge the institutional differences. Also, Al-Husan et al. (2009) suggested that practice transfer is to bridge the differences in the understandings of new practices between headquarters and subsidiaries. Harzing et al. (2016)

used questionnaire survey and regression modelling with 800 multinational company subsidiaries in the manufacturing sector from thirteen countries, they suggested that practice transfer is to bridge the knowledge flow between headquarters and subsidiaries. Chiang and Birtch (2010 and 2012) used questionnaire survey and regression modelling with 1,749 employees in multinational companies in the banking sector from seven countries across Europe, Asia, and North America, they suggested that practice transfer is the interplay between headquarters and subsidiaries to bridge the differences in organisational, institutional, and economic factors. Ahlvik et al. (2016) conducted questionnaire survey and regression modelling with 105 subsidiaries from 12 Nordic multinational companies across different sectors, their results showed that practice transfer is to balance and align subsidiary-headquarter relations in three aspects: the extent of formal control from headquarter, interpersonal communication, and subsidiary's strategic capabilities. Also, Danese et al. (2017) conducted multiple case studies with six practice transfer projects in the energy sector, they suggested that practice transfer is the interplay between headquarters and subsidiaries to introduce new practices and overcome the stickiness of the old practices. Thus, practice transfer is the interplay between headquarters and subsidiaries.

More specifically, from the behaviour perspective, practice transfer is knowledge sharing through communications among individuals between headquarters and subsidiaries (Kahancová, 2010; Haak-Saheem et al., 2017; Ling and Juan-ru, 2017). Kahancová's (2010) case study in the manufacturing sector highlighted the meaning of the interplay between headquarters and subsidiaries in practice transfer. The results showed that practice transfer is about organising communications between the headquarters and local actors while implementing new practices. Similarly, Haak-Saheem et al. (2017) used questionnaire survey

and regression modelling with 815 employees in the UAE, they suggested that practice transfer is about knowledge sharing behaviours through communications at the individual level between headquarters and subsidiaries. Previous research also highlighted the importance of employees' involvement, as the most crucial factor, for effective practice transfer (Kang and Kim, 2017). In addition, Ling and Juan-ru (2017) used secondary data across different sectors, and simulation, to show that practice transfer consists of people with different roles in communications providing complementary knowledge to each other in the process. Thus, practice transfer is knowledge sharing through communications among individuals between headquarters and subsidiaries.

Table 2.1 also shows that research in practice transfer covered geographically different areas and countries, including countries across Europe, Asia, Australia, and North America. In terms of culture influences, Lertxundi and Landeta (2012) suggested that culture differences are not important in practice transfer, comparing to the influences of institutional differences. Also, Chiang and Birtch (2010 and 2012) suggested that culture differences in assertiveness, uncertainty avoidance, collectivism, and power distance are not important, compared to the differences in organisational, institutional, and economic factors between headquarters and local subsidiaries. In addition, Chiang et al. (2017) suggested that culture differences is overrated in practice transfer, and future research needs to focus on organisational, institutional, and economic factors, since they have bigger influences.

In terms of participants in practice transfer, there are debates about the influence of participant's characteristics (Haak-Saheem et al., 2017; Kianto et al., 2017; Ling and Juan-ru, 2017). Participant's knowledge about national business systems (Hayden and Edwards, 2001)

and their communication skills (Ahlvik et al., 2016; Harzing et al., 2016) can decide practice transfer results. Kianto et al. (2017) suggested practice transfer is about knowledge sharing at the individual level and the result is decided by participants' intelligence and knowledge. Ling and Juan-ru (2017) suggested that participant's work experiences can positively contribute to practice transfer. However, Chiang et al., (2017) argued that the individual influences in practice transfer are overrated, since practice transfer is the result of teamwork rather than individual. Thus, the focus of practice transfer research is not only the individuals but also how they are organised as teams.

Much of the research on practice transfer has focused on understanding the activities involved in a practice transfer project. As such the process of practice transfer involves critical aspects of organisational knowledge identification and diffusion. From innovation perspective, Rogers (1995) suggested that the diffusion of information is in a social system. This focuses on the essential activity of practice transfer, which is information sharing. The reason is that information sharing creates new knowledge, and then leads to practice transfer. Thus, this perspective focuses on how information is exchanged between people in practice transfer. This perspective argues that practice transfer is about managing information exchange in the diffusion process among the members of a social system. Information is the basis of practice transfer. And practice transfer does not happen without exchanging information. However, practice transfer is more than merely the exchange of information. It involves the sharing of information, and the mobilisation of the information to create new knowledge about how the organisation operates. This new knowledge may be embodied in new policies, management process or frameworks, or may over time be captured within the informal norms of how an organisation operates. The social process of information exchange

means that new knowledge can be created, or combined in novel ways to create new solutions. Thus, one key aspect of practice transfer is how information is captured and shared, meanwhile, the organisational processes and knowledge management structures that are used.

Much of the research on practice transfer has also focused on understanding the causality of practice transfer and its outcomes. Form the strategic management perspective, practice transfer is defined as companies imitating the best internally existing practices in local sites at different locations or sub-organisations (Szulanski, 1996; Jarrar and Zairi, 2000). The importance of practice transfer is highlighted, because it is identified as a key way in which organisations can achieve competitive success (Drucker, 1985; Adler, 2001; Pittaway, et al., 2004). Also, practice transfer is identified as a high-value-added activity because it enhances the ease with which critical organisational knowledge is transferred and made accessible across distributed organizational units which can improve productivity outcomes (Stiglitz, 2000; Rao, et al. 2001; Zou and Ingram, 2013). Writers such as Drucker (1985) therefore see practice transfer as more than mimicking information. Instead he argues that practice transfer in multinational firms is concerned with the transfer of new products or services ideas from one country to another, but also creating new ways of production, finding new sources of supply, or even identifying new markets. Thus, practice transfer is different from copying existing practice (Badaracco, 1991; Krishnan, Ulrich, and Karl, 2001) and instead can involve the creation of something new based upon the knowledge and learning from other parts of the business. In this way practice transfer is important since it is a way of achieving competitive success (Drucker, 1985) and enhancing organizational performance (Tsai and Ghoshal, 1998; Reagans and Zuckerman, 2001; Buchmann and Pyka, 2015). In sum, practice transfer is important because it creates knowledge to achieve competitive success.

2.3 The characteristics of practice transfer

The processes of practice transfer are about exchanging information about new practice and policies among the participants (Rogers, 1995; Schultze and Leidner, 2002; Chiang et al., 2017). These processes in a practice transfer project involve communications among the team members which leads to more information being shared. However, sharing information does not mean that it will diffuse in terms of leading to new practices or behaviours beyond the team members. Thus, this section discusses three characteristics of practice transfer. They are three key barriers to information spread in practice transfer as below.

First, practice transfer involves heterogeneous people and diverse information sources (Chiang and Birtch, 2010 and 2012; Kahancová, 2010; Ahlvik et al., 2016; Chiang et al., 2017; Ling and Juan-ru, 2017). Since practice transfer is about the flow of new practices from the origin organisation (headquarter or subsidiary) to the receiving organisation (headquarter or subsidiary), understanding each participant's involvement and role is important (Tempel, 2001; Chiang and Birtch, 2010 and 2012). Previous research suggested that headquarters are often better positioned to provide support and coordinate practice transfer activities in comparison to their subsidiaries, because headquarters usually set the company's strategic targets (Tallman and Koza, 2010), control the enabling business resources (Ferner et al., 2012), and have the authority to overcome the subsidiary's resistance (Szulanski,1996). However, subsidiaries are usually in a position that is oppositional or conflictual with headquarter restrictions and influences on practice transfer. Information about headquarter

and subsidiaries are usually difficult to be transferred and understood by each other (Dasgupta, 2000; Garud and Karnoe, 2001; Garud, et al., 2013). Szulanski (1996) investigated 122 practice transfers in 8 companies and suggested that the information recipients lack capacity of clarifying ambiguity, and this is a 'misunderstanding' relationship between headquarter and local subsidiaries. For example, headquarters' communications often highlight their strategy vision and business environmental changes, however, local subsidiaries pay attention to their operations. This requires redefining the roles of who can put headquarter and subsidiaries closely together (Parkhe et al., 2006; Lau et al., 2010; Funk, 2012; Iacobucci and Hoeffler, 2016). Headquarter' influence on practice transfer is subject to the interactions with subsidiaries and the responses from them (Edwards and Ferner, 2004; Kahancová, 2010; Ahlvik et al., 2016). For instance, subsidiary wise, the extent of subsidiary managers accepting new practices, or even against them, can influence practice transfer results (Birkinshaw, Hood, and Young, 2005; Chiang et al., 2017). In such situations, practice transfer is more likely to be carried out through negotiations between the stakeholders in subsidiary and headquarters (Ferner et al., 2012; Ling and Juan-ru, 2017). Thus, practice transfer contains heterogeneous people and diverse information sources.

Second, practice transfer projects are difficult to be organised in a hierarchical organisation structure, due to information takes too long to be passed level by level (Walker et al., 1997; Shane and Cable, 2002; Levin and Cross, 2004). This requires headquarter to consider their roles and involvement in practice transfer. Headquarter involvement in practice transfer can be either direct or indirect. In terms of direct headquarter involvement, its role is considered as directly providing enabling business resources and making decisions (Edwards and Ferner, 2004; Ciabuschi, Forsgren, and Martín, 2011). In terms of indirect headquarter involvement,

headquarters can order a subsidiary to share its practice companywide and allocate decision-making rights during the practice transfer (Tempel, 2001; Thory, 2008; Arp and Lemański, 2016), meanwhile, setting corporate policies that encourages the sharing of new practices with the companies (Tempel, 2001; Brenner, 2009). Many organisations realised the flexibility in organisational structures can enhance their quality of work and practice transfer capacity. In order to increase flexibility in organisational structures, multinational companies tend to be organised as operational networks, so that power within multinational companies is increasingly becoming more dispersed and decentralised (Andersson, Forsgren, and Holm, 2007). However, such flexibility creates a situation, where the practice transfer projects lack control over time and expenses (Putnam, 1993 and 1995; Tymon and Stumpf, 2003; Qumer and Henderson-Sellers, 2008). More importantly, a headquarter may be able to influence practice transfer decisions, however, it may not be able to fully decide the extent to which a practice is adopted (Ferner, Almond, and Colling, 2005). Thus, headquarters need to strike a balance between hierarchical organisational structure and decentralised network-like structure. Burt (2007 and 2015) argued that the organisation structures require new models, tools and techniques for managing practice transfer. However, most of the studies in the area of international human resource management have focused on trying to identify the outcomes of practice transfer in terms of competitiveness and growth of revenue. Less attention has focused on how practice transfer can be effectively implemented in organisations (Patulny and Svendsen, 2007; Mukherjee et al., 2016; Ozkan-Canbolat and Beraha; 2016).

Third, practice transfer has to overcome a large number of risks and uncertainties associated with adopting a new practice (Chung and Gibbons, 1997; Cohen and Fields, 1999; Fleming and Waguespack; 2007). Prior research has suggested that the results of practice transfer may

not always be desirable (Glover and Wilkinson, 2007; Pudelko and Harzing, 2007; Al-Husan et al., 2009; Novitskaya and Brewster, 2016). The undesirable or unintended results of practice transfer are usually caused by insufficient recognition and assessment of newly developed practices (Tempel, 2001; Edwards and Ferner, 2004; Thomas and Lazarova, 2013). Those risks and uncertainties cannot be passed onto a consultant or specialist through outsourcing. The adoption of a practice requires that the practice can be articulated to all the participants in practice transfer and also can be understood by related employees (Newell et al., 2004; Kratzer et al., 2016). Otherwise, the practice transfer may not be realised as it was intended leading to unintended consequences or even performance failures.

In sum, managing practice transfer is a complex task. There are difficulties inherent to the practice transfer processes associated with the heterogeneity of participants and their information biases, hierarchical organisational structure, and risks and uncertainties associated with adopting new practice. These create challenges in how to manage practice transfer. Thus, the next section is going to discuss managing practice transfer.

2.4 Managing practice transfer: critical factors

This section considers what the evidence tells us about the factors associated with the successful management of practice transfer. There has been a wide array of studies looking at practice transfer and practice transfer outcomes. This evidence spans a focus on individuals and their skills or characteristics, on wider features of the organisation, and on practice

transfer teams themselves. The evidence suggests that individual characteristics associated with participants of practice transfer projects such as creativity or work characteristics such as job security as less central to explaining effective practice transfer. Equally wider policy frameworks which may be more removed from the day-to-day activities of the project transfer teams seem less central. By contrast, teamwork, relationships between the team members, and managerial capability to work cross-functionally, come to the fore. Thus, this section reviews the evidence below.

At the individual level, a number of studies explored the relationship between individual creativity and practice transfer outcomes. These studies used various methods such as questionnaire survey, multiple case studies, and mixed methods of both. Their findings suggest that practice transfer outcomes are not necessarily associated with individual creativity (Davidsson and Honig, 2003; Candi et al., 2013). Also, some studies tried to add motivation in their models, to test if creativity and motivation together can influence practice transfer outcomes. They provided similar results by using longitudinal study and structural equation modelling with large data sets (Gulati (1999; Buchmann and Pyka, 2015). However, these studies found that neither individual creativity nor motivation has a strong influence on practice transfer outcomes.

In terms of work characteristics, some scholars believed secure employment and managers' performance might influence practice transfer outcomes. Secure employment can offer high commitment and manager's ability for managing people across teams can influence practice transfer outcomes (Koka and Prescott, 2002; Brass et al., 2004; Gilsing and Nooteboom, 2005). However, their findings showed there was no relationship.

Existing studies have found that the impact of teamwork and information exchange on practice transfer outcomes is significant and remains a key explanatory factor in different cultures (Emirbayer and Goodwin, 1994; Galison, 1997; Bayat et al., 2014). It has been demonstrated that teamwork can bring positive returns to individuals in different culture contexts (Bayat et al., 2014). Teamwork and information exchange are critical to practice transfer where it can engender trust and reciprocity in the exchange relationship. Galison (1997) stated that the use of teamwork tactics is effective in practice transfer activities which involve different culture contexts. However, the work on practice transfer and cultural context remains limited. Culture is defined in many different ways including as individualist or collectivist, long-term oriented or short term oriented, feminism or masculism, low uncertainty avoidance or high uncertainty avoidance. As such the academic concept of culture is deeply contested and is by no means certain. The idea is also rooted in the positivistic concept of culture which has been shown to be deeply flawed by scholars (Ostrom, 1994 and 1998; Fernandez, et al., 2000). Thus, previous research suggests that the impact of teamwork and information exchange on practice transfer outcomes can remain significant without considering culture difference.

At the policy level, the existing studies (Coleman, 1988 and 1990; Fukuyama, 1995 and 1997; Edelman, et al., 2004) explored the relationships between policy and practice transfer outcomes. These existing studies investigated how policies have effects on practice transfer outcomes. These studies suggested that policies can encourage and support practice transfer activities. However, they cannot explain the variance in practice transfer outcomes from organisational units operating under the same policy. Therefore, the existing studies in this

area do not reflect the in-process practice transfer. Organisations can have different practice transfer outcomes under the same policy (Hassard, 1991; Kavanaugh, et al., 2005,). This suggests that it is necessary to explore the relationships between the individual's activities and practice transfer outcomes rather than look to policy frameworks that might be less relevant to the project teams (Leven et al., 2014; Ibert and Müller, 2015).

Gulati (1999) noticed that managers pay more attention, time, and resources to information exchange in successful practice transfer. However, information related to practice transfer is often "sticky" and difficult to spread (Grootaert, 2001; Landsperger et al., 2012; Popkova, et al., 2015). When information is being transmitted, people cross functions and may not be able to fully understand each other. A realistic problem is that local sites usually do not understand the terms used by headquarter managers. This usually leads to ineffective communication among participants during practice transfer. However, the structure of information exchange between functions has rarely been explored. In other words, how people work together across functional groups in the practice transfer? How can practice transfer units (headquarter and local sites) gain useful information from each other to enhance its practice transfer outcomes? Furthermore, Shipton et al. (2006) conducted a longitudinal study of 22 UK companies on the relationship between manager's abilities and practice transfer outcomes. Their findings support that the practice transfer project performance is positively associated with manager's ability to manage teamwork across functions. Tsai (2000) provided similar findings by using structural equations modelling with data collected from 173 Spanish firms.

Findings from Garud and Karnoe (2001) and Yoo et al. (2006) suggest that practice transfer outcomes rely on managing information exchange, which allows participants to get access the

information for their particular needs. Galison (1997), Rodan and Galunic (2004), Boland et al. (2007) also found that there are 1) highly frequent information exchange among participants and 2) intensive information exchange between participants with different skills and knowledge backgrounds in practice transfer. They called this phenomenon 'information brokerage' during practice transfer. This evidence reinforces the importance of how information is managed to ensure it is effectively exchanged in order to transfer practice. It further suggests that there may be some participants located at the intersection between different professional groups. Further, Boland et al (2007) suggested specific people hold information brokerage roles. If this is the case then in practice we would see some people, more than others, are frequently and densely placed at the intersection between professional groups to support the process of practice transfer.

In sum, given the research evidence suggests that managing teamwork and information exchange across diverse groups, such as functional areas or headquarter and local sites, is crucial to achieve practice transfer. In addition, the research suggests that there may be key roles that are important in assuring practice transfer success. One of these roles relates to information brokerage. Thus, the following section will discuss those people who act in information brokerage roles in practice transfer.

2.5 The importance of brokerage actors

The last section has highlighted the highly intensive and frequent information exchange between participants with different skills and knowledge backgrounds in practice transfer. Practice transfer can create changes in workplaces (Scott, 1991; Nebus, 2006; Lyytinen et al., 2016), including increased information exchange across different professionals and getting participants with different skills and knowledge backgrounds involved. Thus, practice transfer is a very complex social system including diverse participants (McEvily and Zaheer, 1999; Shazi et al., 2015; Ozkan-Canbolat and Beraha, 2016). A major challenge to managing this complex system is how to transfer information between different professional groups (Edstrom, and Galbraith, 1977; Bernardi at al., 2012; Dell'Era et al., 2013). Brokerage actors are critical for dealing with these issues (Dyer and Singh, 1998; Becheikh et al., 2005).

Brokerage actors are critical to organising teamwork and collaborations in practice transfer. Brokerage actors can bridge people in different professional groups. Gargiulo and Sosa (2016) found that: (1) Ways of behaving and thinking are more distinctive between than within professional groups. (2) People in different professional groups exchange different information. (3) People are more likely to get alternative opinions or solutions when they are connected to otherwise segregated or isolated professional groups. The potential value of brokerage actors is that they provide access to unique or non-redundant resources and information. Inkpen and Tsang (2005) argued that brokerage actors can help organisations to gain competitiveness.

Brokerage actors are arguably critical to managing information exchange in a practice transfer project. The reasons of this can be classified as internal and external factors (Galbraith, 1974). Internally, participants in practice transfer need knowledge and resource. Brokerage actors can provide access to knowledge and resource through collaborations among participants. Externally, there are uncertainties and risks in adopting new practice in practice transfer. Brokerage actors can help to reduce these uncertainties and risks.

The research also demonstrates that the number of brokerage activities in information exchange is positively related to levels of practice transfer outcomes. It appears that the frequency of brokerage in information exchange has more impact on practice transfer outcomes than social interaction, trust and shared visions between the parties (Tsai, 2000; Burt, 2007). Increasing brokerage activities ensuring information exchange could be more efficient than all project participants trying to increase their frequency of information exchange (Burt, 2007). Therefore, brokerage actors are important to practice transfer.

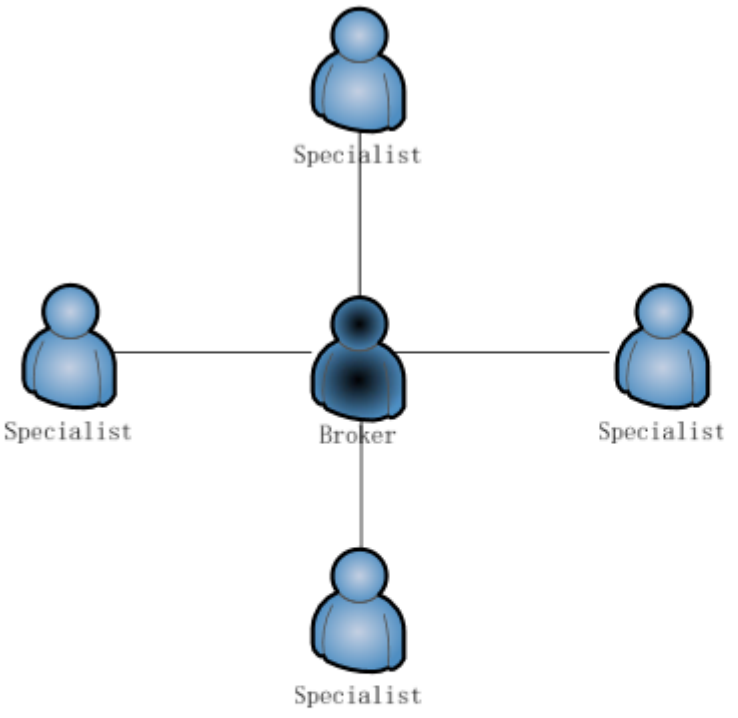
2.6 The characteristics of brokerage actors

This section will discuss two characteristics of brokerage actors: 1) information exchange between different professional groups and 2) the roles of information brokers in practice transfer. Rogers (1995) argued that diffusion of innovation is a very social process. A large amount of social exchange between pairs of individuals forms a network. A network usually consists of several function groups, also known as clusters. A function group is one or more distinguishable specialists who are perceived as being closely interrelated, such as

headquarter group and subsidiary group (Law and Callon, 1992; Burt, 2004; Conway and Steward, 2009; Mukherjee, et al., 2016). In practice, practice transfer usually involves participants across those different groups.

Podolny and Baron (1997) suggested that highly dense connections form among people across different groups in practice transfer. And there are people who have prominently central positions in the communication networks. They are important "brokers" in practice transfer (see Figure 2.1). And these brokers connect information exchange between different function groups and as such become increasingly important in practice transfer projects. A broker in practice transfer provide connections for otherwise disconnected people working together. Without these brokers, the collaborative works between people are disconnected.

Figure 2.1 Broker in practice transfer



Tsai (2004) demonstrates that practice transfer activities involve increasingly spanning boundaries across function groups' collaborations. Gilsing and Nooteboom (2005) suggest that specialists across different function groups can be connected via brokers. Meanwhile, Gulati (1999) suggest that a network is like a "small world" since participants can be connected just through a few network brokers. A "small world" refers to that any two persons in the world can be connected by six 'a friend of a friend' in the middle. Ferlie et al. (2001) confirmed the significance of the broker further through their research on networks. A similar finding was also evident in Sydow and Windeler's (1998) work, who found that people's network positions usually reflected the range of accessible information and resources through their relations. Therefore, the contemporary research in practice transfer has brought into focus the fabrics of network structures and brokerage actors as information brokers within practice transfer networks.

2.7 Network structures and practice transfer

Lounsbury and Ventresca (2003) suggest that a network's structure can help overcome some of the challenges traditionally associated with practice transfer success. They summarised five challenges to information exchange in practice transfer: (1) governance structures; (2) overlapping skills; (3) trust; (4) knowledge background similarity; (5) organisational similarity. Their study highlights that practice transfer networks can ensure smooth information exchange in projects, especially in dealing with those five challenges.

Haythornthwaite (1996), and Liao and Welsch (2005) argued that information exchange for a person or organisation in practice transfer is based on networks, because networks usually can help to build up a high level of social interaction, trust and shared visions between the parties.

Networks appear in taking control of scarce resources, creating opportunity, and reducing risk. Damanpour (1996) found that the information exchange between people is more likely to happen when they have prior ties (either direct or indirect) between them. In other words, successful practice transfer is usually based on previously direct or indirect collaboration. However, Hacket and Dilts (2004) argued that practice transfer networks can also be based on information brokers. Information brokers refer to the information bridging activities mentioned in the previous section. His study found that successful practice transfer can not only be based on previously direct or indirect collaboration, but also facilitated by the brokers with the similarity with both parties in the information exchange.

Networks also appear in dealing with hierarchical relations. The governance system plays a crucial role in practice transfer. This has been described as "access to exclusive information and resource" (Song et al., 2013; Wang, et al., 2013; Lynch, et al., 2016). Her study stressed that the relevant power and authorities can play some key roles in practice transfer. Practice transfer network involving people with power and the relevant authorities in practice transfer have a positive effect on reducing cost, time and to guarantee the return. It is clear that the networks and practice transfer happen concurrently. However, the gap here is in what way networks can promote practice transfer. This question will be addressed in the theoretical

framework discussion. The next section will focus on more specific details about brokerage actors.

2.8 Brokerage actors for translating information

Interests have recently increased in understanding how inter-organisational connections influence practice transfer (Burt, 2004; Owen-Smith and Powell, 2004; Boudreau and Robey, 2005). However, these efforts have almost exclusively focused on the variety of inter-organisational structures that influence practice transfer results, over-looking the interactions among brokerage actors. Thus, this study aims to answer the question how practice transfer can be affected by a combination of different types of brokerage actors.

Practice transfer consists of collaborative work to combine formerly separated knowledge into new knowledge and ideas in different counties or areas (Aalbers, et al., 2016; Leenders and Dolfsma, 2016). Brokerage actors are able to gain access to resources and knowledge through connections with different parties in multinational companies. They have a role to play in practice transfer in 1) translation, 2) bridging institutions and 3) embedding codified practices (Cooke and Wills, 1999; Batjargal, 2003 and 2007; Liao and Welsch, 2005). It is not clear that brokerage actors are the managers or employees with certain skills. Thus, this study draws on literatures on network theory to examine the relations between these three types of brokerage actors and practice transfer results in multinational companies.

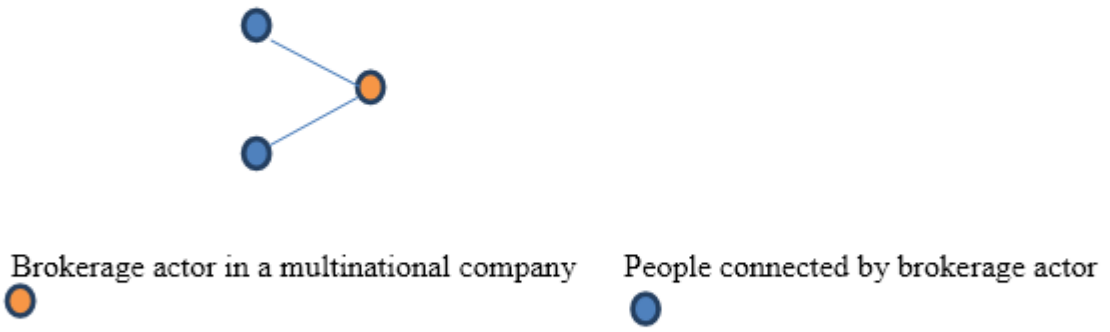


Figure 2.2 Brokerage actors as translator

The challenge in this area is how to understand the complexity of brokerage actors. Figure 2.2 shows a brokerage actor as translator. The work of Uzzi (1996) and Burt (1992 and 2015) suggest that efficient structures in translating information are people as brokerage actors connecting staff from headquarters and local sites. 'Connections' represent collaborations in relationships, so to combine knowledge and resources at minimum cost, brokerage actors should avoid similar connections (for example, connecting two brokerage actors connecting the same people) between them. The brokerage actors as translators are usually centrally located between organisations who aggregate knowledge and resources from the others (Owen-Smith and Powell, 2004; Baker, et al., 2016; Lynch, O'Toole, and Biemans, 2016). Brokerage actors as translators are inter-organisational ties between usually a headquarter organisation and otherwise disconnected local site organisation. The number of brokerage actors as translators is positively associated with the capability of combining knowledge in practice transfer (Burt, 2007). Thus, brokerage actors as translators are beneficial to companies' practice transfer capabilities

Brokerage actors as translators are not only about natural language translation, they also have short connection (or path) lengths which are conducive to the quick spread of knowledge and information (Walker, et al., 1997; Woolcock, 1998; Woolcock and Narayan, 2000). Brokerage actor connections reaching outside an organisation are significantly related to individual (Gilsing and Nooteboom, 2005; Ibarra, et al., 2005; Cross et al., 2015) and organisational-level practice transfer results (Walker, et al., 1997; Tsai and Ghoshal, 1998; Tsai, 2000; Gargiulo and Sosa, 2016). For instance, McEvily and Zaheer (1999) found that advice seeking in practice transfer can be effective through brokerage actor connections across organisational boundaries. Thus, brokerage actors as translators are likely to be effective in the spread of knowledge and information (Tsai 2001; Ferrary and Granovetter, 2009; Schleimer and Faems, 2016).

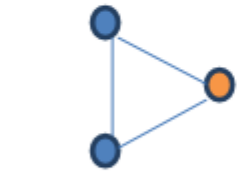
Research using network analysis has emerged as a robust method to link these micro-behaviours of companies and the macro-results of them, and showed that brokerage actors as translators are the agents of combining separated knowledge, (Kraatz, 1998; McEvily and Zaheer; 1999; Svendsen and Svendsen; 2003; Cross, et al., 2015). However, practice transfer in multinational companies usually has complex tasks other than just translation (Obsfield, 2005; Nebus, 2006). A gap in the current theories is whether multinational companies can take advantages from a combination of various types of brokerage actors working on different tasks in practice transfer. Thus, previous research suggests that it is important to find out if a combination of brokerage actors as translators and other types of brokerage actors are effective in practice transfer (Zaheer, et al., 1998; Parkhe et al., 2006). To do so, the next two sections discuss brokerage actors as bridging institutions and embedding codified practices.

2.9 Brokerage actors for bridging institutions

Scott (1995 and 2001) defines institutions as durable social structures, made up of 1) symbolic elements, 2) social activities, and 3) material resources. The processes of bridging institutions in practice transfers are that information about new practices is exchanged among the participants (Szulanski, 1996; Jarrar and Zairi, 2000). These processes are communications among the team members which leads to increasingly shared information. DiMaggio and Powell (1983) suggested that institutions are social structures that have attained a high degree of resilience. In a short term, a multinational company sticks to its network structure and position, once its institutions are built up. The result is that practices can be difficult to diffuse across different institutions. Thus, this research seeks efficient brokerage actor connections, those that can lead to successful institution bridging in practice transfer.

Building up connections between units in multinational companies is usually time consuming and therefore has an opportunity cost. This is because multinational companies' units only have finite or limited capacity for collaborations with each other. Collaborations take time and labour cost and multinational companies usually have a limited number of staff with limited working hours in the area. Therefore, multinational companies can only have a finite number of connections across borders between headquarters and local sites.

Figure 2.3 Brokerage actors for bridging institutions



Brokerage actor in a multinational company

People connected by brokerage actor

Brokerage actors for bridging institutions are interlocked connections among staff (see Figure 2.3), which enable information and business resources exchange, meanwhile increase their abilities to adapt new practices (Jarrar and Zairi, 2000). A connection between organisations is a purposeful social unit that shares business information and resources to achieve the collective target (Ibarra et al., 2005). Brokerage actors can reflect the synthesis process of bridging institutions in practice transfer. Brokerage actors interact through networks, exchanging business resources and information and retain resources and ideas that are practice transfer related. In this synthesis process among brokerage actors, the choice of connections is usually not random (Nohria and Eccles; 1992; Cohen and Fields; 1999; Rodan and Galunic; 2004). For a practice transfer to be innovative, business resources and information being combined are often sufficiently 'distant' from each other that their combinations are not 'obvious'. Before two different institutions are bridged, brokerage actors search or consider what choice of bridging is worth and productive to pursue

(Fernandez, 2002; Edelman, et al., 2004; Fleming and Waguespack, 2007). Thus, brokerage actors can be abstracted away from the business communication aspects to focus on the structures.

Brokerage actors as institution bridges are effective in gathering and getting access to resources and knowledge, those connections can directly facilitate practice transfer (Gulati, 1999; Obstfeld, 2005). As the business resources and knowledge acquired across organisational boundaries are usually heterogeneous and diverse (Burt, 2015), brokerage actors for bridging institutions can help to set up a common base to integrate them (Granovetter, 1973 and 1985; Krackhardt, 1992; Sydow and Windeler, 1998; Joshi, 2006). Moreover, business resources and knowledge are hard to mobilize and transfer across organisational boundaries, brokerage actors as institution bridges can facilitate to form a common business language and shared approach (Podolny and Baron, 1997).

Brokerage actors as institution bridges can help to turn new business resources and ideas, which the organisations are previously unfamiliar with, into practice transfer results. As Obstfeld (2005) and Burt (2015) noted, getting new business resources and ideas through different perspectives and implementing them are two distinct transfer processes. The diversity of business resources and knowledge might be an obstacle to the implementation of them. For instance, people belonging to different organisations might be subject and limited to their own responsibilities and tasks toward the implementation and transfer of business resources and knowledge into separated practice transfer results. Brokerage actors for bridging institutions provide interlocked connections which could help to overcome those limitations mentioned above. Interlocked connections refer to inter-connected ties among

people (Granovetter, 1985; Nohria and Eccles, 1992). Interlocked connections are usually considered as structural redundancy in networks. Structural redundancy means that each person in interlocked connections is not considered as a unique bridge to connect any others. Prior research has shown some specific advantages associated with interlocked connections. Besides connecting cross-organisation resources and knowledge to create new practice, the innovative prospect and value of these external resources and knowledge can be compared and confirmed by people located in different parts of an interlocked structure. The efforts of sharing resources and knowledge may not reach the target due to lack of comparison (Nebus, 2006). Reagans and Zukerman (2001) highlighted that interlocked connections are positively associated with the results of practice transfer. Thus, interlocked connections (which are provided by brokerage actors for bridging institutions) are helpful when the resources and knowledge are clearly valuable from the source organisation's view but not certain from the recipient organisation's view.

In addition, certain resources and knowledge are not significantly valuable to some organisations, however, they can still be hugely beneficial to the others who are able to implement them in practice transfer (Kraatz, 1998; Koka and Prescott; 2002). Prior research showed advantages of interlocked connections in achieving a common view in practice transfer (Krakhardt, 1992; Uzzi, 1996; Pittaway, et al., 2004). In the specific case of practice transfer, brokerage actors for bridging institutions can provide interlocked connections to facilitate mutual understanding and help to build a common basis of implementing new institutions. Therefore, brokerage actors for bridging institutions can support the transfer and implementation of diverse business resources and complex information in practice transfer.

2.10 Brokerage actors for embedding codified practice

The interlocked connections among brokerage actors can facilitate the integration of diverse resources and knowledge in bridging institutions. In the case of practice transfer, accessing diverse resources and knowledge in other organisations through collaboration, albeit necessary, are not enough to enhance practice transfer results significantly (Thorpe, et al., 2005). Brokerage actors need interlocked connections and to be embedded in a cluster. Those interlocked connections help brokerage actors to confirm and corroborate the view that practice transfer is developing in a promising area and the new practice attained is being transferred. For instance, brokerage actors share and recombine diverse sets of resources and knowledge into practice transfer outcomes, e.g. a new business practice (Dyer and Singh; 1998; Mitchell and Boyle, 2015). At the same time, they work against the difficulties associated with the uncertainties in their market, substitutes and technological evolutions. In fact, a practice can easily be replaced or wiped out in the market by other similar practice or newly emerged practice, even before it is formally transferred (Gabbay and Zuckerman; 1998; Gupta and Govindarajan, 2000; Edelman, et al., 2004; Youndt and Snell, 2004; Fleming and Waguespack, 2007). In this situation, brokerage actors are not only translators (as the connections) and bridging institutions (as the connection builders). Building on these insights, brokerage actors with embedded network structures for embedding codified of practice is introduced (Burt, 2007).

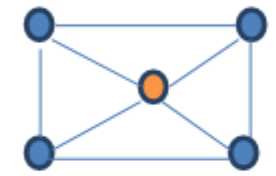


Figure 2.4 Brokerage actors for embedding codified of practice

Figure 2.4 shows the connection structure of brokerage actors for embedding codified practice. From the network structure perspective, there are reasons to expect positive effects of embedded network structures on practice transfer results. Brokerage actors with embedded network structures can increase the diversity of business resources and knowledge since they are well-connected, and their interlocked connections increase common understandings of complex implementation problems. Although prior empirical evidence demonstrated that the number of brokerage actors with embedded network structures correlates positively with practice transfer results, there is less attention devoted to it by managers in practice transfer (Liao and Welsch, 2005; Faulconbridge and Muzio, 2016). The reason is that those equivalent (connecting to the same person, see Figure 2.4) communication channels in embedded network structures are inefficient, in terms of cost and quick spread of information (Burt, 2007). However, embedded network structures provide brokerage actors with a number of equivalent communication channels which can monitor and confirm the directions of practice transfer (Inkpen and Tsang, 2005; Galaskiewicz, 2007).

Consequently, brokerage actors with embedded network structures could be a determinant of the extent of practice transfer by embedding codified practices into the organisation.

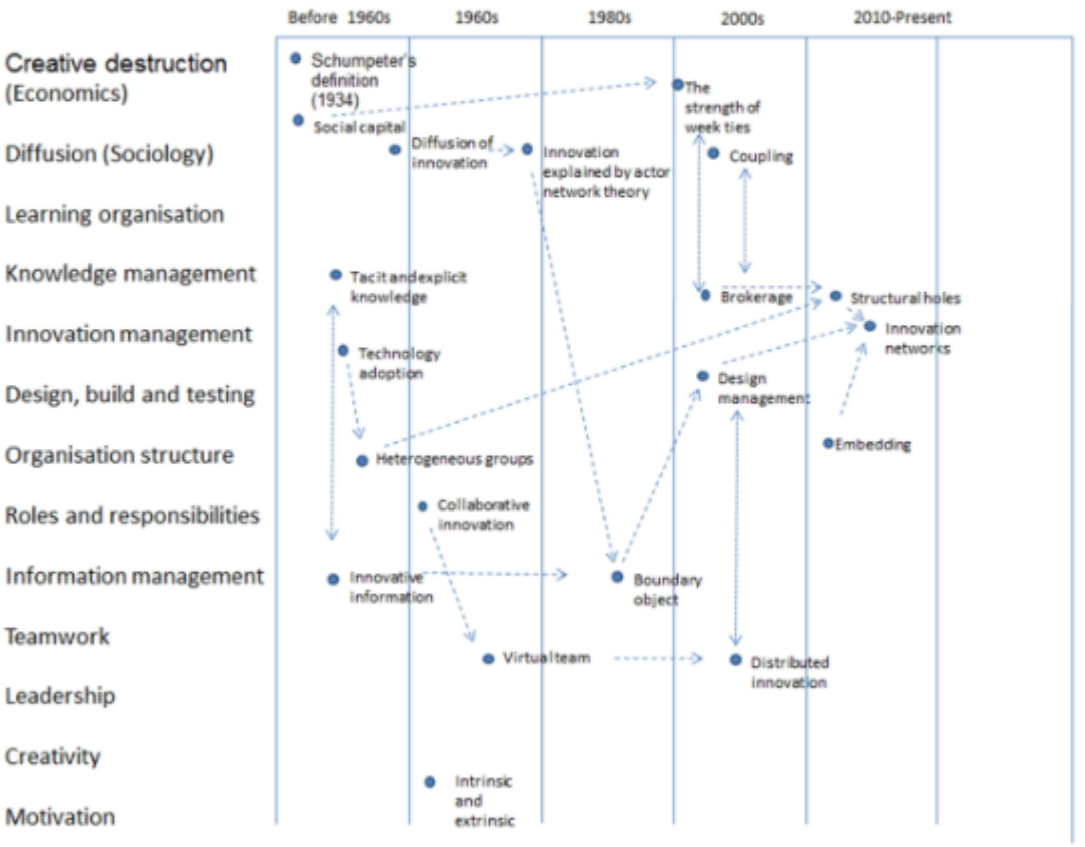
2.11 Summary

To summarise the discussion in this chapter, Figure 2.5 provides a theory map to highlight the core theoretical lens. Figure 2.5 begins with Schumpeter's definition of operational collaborations. Operational collaborations among organisations result in business growth by the integration of products, services, knowledge and skills (Schumpeter, 1934). In multinational companies, there are a large amount of transactions and information exchange among the headquarters and subsidiaries. These transactions and information exchange can be seen as diffusion processes. Rogers (1995) suggested the concept of diffusion in order to explain how companies can achieve development by diffusing their products, services and knowledge. The diffusion theory suggested that companies were in the diffusing processes had better performance than those were not. However, the diffusion theory did not answer the question 'how'. How headquarters and subsidiaries can be get involved in practice transfer, which is also considered as 'internal' diffusing processes.

Figure 2.5 shows another important theory in practice transfer which is diffusion of innovation. The diffusion processes have two features in the theory and connected with other theories below. First, operational collaborations between different professional groups are

important to practice transfer. Such operational collaborations provide opportunities to a multinational company to combine its abilities to develop and grow together. As discussed in this chapter, operational collaborations appear as combining explicit and tacit knowledge (Blau, 1968 and 1982; Rodan, and Galuni, 2004), sharing innovative information (Roger, 1995; Reagans and Zuckerman, 2001), and technology adoption (Roger, 1960, Boudreau and Robey, 2005). Second, practice transfer can be seen as collaborative activities. When practice requires transactions and information across organisational borders between headquarters and subsidiaries, teams from both sides can work as a virtual team (Brass, et al., 2004). Such a team together can combine a multinational company's abilities and meet the common interests (Tsai and Ghoshal, 1998; Tsai, 2000). However, these theories still did not answer the question 'how' yet.

Figure 2.5 Theory map of practice transfer and networks



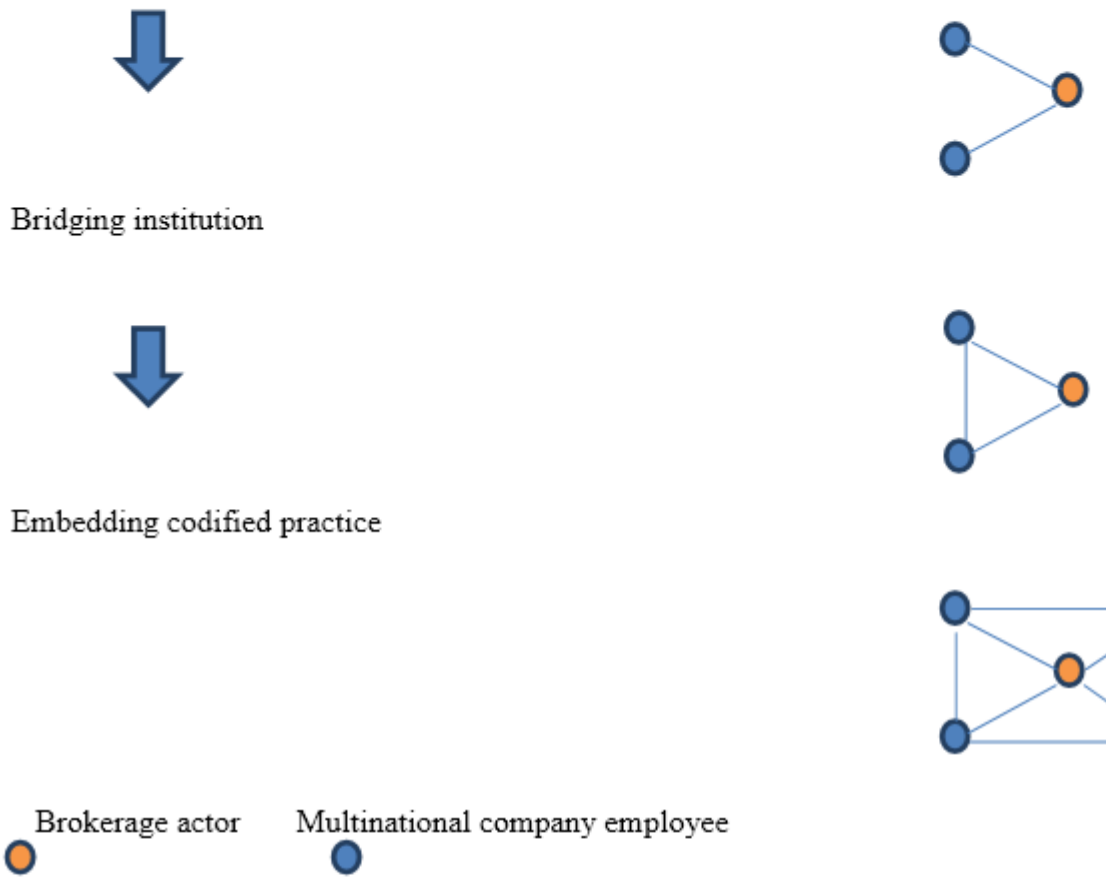
As discussed above, operational collaborations and diffusion of innovation did not answer the question 'how' multinational companies transfer their practices, thus, theories are improved to answer this question. The importance of inter-personal connections was highlighted by Granovetter (1973). This leads to research focuses on inter-personal level analysis. Then, network analysis was introduced to analyse inter-personal connections. Brokerage (Uzzi, 1996) and structural holes (Burt, 2004) were proposed as two effective network structures in practice transfer. Further, network theory highlighted the importance of inter-personal connection structures (Burt, 2007). Therefore, this study's theoretical lens focuses on network theory. Table 2.1 below provides a summary of these changes in theories.

Table 2.2 Theory changes in the area of practice transfer and networks

Author	**Theory contribution**
Schumpeter's (1934) definition of operational collaborations	Highlight the importance of collaborations
Diffusion of innovation (Roger, 1960)	Clarify the process of collaborations
The strength of weak ties (Granovetter, 1973)	Highlighted the importance of inter-personal connections
Brokerage (Uzzi, 1996) and structural holes (Burt, 2004)	Introduce network analysis to analyse inter-personal connections
Network theory (Burt, 2007)	Highlighted the importance of inter-personal connection structures

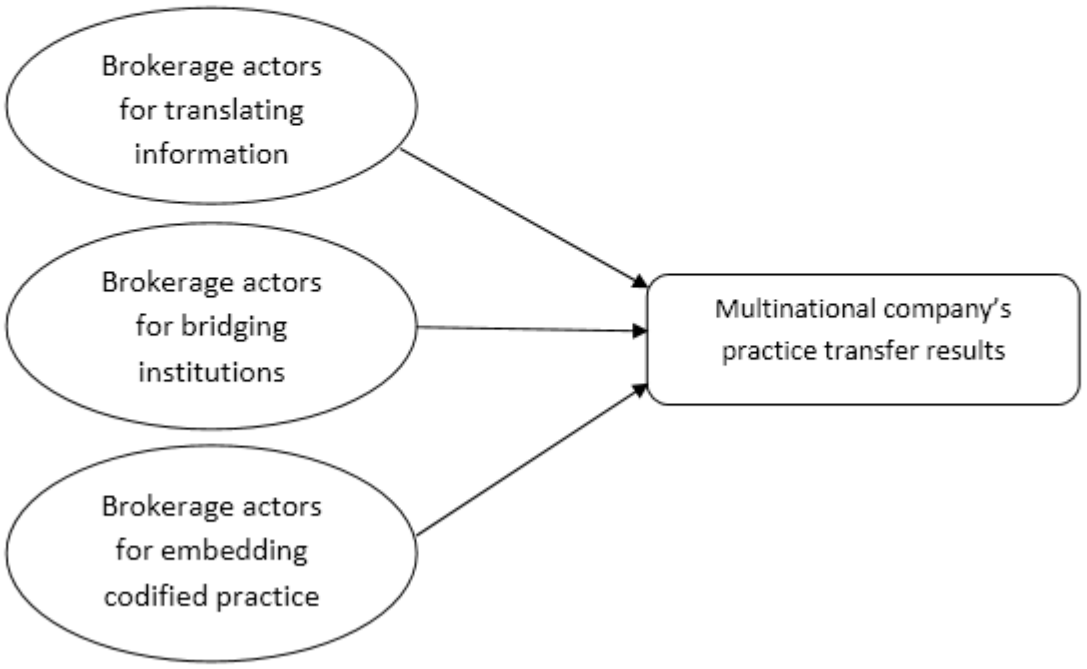
Network theory highlighted the brokerage actors for translating information, bridging institutions, and embedding codified practices (see Figure 2.5). First, this discussed what practice transfer and brokerage actors are. Second, this literature review highlights these three roles of brokerage actors in practice transfer. Third, the discussion shows that these three roles of brokerage actor as network structures are: connecting people (translating information), building up connections (bridging institutions), and embedding in interlocked connections (transferring codified practices). Thus, it provides a reason for using network analysis to investigate these three roles in practice transfer.

Figure 2.5 The tasks and roles of brokerage actors



As discussed in the literature review, these three roles of brokerage actors have positive effects on practice transfer results. Figure 2.6 shows them as the proposed factors of this research. First, this literature review highlights that brokerage actors for translating information enable other participants to combine knowledge, skills, and resources in practice transfer. Second, the discussion about brokerage actors for bridging institutions suggests that brokerage actors can build up connections between headquarters and local sites. Third, brokerage actors for embedding codified practices work in clusters and those inter-connected actors can have better performance in transferring codified practices.

Figure 2.6 The proposed factors of this research



Chapter 3 Theoretical framework: Brokerage actors and networks for practice transfer

3.1 Introduction

Previous chapter led this study to focus on network theory. This chapter provides a theoretical framework which is adapted to explain network dynamics, structure, and influences of brokerage actors during practice transfer. At first, network dynamics represent complex interactions among people in the processes of practice transfer, so that can reveal how brokerage actors emerge. Then, those regular patterns of people's network positions and connections can be revealed in network structures, in order to show what brokerage actors' connection structures are in practice transfer. Finally, network influences are about testing the relations between these brokerage actors' connection structures and practice transfer outcomes. This research's theoretical framework is based on the structural hole theory (Burt, 2007 and 2015). The structural hole theory argues that the gaps between people in a practice transfer network can be strategically bridged and contribute to practice transfer outcomes.

The reason for adopting the structural hole theory in this research is to explore the activities among the participants of a practice transfer project using the lens of a network structure. This research (in the last chapter) suggested that it is important to explore the practice transfer activities among the participants, as this will allow a more micro and dynamic perspective.

The structural hole theory provides a conceptual model for analysing the connections and gaps between people in practice transfer activities. The structural hole theory can be helpful to conceptualise the practice transfer activities among participants as networks of relationships (Borgatti, 2011). Thus, this research adopts the structural holes theory to explain brokerage actors. Based on the structural hole theory, this research derives additional implications to the dynamics, structure, and influences of brokerage actors. As discussed in the last chapter, brokerage actors have rarely been examined systematically in ways that show how they emerge in practice transfer, what roles they play, and the extent of their influences on practice transfer results. Thus, to improve the knowledge about brokerage actors in practice transfer networks, this research uses the structural hole theory to reveal how a practice transfer network evolves and how brokerage actors create the structures in the network (Section 3.3 about the network dynamics of brokerage actors), what network structures brokerage actors create in practice transfer networks (Section 3.4 the network structures of brokerage actors), and how various brokerage actor roles influence the outcomes of practice transfer (Section 3.5 the influences of brokerage actors).

3.2 Practice transfer network and brokerage actors

Network theories are increasingly important in improving the understanding of practice transfer since the regular patterns in practice transfer activities can be revealed (Borgatti, 2011; Shazi, et al., 2015; Lynch, et al., 2016). Also, Burt (2007 and 2015) suggests analysing practice transfer activities from a network perspective, since networks can present the dynamics and structure of information exchange among participants in practice transfer.

The major barrier to practice transfer is that information can be difficult to diffuse across organisational borders between headquarters and local sites (Rogers, 1995; Weiblen and Chesbrough,, 2015; Gupta and Maltz, 2015; Aalbers et al., 2016). Thus, it is important to find out how to facilitate information exchange across organisational borders. In a practice transfer project, information exchange among participants is highly complex. Participants exchange information concurrently. These information exchange relations between participants form a complex network (Dasgupta, 2000; Westlund and Nilsson, 2005; Willem and Scarborough, 2006; Burt, 2007; Gilsing, et al., 2016). Thus, managing practice transfer has switched from thinking in terms of managing project teams to managing networks.

Practice transfer networks have the following features in theories. Information exchange among different professional groups is crucial to practice transfer. Such information exchange enables professionals to combine their knowledge and skills to complete the tasks

in practice transfer. Information exchange in practice transfer appears as communications between peers across different professional groups (Boudreau and Robey, 2005; Hofman, et al., 2016). In practice transfer projects, there is a great amount of information that needs to be exchanged between headquarters and subsidiaries (Inkpen and Tsang, 2005; Garud, et al., 2013; Bayat, Schøtt, and Zali, 2014; Leenders and Dolfsma, 2016). Information exchanges between different professionals result in the integration of knowledge and skills and create practice transfer (Cooke and Wills, 1999; Cooke, et al., 2005; Shazi, et al., 2015). When practice transfer requires knowledge across different professional groups, information exchange between these professional groups has a significant influence on performance (Gilsing and Nooteboom, 2005; Bayat, Schøtt, and Zali, 2014; Iacobucci and Hoeffler, 2016).

In sum, the evidence suggests practice transfer takes place in network structures where individual actors create ties to others in ways that support practice transfer. Not all actors play the same roles in the exchange of information. A key role that has emerged is that of broker. However, there has been little research that has systematically examined how the roles of brokerage actors involved in practice transfer change over time, and who performs these broker roles and the impact this might have on the effectiveness of the practice transfer outcomes. This research seeks to address this gap. Within this chapter the theory framework is set out which explains:

a) The dynamics of brokerage actors is about how they change according to the connections among participants being made in practice transfer. The question is therefore how brokerage roles evolved during practice transfer. This leads to the first research question proposed in the later section, what is the dynamics of brokerage

actors in practice transfer?

b) The network structures of brokerage roles created by the dynamics shows the various roles of brokerage actors. More importantly, this provides explanation in theories about why network structures can represent these brokerage roles. This leads to the second research question proposed in the later section, what are the roles and structures of brokerage actors in practice transfer?

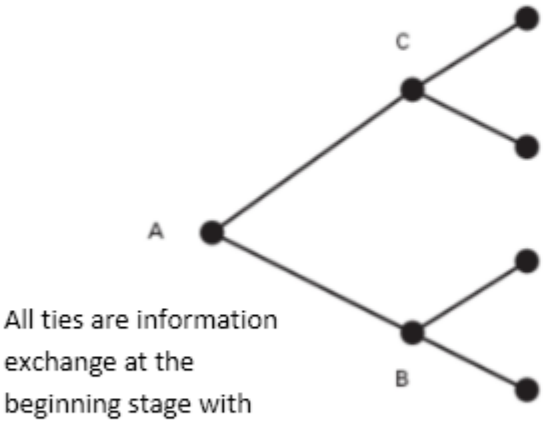
c) The influence of brokerage roles on practice transfer outcomes is that it increases knowledge exchange and shortens pathways. The aim here is to look at what the evidence suggests about the impact of brokerage roles on practice transfer outcomes. This leads to the third research question proposed in the later section, to what extent can brokerage actors influence the results of practice transfer?

3.3 The network dynamics of brokerage actors

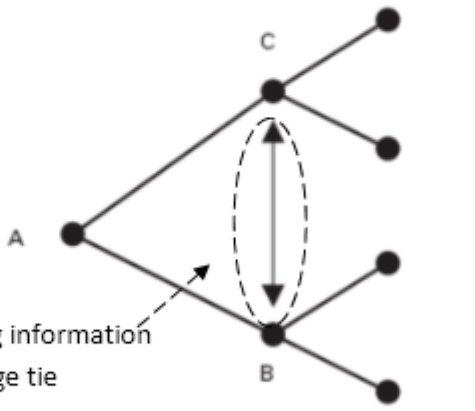
According to Burt's (2007) theory, networks do not stay static in practice transfer. The changes in network structures during time are not completely random (Watts, 1999; Powell and White, 2005; Johnston, 2006; Lazzeretti, and Capone, 2016). However, network

dynamics have received little attention (Clegg, et al., 2016). Obstfeld (2005) suggested that changing network dynamics is a process of creating new connections between participants in practice transfer. Thus, network dynamics can be understood as a series of network broker activities. In other words, the relationship between network dynamics and brokers is that network dynamics consists of a series of broker activities. A series of broker activities is a sequence of connection building among people in the network. Network dynamics is about introducing disconnected participants and facilitating information exchange between connected participants (Davis, 2016; Binz and Truffer, 2017). In network dynamics, brokerages are ongoing activities rather than just static network structures. Figure 3.1 shows *tertius iungens* activity (Obstfeld, 2005), there is a gap between B and C connected by A at the first stage (see Figure 3.1). Person A acts as a broker between B and C (stage 2) and a new information exchange tie is built up between B and C (stage 3). Such brokerages (stage 2) connect the gaps between people in the network. Then B can also become a broker to connect A and a new person D (stage 4).

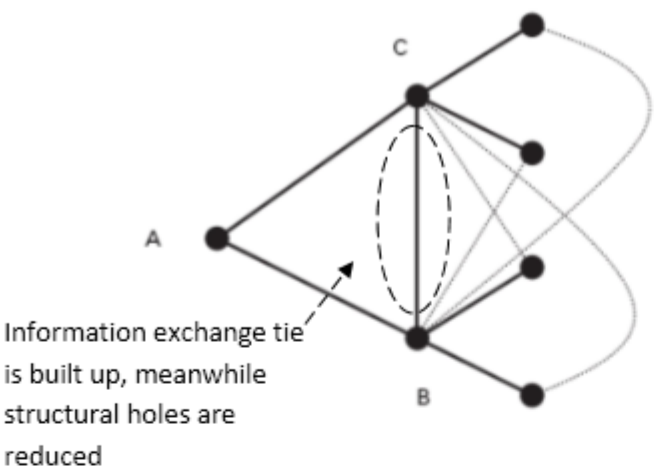
Figure 3.1 Network dynamics with *tertius iungens* activity



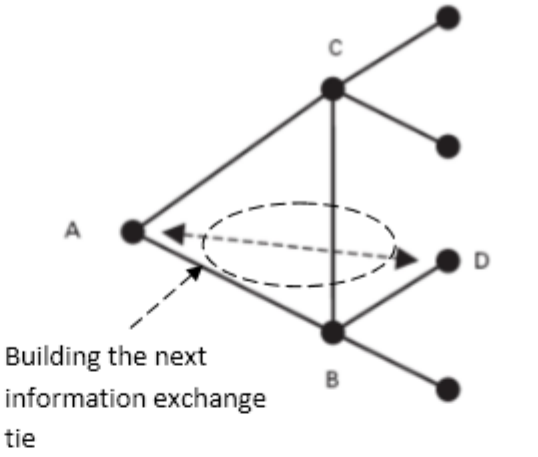
Network at Time 1



Time 2: Network after *tertius iungens* introduction



Time 3: New structural holes created



Time 4: Second reciprocal *tertius iungens* introduction

Source: Adapted from Obstfeld (2005)

A similar dynamic in practice transfer is also suggested by Rogers (1995). Information exchange among the participants in practice transfer over time is to combine different knowledge and skills. Such dynamics in practice transfer is described as a person that has the relevant knowledge or skills, another person that does not yet have relevant knowledge or skills, and setting up a communication tie connecting the two. In a large network, this dynamics can apply to between one and several people (Green and Brock, 2005; Afuah, 2013; Garud, Tuertscher, and Van de Ven, 2013). Following this process the network structure looks like that presented by Figure 3.1 as four stages. In stage 1, the needs for connections between people are identified by brokerage actors. In stage 2, those people need to be connected are introduced, information exchange between them is through brokerage actors. In stage 3, direct connection is set up between these people. In stage 4, brokerage actors seek for further needs for connections between people. Thus, it is clear that practice transfer network dynamics is about bridging the gaps between disconnected people. During this process, the network can facilitate new coordination and information exchange between otherwise disconnected individuals. Thus, network dynamics are important in practice transfer.

The last few paragraphs highlighted the importance of network dynamics in practice transfer. Then, what is the regularity of practice transfer network dynamics? Network structures can change during practice transfer (Johnston, 2006; Lazzeretti, and Capone, 2016). Thus, academic attentions have been drawn to the mechanism of practice transfer network dynamics. The structural hole theory (Burt, 1992, 1997, 2004, 2007 and 2015) suggests that the network evolves in the way of bridging the gaps between people. A practice transfer network usually starts with many gaps (or structure holes) between people. During practice

transfer, those gaps between people are strategically connected. In other words, practice transfer network structure usually begins with an open structure (or non-redundant structure) and evolves towards a closed structure (or redundant structure).

Network dynamics is shaped by the flow of practice transfer works (Burt, 2007). For example, headquarter needs to discuss the task with subsidiaries. This can be seen as 'pairing' people together in the network. Each time when 'pairing' occurs, a connection between two people is created in the network to represent the information exchange relation. From Burt's (2015) view, this is the mechanism which can bridge the structural holes in networks.

Burt (2007) summarised network dynamics as a cumulative process, where bridging structural holes is correlated with network density. A question left here is why network density matters and what kind of network density can influence bridging structural holes? Network density is measured by the number of ties in a given network, especially the ties connected to the mutual third parties (Granovetter, 1973, 1985 and 1992; Gargiulo and Benassi, 2000; Burt, 2007; Dagnino, et al., 2016). The focal node is called ego, and a node directly connected to ego is called alter (Burt, 2007). For example, Figure 3.2 shows that in the situation "no relation", there is no information exchange between ego and alter. In the situation "weak relation", there is an information exchange relationship between ego and alter with other people on the outside (see the Figure 3.2). However, those third parties are not 'common friends' (this section uses the term 'common/mutual friends' to describe the mutual third party in a practice transfer network only which does not refer to friendship), since they are not connected to each other. Thus, according to Granovetter (1973, 1985 and 1992) and Burt (2007)'s theories, the relation between ego and alter is still weak. Connections with the

'common friends' are required to make information exchange happen in this situation. In this situation, ego and alter are the only information source to each other, every information exchange between ego and alter cannot be verified by anyone else. For example, a creative idea without confirmation from a reliable third party could be considered as risky. Thus, information exchange in practice transfer usually requires ego and alter to have some mutual third parties surrounding them for the information exchange relationship to be successful.

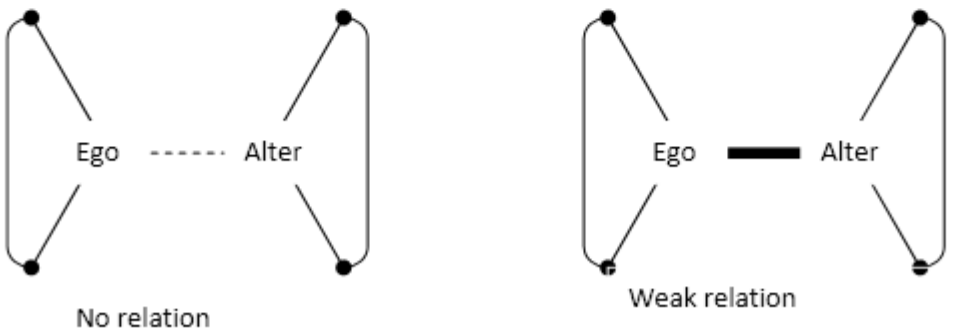


Figure 3.2 The strength of relation in network, adapted from Burt (2007)

Based on the discussion above, the regular patterns of practice transfer network dynamics are 'bridging the gaps' between disconnected people through the mutual third parties in the network. Bridging the gaps between disconnected people means setting up information exchange relations and teamwork between people. Thus, this research suggests that the regular patterns of practice transfer network dynamics are mutual third parties bridging the gaps between disconnected people. A successful practice transfer network can benefit from strategically bridging the gaps between participants to improve practice transfer outcomes. What we understand less is how the gaps between participants in practice transfer networks can be strategically bridged. This study therefore proposes the first research question:

Research Question 1: What is the dynamics of brokerage actors in practice transfer?

Although this regularity of practice transfer network dynamics has been proposed in this section, the challenge is how to bridge disconnected participants in complex practice transfer networks. Thus, it is necessary to discuss the various ways that brokering roles might connect people in networks. As discussed before, practice transfer is shifting away from headquarter-subsidiary collaboration to headquarter-broker-subsidiary collaboration. Brokers' roles are not clearly identified in practice transfer networks. Each professional group in a practice transfer network has an interface and structural boundary. The interface is the brokers connecting information exchange between different professional groups and the structural boundary is the gaps bridged by brokers in the information exchange between different professional groups (Burt, 2007; Fleming and Mingo, 2007; Lee, 2009). Information can be transmitted at the interface with brokers where people from different professional groups can

be connected by a few brokers (Starkey and Tempest, 2004; Zou and Ingram, 2013). Studies suggest that the information brokerage process in the network is crucial since it can turn the information exchange paths between people into short pathways thus accelerating the information exchange (Granovetter 1974; Coleman, 1988 and 1990; Dyer, and Singh, 1998). Thus, this study proposes brokers as the regular patterns of practice transfer network dynamics.

3.4 The network structures of brokerage actors

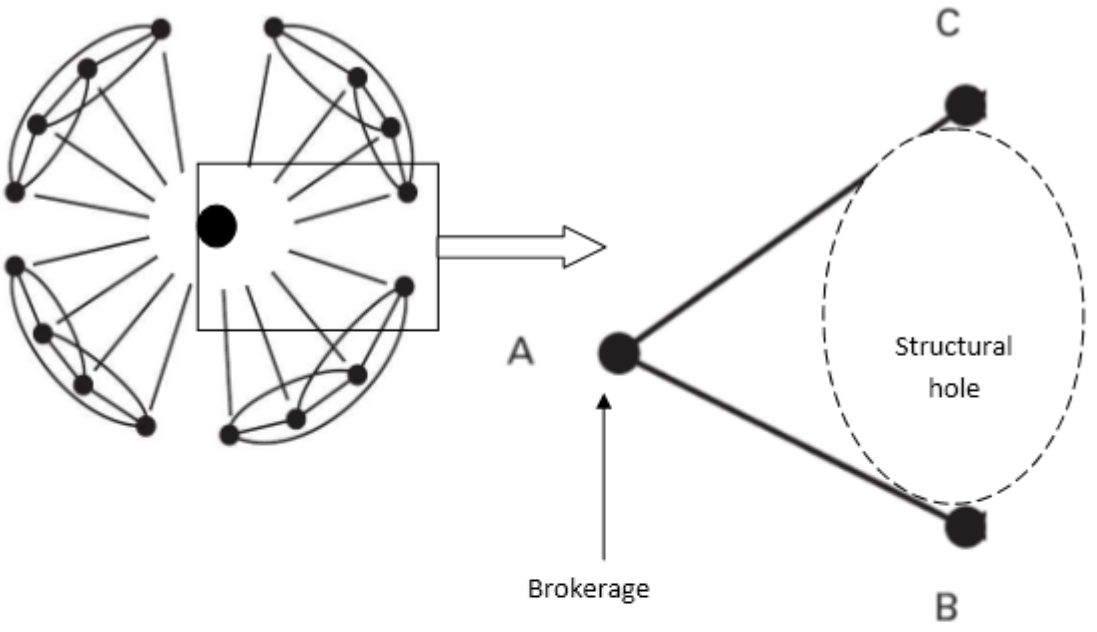
There are two network structures related to the performance of a network, open and closed structures (Burt, 2007). Open structures of networks relate to connecting people in networks, which is important to bridging information exchange. On the other hand, closed structures of a network relate to network stability, which can facilitate information exchange and insure practice transfer from risks. Thus, this section discusses how open and closed network structures are related to practice transfer.

Open network

Open network structures are related to brokerage actors for translating information, since they are about bridging information exchange in practice transfer. Scholars have acknowledged that open structure is valuable in practice transfer networks (Burt, 1992, 2004, and 2007; Podolny and Baron, 1997). A first question is what is an open structure network? Brokers are

people bridging information exchange in networks. The gaps between people in the network are concerned as structural holes (see Figure 3.3). Structural holes are defined as gaps between people that can be strategically connected to affect their behaviours in networks (Burt, 2007 and 2015). Structural holes are gaps between disconnected contacts in networks (Badaracco, 1991; Batjarga, 2003, 2006 and 2007; Nohria and Eccles, 1992; Grootaert, 2001). Thus, structural holes can measure the constraints and opportunities in networks (Burt, 1992 and 2004). Brokers are the linkages between people in networks and structural holes are the gaps that can be bridged by brokers (see Figure 3.3).

Figure 3.3 Open network



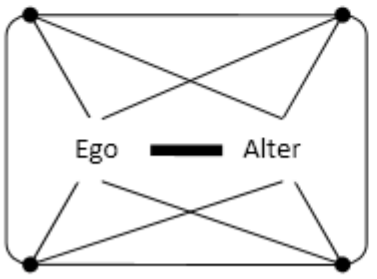
Previous research found the positive impacts of open network structures in practice transfer (Burt, 2007 and 2015). Open network structures can combine diverse knowledge and skills from different organisations in practice transfer. The information exchange in open network

structures usually relies on brokerage actors as translators, due to the organisational boundaries between people. Open network structures usually are very creative since it can combine diverse knowledge and skills. However, practice transfer progress in open network structures is usually slow, since the information exchange between people relies on brokerage actors as translators. In other words, the brokerage process in the network can also slow down practice transfer progress. In contrast, closed network structures, which are discussed later, can progress fast, since most of the information exchanges are through direct contacts. Thus, open network structures are usually creative, however, not efficient (Burt, 2007 and 2015).

Closed network

Closed network structures are related to brokerage actors for bridging institutions and embedding codified practices, since they can facilitate information exchange and insure practice transfer from risks. Scholars have drawn attentions to closed structures in practice transfer networks. The closed structures of networks are also called as closure and embedding (Uzzi, 1996; Burt, 2007; Yan and Fang, 2014). The closure is a fully connected network of people (Blau, 1968 and 1982; Burt, 2007; Burt and Merluzzi, 2014). Embedding is a situation that people are surrounded by mutual contacts (Burt, 2007; Burt et al., 2014). Thus, a closed network is a dense network where most of the people are connected to each other (see Figure 3.4).

Figure 3.4 Closed network



Ego and alter are in a closed network surrounded by mutual contacts

Why is a closed network structure valuable in practice transfer networks? Previous research found the positive impacts of closed network structures in practice transfer (Yound and Snell; 2004; Cano-Kollmann et al., 2016). Closed network structures can result in high efficiency. Practice transfer progress in closed network structures is usually very fast. The reason is that positive and strong mutual contacts between two people can facilitate information exchange between them. Those mutual contacts can be the multiple information sources for confirming information, therefore, lower the risk for either person trusting the information. In contrast to open network structures, closed network structures rely on different roles of brokerage actors. Information exchanges between people in a fully connected network are usually direct contacts. Thus, it does not rely on brokerage actors as translators, instead, it requires

brokerage actors for bridging institutions and embedding codified practices. However, closed network structures are usually not creative, since people are usually surrounded by direct contacts from the same organisation or professional group (Carroll and Teo, 1996; Hargadon, 2003). Thus, closed network structures are usually efficient (Friedkin, 1981 and1982; Chung and Gibbons, 1997) however, not creative (Burt, 2007 and 2015).

Comparison of open and closed network

Uzzi (1999) suggests that closed network structures between people can facilitate information exchange since information can be quickly spread through interlocking connections. People who are fully connected to each other are more likely to share new information and try different strategies (Yound and Snell; 2004; Cano-Kollmann et al., 2016). However, closed network structures between people may also restrict the range of information access. Granovetter (1992) argued that new information usually comes from people who are not involved in the closed network structures. The exchange of "new information" is crucial to practice transfer (Burt, 2007 and 2015). New information means information has not been shared with the receivers before. Those people in open network structures usually have different backgrounds and skills and can offer new information and advance practice transfer. Thus, this research suggests that the regular patterns in brokerage actor structures are information exchange in both open and closed structures.

As mentioned in the last paragraph, the empirical findings in the previous studies in practice transfer network can be classified into: (1) those findings that encourage an open structure with structural holes and brokerage, and (2) those findings that encourage the opposite of an open structure, a closed structure with embedding and closure. The empirical findings encouraging open structures focused on structural holes. Structural holes are the gaps between people with different backgrounds and skills. The empirical findings encouraging the open structure network found that diverse information from people with different backgrounds and skills can advance the social capital and benefit both the individuals and organisations. Also, there are empirical findings encouraging the opposite of an open structure network, closed structure network with embedding and closure. Embedding is the opposite of structural holes. Structural holes treat the gaps between people as an asset. Quite the contrary, embedding treats the strong ties between people as an asset.

There is a weakness in network theory, when explaining the co-existence of open and closed structures (Burt, 2007). Whether they can co-exist in a network was also argued by previous research in the area of network influences (DiMaggio et al. 2001; Cooke et al. 2005). Thus, the regular patterns of brokerage actors' network structures are unclear. The emerging brokerage actors and information exchange relies on reducing structural holes in networks. In other words, practice transfer networks need structural holes in the open structure, however, information exchange in practice transfer requires the opposite, embedding the information exchange relations in the closed structure.

Can a practice transfer network have both open and closed structures in it? Closed structures in the network provide efficiency; however, creativity in collaborations requires open

structures. In other words, how can a practice transfer network be efficient and creative? Open and closed networks appear contradictory to each other. In other words, the condition of a broker emerging relies on the opposite of structural holes, embedding. What is a problem in open network structures is an asset in closed network structures. Similarly, what is a problem in closed network structures is an asset in open network structures. Structural holes and brokerage treat the open structure as valuable. In opposition, closure and embedding treat the closed structure as valuable.

As discussed above, network structures in practice transfer networks needs further research (Burt, 2007 and 2015). Information exchange relations are concerned as ties among people in practice transfer networks (Aalbers, Dolfsma, and Koppiu, 2013). The structure of those information exchange ties among people needs to be analysed to reveal the broker roles. Practice transfer networks can present the collaborations between people from different organisations (Friedkin, 1993 and 1999; Bernardi, 2012). Then, those collaborations in practice transfer networks need be analysed at interpersonal level to reveal the brokerage roles (Beugelsdijk and Van Schaik, 2005; Gulati, 1999). Therefore, all the above discussion on open and closed network structures leads to the second research question.

Research Question 2: What are the roles and structures of brokerage actors in practice transfer?

3.5 The network influences of brokerage actors

Open network structures explain how the information flow crosses the structural holes. This influences how people share the non-redundant sources of information in practice transfer. Thus, brokerage actors for translating information, which are related to open network structures, can influence the information flow. Closed network structures explain reducing structural holes between people in the network, in other words, new information exchange ties added between people. This influences whether practice transfer can be completed quickly. Thus, brokerage actors for bridging institutions and embedding codified practices, which are related to closed network structures, can influence the practice transfer progress.

Both of open and closed network structures can have positive influences on practice transfer. This is consistent with the previous discussion about the positive influences of the three brokerage actor roles, since open network structures representing brokerage actors for translating information and closed network structures representing brokerage actors for bridging institutions and embedding codified practices. Burt (2007) suggested open and

closed network structures can be measured separately by measuring the network constraints[1], however, then they should be synthesised as the open-closed tension (see Figure 3.5) to evaluate network performance.

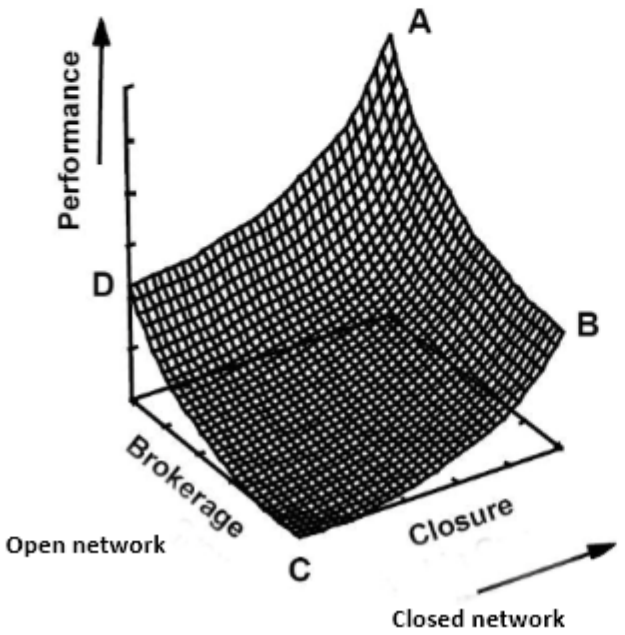


Figure 3.5 Brokerage-closure tension from Burt (2007, P226)

[1] Burt's (1992) measure of constraint in information exchange networks will provide a measure of brokerage and closure. In the following formula, c_{ij} means the constrain between node i and node j in network k, p_{ijk} refers to the proportion of the total relational strength that ego devotes to a given alter in proportion to the sum of relational strengths of all other of ego's alter ties, and $\sum p_{iqk} p_{qjk}$ captures the degree of triadic closure between i, j, and third parties q in network k (Burt 1992).

$$c_{ijk} = \left(p_{ijk} + \sum_{q \neq i \neq j}^{Q} p_{iqk} p_{qjk} \right)^2$$

There is a common error in applying Burt's theory, which is to consider open and closed network structures separately. Rather than considering a network is open or closed, a network can have open parts and closed parts. To resolve this issue in the theory, this study proposes a core-periphery network model which contains: (1) brokerage actors as the core of the network and (2) the periphery consists of heterogeneous people (for examples, headquarter staff and subsidiary staff). Core-periphery means a network structure, which is a group of inter-connected people in the centre connecting the others surrounding them (Burt, 2007). A core-periphery network offers the core as closed network structures for brokerage actors and the periphery as open structures for practice transfer. A core-periphery network has the following features. (1) Information exchange network in practice transfer project follows a core-periphery structure. The contradiction between closed and open structure is actually not true, they can co-exist in a core-periphery structure. (2) Brokerage and structural holes are the mechanisms of information exchange between heterogeneous groups. It can explain the influences of brokerage actors for translating information. (3) And closure-embedding is the condition of information exchange between heterogeneous groups. It can explain the influences of brokerage actors for bridging institutions and embedding codified practices. Based on above discussion, this study proposes the third research question.

Research Question 3: To what extent can brokerage actors influence the results of practice transfer?

3.6 Summary and research questions

The practice transfer network presents the dynamics and structure of information exchange among participants in practice transfer. The regular patterns in practice transfer activities can be found in networks. For example, Burt (2007 and 2015) suggested that strategically connecting people can provide opportunities to access information in practice transfer. If information is not efficiently shared across organisations, practice transfer can hardly be achieved (Hargadon, 2003). In practice transfer, information exchange across the boundaries between organisations is concerned as a crucial factor in combining knowledge and skills from different fields (Davidsson and Honig, 2003). Information exchange across organisations usually relies on new cross-disciplinary roles in networks. These new cross-disciplinary roles are also known as brokerage actors. These new cross-disciplinary roles in practice transfer can be analysed in network dynamics and structures (Vasudeva, Zaheer, and Hernandez, 2012).

Information exchange in practice transfer is not static. Practice transfer activities are moving away from the traditional way of headquarter-subsidiary to a new way of practice transfer collaboration between different professionals through the whole practice transfer process (Funk, 2012; Fang, et al., 2015). In the traditional way of headquarter- subsidiary, information exchange across different organisations usually happens when the headquarter tasks are finished and switch to the subsidiaries' tasks stage. This has been shifted in that information exchange between organisations is constantly required through the whole practice transfer process. This change results in the structure of information exchange in

practice transfer becoming more complex. It raises questions about the role of brokerage actors, and how they operate to manage the dynamics and structures of network involved in practice transfer over time. Thus, this study seeks to explore three questions:

Research Question 1: What are the dynamics of brokerage actors in practice transfer?

Research Question 2: What are the roles and structures of brokerage actors in practice transfer?

Research Question 3: To what extent can brokerage actors influence the results of practice transfer?

The links between the research questions are among the network dynamics, structure and influences. The first research question starts to explore how a network evolves from no connections to a large number of highly complex connections during the progress of a practice transfer project. Thus, the first research question focuses on how brokerage actors as brokers emerge to improve the connectivity in the network. As a result of the increased number of brokerage actors as brokers in the network, the network structure becomes more complex. Therefore, the network structure becomes the focus for the second research question. One regular pattern in the network is the closed structure due to the increased number of actors operating in broker roles. In the closed structures, people are more interconnected by brokerage actors. The other regular pattern in the network is the open structure. The second research question proposes that the brokers do not only result in creating closed structures (as interconnected people in the network), but also the open structures (as people connected by a third person). Thus, the second research question

proposes two regular patterns of network structures co-exist within practice transfer networks. Then, the third research question is to test the relations between these brokerage actor structures and practice transfer outcomes.

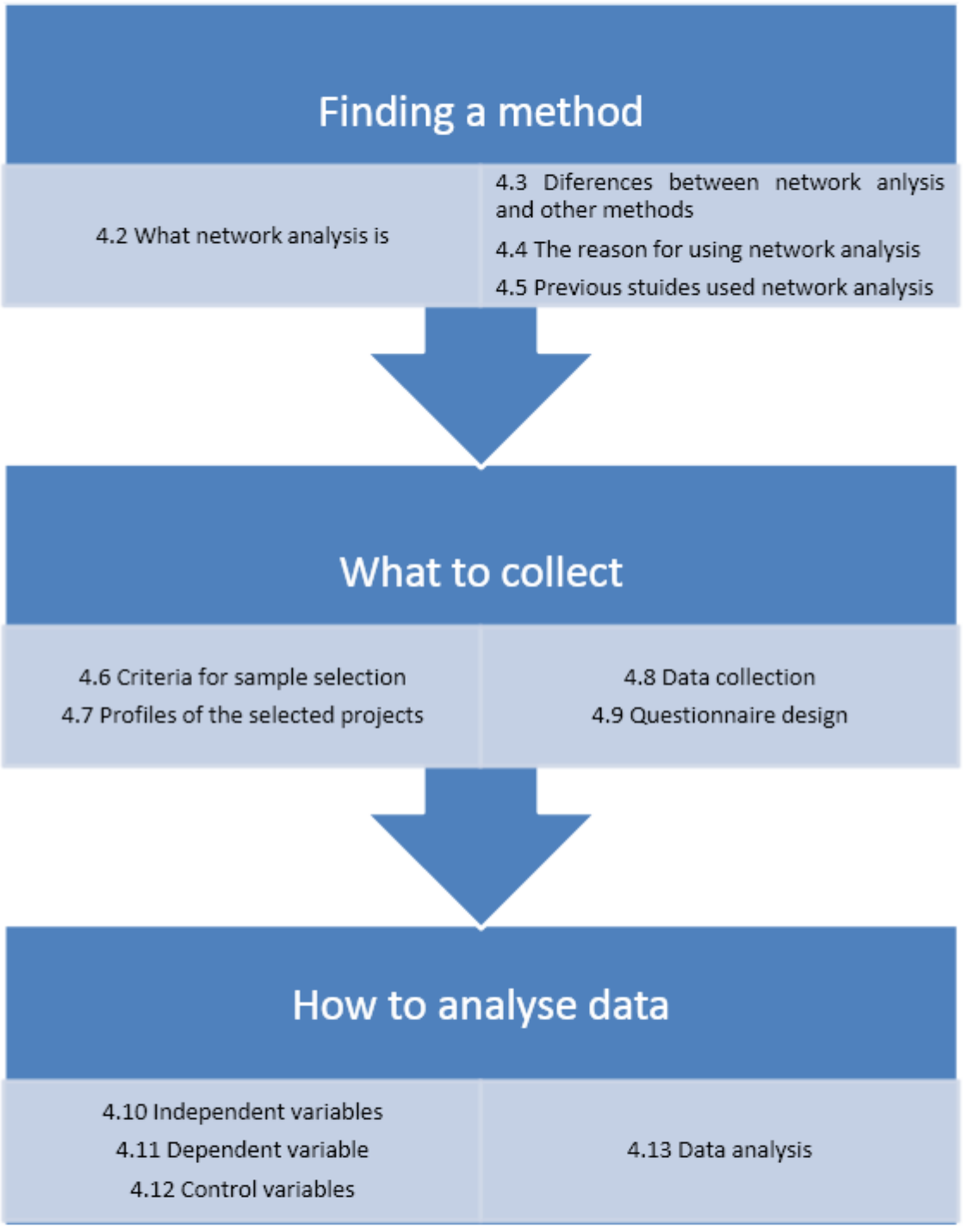
Chapter 4 Methodology

4.1 Introduction

This chapter is structured as three main parts (see Figure 4.1). These three parts are finding a method, collecting data, and analysing data. First, this chapter discusses what method is used and the reasons. Second, how the data about networks are collected. Third, this chapter discusses how to use network regression modelling with the results from network analysis to explore the network influence, in other words, regression modelling using the results from network analysis as variables. This chapter also discusses how to analyse and visualise the dynamics and structures of networks. Following the sub-section on the approach to data analysis, this chapter outlines the methodological issues and philosophical discussion about network analysis.

The field work was conducted during the first quarter of 2018 which captured the start to completion of each practice transfer project. The data collected by questionnaire survey cover the entire project stages to reveal the dynamics, structures and influence of brokerage actors. The survey was conducted with all the participants in four practice transfer projects, which include directors, subsidiary staff, headquarter staff, advisors, project managers, budget managers, assistant project managers, and administrators.

Figure 4.1 The structure of this chapter



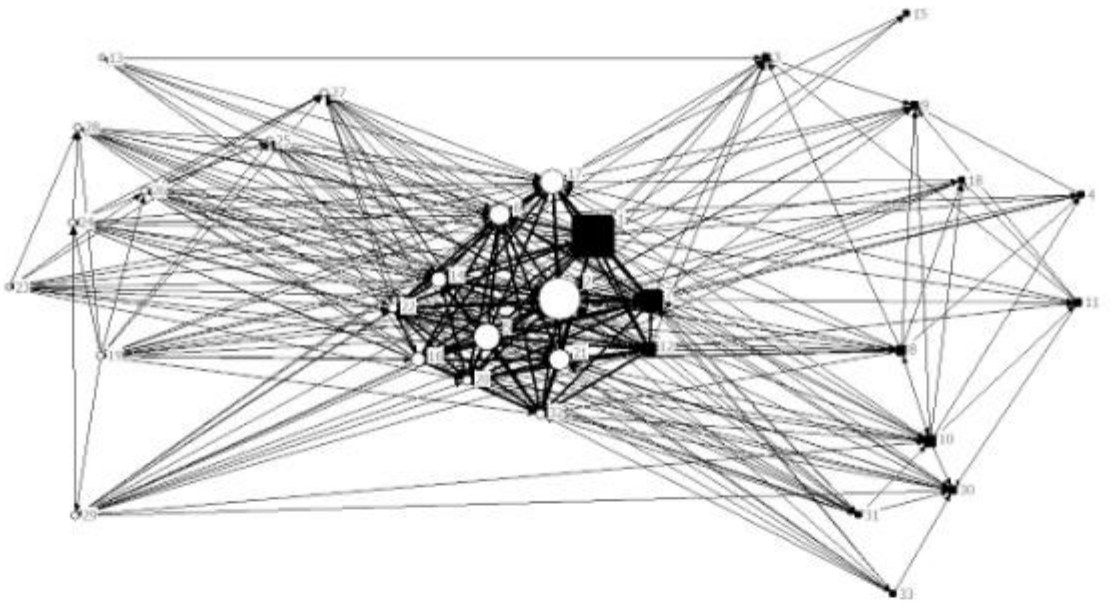
4.2 Network analysis

Network analysis is a method for investigating structures, dynamics and influences caused by multiple actors with complex connections (Wasserman and Faust, 1994; Snijders, et al., 2010). Networks are conceptualised as nodes and ties connecting them. Network analysis usually provides quantitative analysis and network visualisation. Network analysis has been adopted to analyse business activities (Burt, 1992, 2004 and 2007). This research adopts network analysis to analyse how people are engaged on particular practice transfer projects. Especially, how information are exchanged among participants in each practice transfer project. Network analysis can provide the visualisation of the structure of information exchange among people. Each network visualisation is presented as a network snapshot. A network snapshot represents the information exchange relationships among the people who participate in a particular practice transfer project at a given point in time. In this research, network analysis is used to visualise the structures and dynamics of network.

'Tie' and 'relationship' as terms are frequently used in this research. In this research, the word 'tie' refers to the connections among people in networks. The word 'relationship' refers to causality relations, for example, it refers to the cause and effect relation between networks and practice transfer outcomes in the network influence findings. Figure 4.2 provides a hypothetical example of a network snapshot during practice transfer. In this snapshot, the nodes with different shapes represent participants with different roles in practice transfer (in Figure 4.2). The ties among them show the information exchange relations that occurred in the practice transfer. The content of these information exchange relations can include

proposing ideas, confirming information, and decision making. The thickness of each tie represents the frequency of information exchange, which means how often this information exchange happens. The people in the centre of the network are the brokerage actors connecting headquarter and the local subsidiary. This is measured by a brokerage score which is discussed in the later independent variable section. The size of each node represents the person's brokerage score, which measures to what extent the person is a brokerage actor.

Figure 4.2 A network example



Staff from headquarter Staff form local subsidiary

Information exchange tie

Network analysis can also quantify and compare network patterns (Wasserman and Faust, 1994). For example, this study focuses on the people who act as brokerage actors in the

centre of the network. Network analysis takes account of three elements in networks, i.e. actors, ties, and mechanism (Conway and Steward, 2009).

Nodes (or actors): In this research, actors are the participants in each selected practice transfer project. Information exchange activities (Rogers, 1995) are relationships between individual participants. A network represents activities between individual participants (Burt, 2007 and 2015).

Ties (or links): In this research, the ties represent information exchange relationships among participants involved in the practice transfer. Information exchange ties include both providing and receiving information. Information exchanges are concerned as directed relational ties among participants in each selected practice transfer project. The content of each information exchange is related to the practice transfer project. The content of information exchange includes proposing ideas, confirming information, and decision-making related information.

Mechanism: In this research, the mechanism is brokerage in the network. This network mechanism is based on network theory (Burt, 2007 and 2015). This network mechanism can help to find out the patterns in each network. For example, some types of brokerage actors can be found as significantly important in networks.

Based on the main elements in network analysis, network analysis can provide results about network dynamics, structure and influence. Network structure and dynamics can be analysed by visualising the network across time during the practice transfer project. And then the regular patterns of how the practice transfer network evolves can be analysed. The network structure can be quantified as regular patterns in the network, such as brokerage and centrality. For example, a brokerage score can specify the extent to which they play the role of brokerage actor. Centrality values can quantify a person's network location in terms of the person's connections in the network. Eventually, network influence can be found out from these quantified network patterns. These quantified network patterns can be tested against practice transfer outcomes using statistical modelling. Therefore, network analysis can be used to represent, analyse and theorise about activities and systematic characteristics in networks (Berkowitz, 1982). Such activities and characteristics are, for example, brokerage actors, the network locations of them (centrality), and the network dynamics.

4.3 The differences between network analysis and other methods

Difference 1: Comparing to a qualitative method

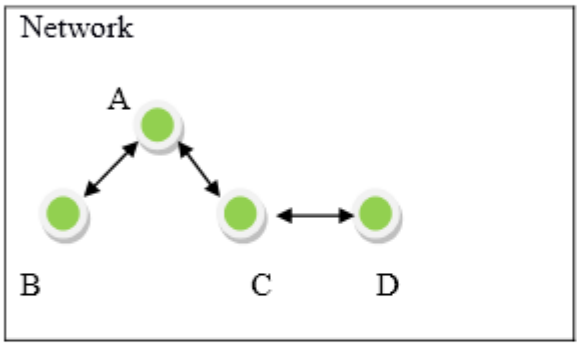
First, a qualitative approach can be adopted to analyse network dynamics. The complex interactions between participants can be drawn as network snapshots through the analysis of interview data. These network snapshots can present how networks evolve. Then regular patterns of network dynamics can be revealed. Comparing to a qualitative approach such as

the case study, network analysis can quantify the pattern of network dynamics and enable actor-based modelling. The network modelling approach can provide quantified and comparable results about a network. Thus, the analysis yielded through network dynamics can provide not only details about regular patterns but also quantified results which can be used in regression modelling to test network influence.

Difference 2: Comparing to a quantitative method

Traditional survey based statistical methods are not able to represent networks in the same way. For example, Person A connects to persons B, C, and, indirectly, D (see Figure 4.3). In network data, this network is coded as a matrix with Person A, B, C and D as both column and row. If there is a connection between two of them, there is 1 at the intersection. If not, there is 0 at intersections. The network can be drawn based on the numbers in the matrix. In statistical data, this network is coded as a table with Person A, B, C, D as the row, and number of connections as the column. However, the network cannot be drawn based on the numbers in statistical data. The reason is that the network cannot be drawn based on how many connections each person has. Statistical data does not contain information about who is connected to whom. There are many different networks which can all have the same number of connections for each person but have different structures (as illustrated in Figure 4.3).

Figure 4.3 Comparison of network data and statistical data



Network data representing the network above

	A	B	C	D
A	0	1	1	0
B	1	0	0	0
C	1	0	0	1
D	0	0	1	0

Statistical data representing the network above

	Number of connections
A	2
B	1
C	1
D	1

Also, statistic regression modelling focuses on the relationships between variables. However, the details of these variables are usually missing. Regression modelling can provide analysis in network influence, but have a very limited contribution to the understanding of the details about network dynamics and structure. Compared to regression modelling, network analysis provides more details about network structures. The differences between network regression modelling and statistic regression modelling are discussed further in the later data analysis section.

Difference 3: Comparing to both qualitative and quantitative methods

The discussion above compared network analysis with qualitative and quantitative methods separately, here we consider how network analysis triangulates with qualitative and quantitative approaches. Qualitative designs are usually more descriptive in details than quantitative designs (Glaser and Strauss, 1967). The reason is that case studies with interviews use the mass of qualitative data to relate more strongly to theory (Yin, 1999 and 2003). However, it is difficult to provide accurate modelling or prediction of network influence by using qualitative approaches. Comparing to both qualitative and quantitative methods, the results of network analysis can provide quantitative modelling of network influence and qualitative details about network structures and dynamics.

The advantages of network analysis are 1) abstraction and 2) theory building (Borgatti, 2012). First, network analysis research usually abstracts connections into networks and focuses on the network structure and the changes during time. The abstraction can cover the details of

networks. For example, the connection structures are represented in a network. From the network perspective, a network covers the ties and presents them as diagrams. Second, theory building by using network analysis has an assumption that the position of each person in a network is an indicator of practice transfer outcomes. However, the position of each person in a network is difficult to be defined and measured. For example, people in the centre of the network may be defined as well-connected. Such pre-defined findings and concepts in research may restrict research to develop new findings and concepts. To overcome this issue, network analysis provides a way to measure the position of each person in a network. Thus, network analysis is used to explore the regular patterns of network structure rather than confirm pre-defined findings and concepts.

Based on above discussion, this study suggests that 1) network analysis can provide analysis of network influences, structures and dynamics, 2) comparing to a quantitative method, network analysis can provide better analysis in the details of network patterns, and 3) comparing to a qualitative method, network analysis can quantify network patterns and test network influence. Network analysis can help to understand the complex dynamics of networks (Burt, 2007). It can also help to understand the cause-effect relations in networks (Bogartti, 2011). Thus, this research chooses a network approach to address the research questions of this thesis.

4.4 The reasons for using network analysis

The research questions proposed in this research have required the analysis of network dynamics (research question 1), structures (research question 2) and influence (research question 3). This study suggests using network analysis to answer these research questions. There are four reasons for using network analysis in this research, 1) for analysing the network dynamics of brokerage actors, 2) for analysing new network structures and actor roles, 3) for analysing the influences of brokerage actors, and 4) qualification for testing network influences.

This research aims to improve the theories in brokerage actor with data in practice transfer projects. Network analysis enables analysing various network actors and connection structures in the context of practice transfer. The choice of this method can also be generalisable within similar business contexts. In the following paragraphs, this section is to discuss the reasons for using network analysis from four aspects: 1) analysing the network dynamics, 2) analysing new network structures and actor roles, 3) analysing the network influences of brokerage actors, and 4) qualification of network influences.

Reason 1 for using network analysis: The dynamics of brokerage actors

Networks do not only represent an individual's work in practice transfer but also how that work is put together to achieve practice transfer. In practice transfer, people usually work as a team and concurrently exchange information with each other rather than as individuals on separate tasks (Rogers, 1962 and 1995). To analyse the practice transfer activities among participants, a network needs to present the dynamics of relations among a set of actors. This cannot be analysed by quantitative methods, such as regression modelling or structural equation modelling (Snijders et al., 2010). For example, how do the information exchange relations evolve among all participants in a network? Network analysis can help to understand the complex dynamics of networks (Burt, 2007). Network dynamics can be presented as several sets of snapshots at different stages of practice transfer. Those network snapshots can show the changes in information exchange relationships across different stages of practice transfer. For example, those network snapshots can be used to compare the changes in information exchange relationships among actors in a network. Thus, this research adopts network analysis to provide network snapshots about the connectivity and interdependence between people across different stages of practice transfer.

Reason 2 for using network analysis: New network structures and brokerage actor roles

New brokerage actor roles require reconfiguration of analysis approaches (Burt, 2012 and 2015). These new actor roles cannot be readily dealt with by case study or structural equation

modelling (Borgatti, 2011). The reason is that these new actor roles do not emerge with formal titles appointed by an organisation. For example, a manager can act as an actor to bridge information gaps between people, but this person's perception of his or her own role may still be a manager rather than a network actor. To explore the new brokerage actor roles, this research adopts network analysis to analyse the structures of those people's connections in networks.

Reason 3 for using network analysis: Analysing the influences of brokerage actors

Network analysis can provide not only the snapshot of the overall network structure but also each person's own sub-network structure (also known as ego network, Hanneman and Riddle, 2005). The comparison of each person's own sub-network structure and practice transfer outcomes can provide further analysis about the influences of the network. Case study and equation modelling can only deal with dyadic relations (relations between two parties) in networks. Those traditional analysis approaches such as regression modelling or case study cannot provide information about the complex network influences, such as brokerage and centralities (Snijders et al., 2010; Borgatti, 2011). Thus, this research uses network analysis to analyse network influences. Also, there are arguments about how case studies can result in inaccurate results about network influences (Borgatti, 2011). The complex connections among people in networks usually need quantification in analysis. Snijders et al. (2010) argued that it is difficult to identify the overall network influence and structure without using

network analysis. Thus, this research uses network analysis to analyse the influences of brokerage actors.

Reason 4 for using network analysis: Quantification

Quantification is a feature of network analysis (Burt, 2013). Network analysis can provide quantitative results about network patterns. Network analysis can quantify the structure of information exchange ties in each network, brokerage roles, and each person's location in the network. These complex network patterns are difficult to quantify by traditional analysis approaches. Quantified network patterns can be used in regression modelling. This can help to find out the brokerage actor influences on practice outcomes. To explore the brokerage actor influences, this study uses network analysis to provide quantification of networks.

Overall, to answer the research questions, network analysis can present the overall structure of the network of each practice transfer project. This can help to understand the inter-personal level interactions by conceptualising individuals as the actors (or nodes) and interactions between individuals as the ties (or links). Complex networks usually have regular patterns in structures and dynamics, these patterns can be observed from the network snapshots generated by network analysis. In network snapshots, general patterns of inter-personal level interactions and their evolution can be observed and analysed. Also network analysis can provide the depictions and quantification of these interactions among people. Thus, this study uses network analysis to analyse these inter-personal level interactions.

4.5 Previous studies used network analysis

The previous studies in business management that used network analysis includes the following: individual level such as teamwork, organisational level such as manager employment changes, industry level such as firm alliances, policy level such as firm clusters, and team level such as functional units within companies. This section discusses these uses of network analysis.

At the individual level, a number of studies explored the relationship between teamwork structures (who works with whom) as networks and team performance by using network analysis. These studies are discussed in the previous theoretical framework chapter. Thus, here only provides a brief summary of them. Method wise, these studies collected data by various methods such as questionnaire survey, interview, and mixed method of both. They mainly tested how individual characteristics, such as age, education, work position, and work experiences, are associated with their positions in networks (Tilson et al., 2010; Yoo et al., 2010; Svahn et al., 2017). Also, some studies tried to add motivation in their models, to test if creativity and motivation together can influence team performance (Nan, 2011; Svahn et al., 2017). As mentioned in the previous theoretical framework chapter, these studies suggested there are relationships between individual's network position and performance, but neither individual creativity nor motivation was found to have a strong influence on team

performance. Those studies provided implications on how individual level factors influence performance in networks.

In terms of the organisational level, Tregaskis and Almond (2019) investigated how the subsidiaries of multinationals connect with key actors in terms of labour market skills. They conducted 51 semi-structured interviews with 53 respondents. Their findings revealed three points about embeddingness. 1) The network power structures can be different within the same national policy framework, and the networks structure differently in response, in order to achieve collaborative learning and innovation outcomes. 2) Sub-clusters can help competitors achieve competitive advantages by occupying different parts within the network. 3) Networks provide long term relationships to facilitate shared learning. Some other scholars tested changes in manager's employment as networks influence firm performance. They suggested that secure employment can offer high commitment in the long-term and manager's ability for managing people across teams can influence firm performance (Brhel et al., 2015; Lyytinen et al., 2016; Parker et al., 2017). Their findings showed there was no relationship between managers' networks and firm performances. Parker et al. (2017) conducted a longitudinal study with UK companies on the relationship between manager movements and firm performances. Their findings support that firm performance is positively associated with manager's movement across sectors. Brhel et al. (2015) and Lyytinen et al. (2016) provided similar findings by using network analysis and qualitative analysis with data collected from 173 European and US firms. Also, research conducted by Dougherty and Dunne (2014) and Yoo et al. (2010) suggest that firm performances rely on managing information exchange networks, which allows employees to get access to the information for

their particular needs. Network analysis was used in this area to show that how actors access information through networks is a key explanation underpinning firm success.

At the industry level, some scholars studied the effects of firm alliance networks (Lyytinen and Rose, 2003; Colombo et al., 2014). These existing studies have found that the impact of teamwork and information exchange in networks on firm performance is always significant (Hanseth and Lyytinen, 2010; Iansiti and Lakhani, 2014). Orlikowski (1996) used network analysis to find out what are effective in firm collaboration activities. It has been demonstrated that teamwork relations can bring positive returns to firm alliance (Colombo et al., 2014). And it will also bring advantages to the firms by facilitating trust and reciprocity. Network analysis was used in this area to demonstrate that teamwork and information exchange are critical in firm collaborations.

At the policy level, Monaghan, Gunnigle and Lavelle (2014) conducted 59 semi-structured interviews with 33 actors in multinational companies, national and subnational institutions in Ireland. They found that connections with subnational institutions can help foreign market entry. Particularly, these connections can help multinational companies to find opportunities in the local environment for foreign market entry. And commitment decisions can be achieved through these connections with subnational institutions. Also, these connections can facilitate learning and trust building. Other existing studies (Greenstein et al., 2013; Bhatt et al., 2016; Munir et al., 2016) explored the relationships between firm cluster policy and firm performance outcomes. These existing studies investigated how policies for forming firm clusters have effects on performance outcomes. These studies suggested that firm cluster policies can encourage and support business activities. However, they cannot explain the

variance in firm performance outcomes from organisations under the same policy. Organisations can have different performance under the same policy (Boudreau, 2010; Munir et al., 2016). Overall, these existing studies used network analysis to reflect the policy influences on firm networks.

At the team level, Boudreau (2010) analyses company's functional units as networks. Organisations are often multiunit organisational structures. Each unit needs information from each other to complete their tasks. The results suggest that these units can benefit from new information developed by other units. And such information exchange networks among organisational units provide opportunities for firm development. The structure of information exchange networks between cross function was also explored. Network analysis helped to gain useful information about how functional units work with each other to enhance firm performance. Overall, previous studies used network analysis to explore business activities as networks. These uses of network analysis helped us to understand the connection patterns in networks.

4.6 Criteria for sample selection

The data collection focuses on the evolving structures of networks in practice transfer projects. The network data needs to cover the dyadic relationships among participants in networks (Conway and Steward, 2009; Burt, 2015). Thus, the dyadic relationships among

participants in practice transfer are the samples for this research. The quality of network data can influence the analysis results in three aspects. First, the selected practice transfer projects needs to be representative, so that the analysis results can reflect the general patterns in networks and brokerage actors. Second, the data about each network needs to cover the whole network rather than just a portion of the network. The results from partial networks cannot reflect network dynamics and structures. The missing network details can cause inaccurate results. Third, the robustness of data can have effects on the accuracy of the regression modelling results. The regression modelling of network influence requires robust data to support it so that the results can be generalisable. Thus, this research establishes a number of criteria to select the suitable samples. These criteria are:

- The selected projects should have a substantial and suitable sample size for regression modelling testing the relationships between networks and practice transfer outcomes. Thus, this research selects four projects with a total sample size of 162, which is considered as an idea sample size between the number of 120 to 250 for regression modelling (Burt, 2007).

- The selected practice transfer projects should have official statements about the practice transfer results they achieved. This can help this research to decide if a selected practice transfer project is successful or not. This research aims to investigate networks in successfully completed projects. Burt (2007 and 2015) suggested that data collected from successful projects are more representative in showing the network influences than unsuccessful projects. Thus, this research selects practice transfer projects with clear achievement statements.

- The selected practice transfer projects need to have a clear progress at each project stage. The projects should have a clear start and completion dates for each practice transfer stage so that the collected data can be analysed to present network dynamics at each stage of practice transfer.

- The length for each selected practice transfer project should span within a twelve-month range. This can help to avoid the influence of policy and economy changes in the same period (Burt, 2007).

- The size of each selected project should be commensurate with providing the optimum sample size for the analysis purposes. Project size can affect network analysis results (Rodan and Galunic, 2004). Small projects usually cannot provide sufficient data for network analysis. Suitably large projects are more likely to reflect network complexity.

- The selected practice transfer projects should have a high level of novelty and complexity involving headquarter and subsidiaries rather than copy existing projects. Burt (2007 and 2015) suggested that projects with a high level of novelty and complexity are the ideal samples for analysing the complex dynamics and structures of networks.

- In order to confirm the quality of each practice transfer project, the selected projects should have project reports with evaluations from reliable third parties.

After carefully considering all these criteria above, this study draws on data collected during four practice transfer projects about product redistribution and staff relocation. These selected projects fulfil all the criteria discussed above. The next section provides the profiles of these selected projects.

4.7 Profiles of the selected projects

Within the criteria set out in the last section, four practice transfer projects are selected from two multinational companies TCL and Inspur for the primary fieldwork. The fieldwork was conducted from January to March 2018. This research treats all the participants in those practice transfer projects as the analysis units. In other words, the actors in this research's networks are the individuals who participated in those selected practice transfer projects. Those human actors in networks are essential to explore network dynamics, structures and influences. Thus, the network roles of human actors are essential information in data collection.

This study selects four practice transfer projects for the primary fieldwork. A total number of 162 people are included in the data collection. The details about sample size are listed in Table 4.1. This is considered as a good sample size for network analysis (Conway and Steward, 2009). To avoid the single network bias (data collected from just one network could cause inaccuracy in the network modelling due to the unique setting of the network), this study selects four practice transfer projects to collect the data. To avoid the bias in data collected across multiple practice transfer projects, the selected practice transfer projects have

a common nature which is about offshore practice transfer. Also, this study considers avoiding different settings across the selected projects, such as project size, project length and so on.

Table 4.1 shows the profiles of the four selected projects. The four selected practice transfer projects are from two multinational companies, and Inspur group. TCL Corporation is the third largest LCD TV supplier worldwide which has revenue of US$16.44 billion globally and 79,293 employees across 78 countries in 2018. Its business is in consumer electronics and home appliances. Their main products include television sets, smartphones, mobile phones, air conditioning, washing machines, and refrigerators. Their business has been in the UK for 23 years (since 1996). The UK subsidiary has revenue of US$1.2 billion and 1129 employees in 2018, and ranked as the third largest LCD TV supplier in the country. Inspur Group is the second largest computer server supplier worldwide, which has revenue of US$11.25 billion globally and 63,819 employees across 102 countries in 2018. Its business is in computer server, computer, storage, special computer, information security products, network, ERP (Enterprise Resource Planning), and software. Their main products and services include computer server, cloud computing, big data, key application hoststorage, artificial intelligence, and ERP (Enterprise Resource Planning) systems and software. Their business has been in the UK for 25 years (since 1994). The UK subsidiary has revenue of US$1.7 billion and 1291 employees in 2018, and ranked as the second largest computer server supplier in the country.

Table 4.1 Profiles of the projects and companies

Project Name	TCL product redistribution	TCL staff relocation	Inspur product redistribution	Inspur staff relocation
Fieldwork date	Jan/Feb 2018	Jan/Feb 2018	Feb/Mar 2018	Feb/Mar 2018
Number of participants	37	42	47	36
Company	TCL Corporation		Inspur Group	
Ownership of the company	Private, public listed on the Hongkong Stock Exchange and the Shenzhen Stock Exchange		Private, public listed on the Hongkong Stock Exchange, the Shanghai Stock Exchange and the Shenzhen Stock Exchange	
What the company does	Consumer electronics and home appliances. Main products: Television sets, smartphones, mobile phones, air conditioning, washing machines, and refrigerators.		Computer server, computer, storage, special computer, information security products, network, ERP (Enterprise Resource Planning), and software. Main products and services: Computer server, cloud computing, big data, key application hoststorage, artificial intelligence, and ERP (Enterprise Resource Planning) systems and software.	
Size worldwide	Revenue: US$16.44 billion (2018) globally, Number of employees: 79,293 (2018) across 78 countries, and ranked as the third largest LCD TV supplier worldwide.		Revenue: US$11.25 billion (2018) globally, Number of employees: 63,819 (2018) across 102 countries, and ranked as the second largest computer server supplier worldwide.	
Size in the UK	Revenue: US$1.2 billion (2018), Number of employees: 1120 (2018), and ranked as the third largest LCD TV supplier in the country.		Revenue: US$1.7 billion (2018), Number of employees: 1291 (2018), and ranked as the second largest computer server supplier in the country.	
Length of time in the UK	23 years by 2019 (since 1996)		25 years by 2019 (since 1994)	
The relationship between headquarter and subsidiary	TCL headquarter has direct involvement in the practice transfer. It directly provides enabling business resources and allocates decision-making rights during the practice transfer, meanwhile, sets corporate policies that encourages the sharing of new practices with the company globally.		Inspur headquarter has direct involvement in the practice transfer. It directly provides enabling business resources and allocates decision-making rights during the practice transfer, meanwhile, sets corporate policies that encourages the sharing of new practices with the company globally.	

Headquarter managers	TCL headquarter managers are based in Huizhou China and travel globally as needed by the subsidiaries. They usually have more than 10 years working experiences in headquarter or in the company. They are in charge of the strategic decisions and allocating business resources.		Inspur headquarter managers are based in Jinan, China and travel globally as needed by the subsidiaries. They usually have more than 10 years working experiences in headquarter or in the company. They are in charge of the strategic decisions and allocating business resources.	
Subsidiary managers in the UK	TCL subsidiary managers in the UK are in charge of the local business. They usually have more than 5 years working experiences in the subsidiary or globally.		Inspur subsidiary managers in the UK are in charge of the local business. They usually have more than 5 years working experiences in the subsidiary or globally.	
The purpose of the practice transfer project	To transfer the existing product distribution practice from the Europe subsidiary to the UK	To transfer the existing staff relocation policy from the Europe subsidiary to the UK	To transfer the existing product distribution practice from the Europe subsidiary to the UK	To transfer the existing staff relocation policy from the Europe subsidiary to the UK

Both companies are private and public listed on the stock market. And both of them have direct involvement in the practice transfer. They directly provide enabling business resources and allocate decision-making rights during the practice transfer, meanwhile, set corporate policies that encourage the sharing of new practices with the company globally. Their headquarter managers are based in China and travel globally as needed by the subsidiaries. They usually have more than 10 years working experiences in headquarter or in the company. They are in charge of the strategic decisions and allocating business resources. Their subsidiary managers in the UK are in charge of the local business. They usually have more than 5 years working experiences in the subsidiary or globally. Their practice transfer projects are about transferring the existing product distribution practice and staff relocation policy from the Europe subsidiary to the UK. More details about these practice transfer projects are provided in Chapter 5.

Burt (2007 and 2015) suggested that data collected from successful projects are more representative in showing the network influences than unsuccessful projects. Thus, this study selects successfully completed projects with clear achievement statements about the innovation results they achieved. Also, as shown in Table 4.1, due to the successful experiences of the companies, the relationships between headquarters and subsidiaries, and the clear purposes of the practice transfer projects, these projects from TCL and Inspur are considered as representative.

This study chooses practice transfer projects in staff relocation and product redistribution, since they have a high level of collaborative activities between headquarters and subsidiaries. The selected projects should have a high level of participation from both of headquarters and subsidiaries, so that can reflect how brokerage actors connect the collaborations between them. Staff relocation and product redistribution usually have the participation from both of headquarters and subsidiaries to ensure the new practice favours both of them, since human resource and production are crucial parts of a company's management (Oppong, 2018). Staff relocation and product redistribution is required to be fit in the context of subsidiaries, meanwhile, the introduction of new practice needs to have the supports from headquarters. In this case, as discussed in Chapter 2, brokerage actors who connecting information exchange and teamwork between headquarters and subsidiaries are crucial to the success of practice transfer. Thus, projects in staff relocation and product redistribution are representative to reflect brokerage actors in practice transfer. The accesses for these selected projects were achieved as below.

Project No.1 TCL product redistribution

Access for this project was achieved through a direct approach to TCL, following an online presentation was given to all of the company's directors. Unconditional access was granted and full co-operation was received in November 2017. A formal notification was made to the project team by those company's directors at a presentation in December 2017. After three weeks, the project team confirmed access with each individual's permission, totally 37 people including headquarter staff, subsidiary staff and project managers.

Project No.2 TCL staff relocation

Access was achieved following two telephone conversations with the chief operations officer (COO) in the second week of November 2017. All the members of the project team were pleased to be involved in this study. As the COO requested, an online presentation was given to all the project team members a week after to explain the purpose of this study. Thereafter, full co-operation was received in the last week of November 2017 from all 42 project team members including headquarter staff, subsidiary staff and project managers.

Project No.3 Inspur product redistribution

Access was arranged following an approach by the chief operations officer (COO) by telephone in October 2017. The COO had become very interested in having some network

snapshots of the practice transfer activities for his project. The project manager requested a presentation for the main project members through the internet in the second week of October 2017. This presentation allowed main project members to understand that the purpose of this study is to improve the understanding of networks. Complete co-operation from all 47 members of the project team was given in the third week of October 2017. These members include all the headquarter staff, subsidiary staff and project managers who are involved in this project.

Project No.4 Inspur staff relocation

Permission to carry out data collection was granted by the chief operations officer (COO) following a direct approach by telephone in October 2017. The COO clearly demonstrated an interest in and support of this research. An online presentation was given to all team members to explain the purpose of this study in the first week of November 2017. Permission for data collection was given with each individual's permission in the second week of November 2017, from totally 36 people including headquarter staff, subsidiary staff and project managers.

This study selected four practice transfer projects about product redistribution and staff relocation according to the sample selection criteria discussed in the last section. These four

projects fulfil all the sample selection criteria. The next section will discuss the details of this data collection.

4.8 Data collection and sample size

Table 4.2 shows the relations between data collection and research questions proposed in each part of theoretical framework. The first research question refers to network dynamics. It requires data to show how brokerage emerges to improve the connectivity in the network during each practice transfer project. This includes data about: 1) who are in the network at each stage of project, 2) the connections between people at each stage of project, 3) what these connections are about. The second research question refers to network structures. It requires aggregated data of each project stage from research question 1 to show the overall network structures. To answer the third research question about network influences, it requires additional data about each individual's characteristics as the control variables and practice transfer outcomes as dependent variables.

Table 4.2 Data collection, related theories in theoretical framework, and research questions

Research Question	**Related theory in theoretical framework**	**Data collection and required data**
Research Question 1	Network dynamics	Network questionnaire survey, Data about 1) who participated in the project, 2) a list of connections

		including who are connected to whom in teamwork and information exchange, and 3) the nature of these connections at each stage of project
Research Question 2	Network structures	Network questionnaire survey, Data about 1) who participated in the project and 2) a list of connections including who are connected to whom in teamwork and information exchange, and 3) the nature of these connections in the overall period of project
Research Question 3	Network influences	Network questionnaire survey (the independent variables) with additional questions for individual characteristics (the control variables) and practice transfer outcomes (dependent variables) Data about 1) Network patterns (which is already collected for Research Question 1 and 2 above), 2) individual characteristics, and 3) practice transfer outcomes

A total number of 162 people are included in the data collection. This data includes all of the participants from headquarters and subsidiaries. The details about sample size are listed in Table 4.3. This is considered as a good sample size for network analysis (Conway and Steward, 2009). To avoid the single network bias (data collected from just one network could cause inaccuracy in the network modelling due to the unique setting of the network), this study selects four projects to collect the data. To avoid the bias in data collected across multiple projects, the selected projects have a common nature which is about practice transfer

in product redistribution and staff relocation. Also, this study considers avoiding different settings across the selected projects, such as project size, project length and so on. A detailed discussion about the selection of samples is provided in the previous sections.

Table 4.3 Sample size

Project Name	**Number of participants in each project/network**	**Number of participants in questionnaire survey**	**Number of managers answered the open questions to elaborate the project details**
TCL product redistribution	37	37	1
TCL staff relocation	42	42	1
Inspur product redistribution	47	47	1
Inspur staff relocation	36	36	1
	Total sample size 162	**Total number** 162	**Total number** 4

Project Name	**Fieldwork date**	**Number of ties in each network**	**How long time span the network represents**
TCL product redistribution	Jan-Feb 2018	297	9 weeks
TCL staff relocation	Jan-Feb 2018	382	9 weeks
Insupr product redistribution	Feb-Mar 2018	389	8 weeks
Inspur staff relocation	Feb-Mar 2018	286	8 weeks
		Total number 1354	

In order to cover all the relevant participants in networks, this research needs to set network boundaries. Network boundaries decide who should be included in the networks and who not. This research uses three criteria (Conway and Steward, 2009) about setting network boundaries. Thereby, the network boundaries in this research are identified as below:

- Each network includes a specific group of people. For the purpose of this research, the networks in this research focus on the participants involved in the selected projects.

- Each network includes specific types of interactions among people. For the purpose of this research, the networks in this research focus on information exchange among participants in the selected projects.

- Each network includes people and relationships related to specific activities. For the purposes of this research, the networks in this research focus on the participants and information exchange among them in the selected practice transfer projects.

This section has discussed the data collection, especially about sample size, single or multiple network choices, and network boundary. These issues are crucial to the data accuracy. In other words, this section answered the question about who should be involved as samples in this study. The next section is to discuss what information needs to be collected as data in this study.

4.9 Questionnaire design

Comparing to collecting data from the records of electronic communications (e.g. emails, electronic files exchange, and video conferences) as the alternative way, a network questionnaire survey provides a better coverage of data. A network questionnaire survey can collect information about (1) individual profiles (2) information exchange ties of using both conventional communications (e.g. face-to-face meetings and exchanging documents) and electronic communications, and (3) relevant work details.

The questionnaire in this research is designed based on the questionnaires from existing network research and modification for this research's purpose. This research's questionnaire

is designed upon questionnaires from Burt's (2007) and Krackhardt (2007). Items in these two questionnaires are considered as templates for developing network survey questions (Borgatti, 2011). These existing question items are modified and recombined into a new network survey questionnaire, particularly as a questionnaire covering network dynamics, structures and influences (see Table 4). The questionnaires from Burt (2007) and Krackhardt (1992) can effectively identify network dynamics and structures. These items are conventional and typical in network research to capture dyad relations in networks. This study extends the questionnaire for the purpose of assessing network influences. Table 4.4 summarises the items in this study's questionnaire.

Table 4.4 Questionnaire items (the full questionnaire is in Appendix)

Question items	**Related research question**
● Who you send information to in the project ● Whom you receive information from in the project	Research question 1, 2 and 3
● How do you exchange information with the person sending you information or receiving information from you	Research question 1 and 2
● What is the information related to?	Research question 1 and 2
● How frequent and critical is this information exchange	Research question 1 and 2

● At which stage does this particular information happen (specify by which week)	Research question 1 and 2
● Evaluation of transfer outcomes from managers and participants	Research question 3

Krackhardt (2007) recommended the 'name list' approach. The 'name list' approach starts with getting the data about who are included in the network. In this research, the name lists are provided by the organisations involved in the selected projects. All these organisations are asked to give a list of people who are formally appointed in the projects. These names of individuals are the 'name list'. During the data collection, participants select the people they are connected with in the name list. Burt (2007) raised two potential constraints about using the 'name list' approach. First, the name list might result in the overstated connections between people in the network. Thus, the network data gathered by the 'name list' approach should be confirmed from both parties' questionnaires to avoid the exaggerated connectedness. In this research, each connection between two people is confirmed from both of their questionnaires. Also, this research confirms the data with the meeting logs from each organisation. Second, people who are not formally appointed by the organisations are difficult to identify by the 'name list' approach. Those people can be the missing data and result in an incomplete network structure in the findings. To resolve this issue, this research combines Burt's (2007) "snowballing" approach with the 'name list'. The "snowballing" approach starts with a group of people who are formally appointed in each project. In this research, these people are the participants in each 'name list' provided by each organisation.

These participants are asked to name their connections that are not included in the name list. Then, everyone who is not included in the ‘name list’ approach can be found by using the 'snowballing' approach. It has been noticed that the "snowballing" without a ‘name list’ might mislead to some people who are not in the network (Hanneman and Riddle, 2005). Thus, the 'snowballing' and 'name list' approaches can be complimentary to each other. In order to collect the data about the entire network of each project, this research uses a questionnaire which combines both 'name list' (Krackhardt, 2007) and 'snowballing' (Burt, 2007) approaches. In the total sample size of 162 people, 153 were identified by using 'name list', and 9 were identified by using 'snowballing'.

Burt (2007) and Krackhardt (2007)’s questionnaires are designed for research in interpersonal connections in networks. This research’s questionnaire adopts question items from both of them. Burt (2007) focused on the structure of connections within networks. Krackhardt (2007) examined the overall structure of network as a system. The questionnaire contains the following elements based on the questionnaires from Burt (2007) and Krackhardt (2007):

- Interviewee’s profile
- Information about who receives information from in the project
- Information about who sends information to in the project
- Information about the mode of interactions in information exchange
- Information about the content of information exchange

Short open questions are also included in managers’ questionnaires to answer the questions about each project below.

- How many stages are in the project?
- What are the stages of the project?
- What is the nature of work at each stage?

In sum, this questionnaire consists of four major parts: (1) individual profile (2) information exchange relations in network including who you send/receive information to/from (independent variables), (3) project work details (control variables) and (4) practice transfer outcomes (dependent variable). The data about the networks are collected by questionnaire survey. And the data about each individual's practice transfer outcomes are provided by the companies collected from both managers and participants. Each individual has two practice transfer outcome scores (one is from the managers and the other is from the participant) based on the work the person has done in the project. The details about the practice transfer outcome data are discussed in the dependent variable section. The origin of each part and the changes made are shown in the Table 4.5 below.

Table 4.5 The elements of the questionnaire (the full questionnaire is in Appendix)

Part of the questionnaire	**Origin and reasons**	**Changes made in adopting the question items**
Part 1 Profile	Burt (2015) and Krackhardt (1992). This section provides the information to distinguish each individual in the survey.	Changes about the layout to fit to one A4 page
Part 2 Network (independent	Burt (2015) and Krackhard	Combining Burt's

variables)	(1992). This section provides the information about 1) who are in networks and 2) who are connected to whom.	questionnaire with Krackhard's to increase the coverage of network survey
Part 3 Practice transfer works (control variables)	Amabile (2005): Participants' work and knowledge backgrounds (Question 1-5) Amabile (2005): goal oriented (Question 6, 7 and 8), structured work preference (Question 9, 10 and 11), problem solving (Question 12, 13 and 14), and teamwork (Question 15, 16 and 17) Quinn and Shepard (1974), Cummings, Armeli, and Lynch (1997), and Grant (2008): Job satisfaction (Question 18,19 and 20). Gagne et al. (2015): Need for	The structure and answer presentation to increase the efficiency of answering the questions

	autonomy (Question 21,22 and 23) and Need for competence (Question 24, 25 and 26), Vanden Broeck et al. (2010) Need for Relatedness (Question 27, 28 and 29) Bolino and Grant (2016) Prosocial motives (Question 30, 31 and 32), Prosocial behaviours (Question 33, 34 and 35), and Prosocial impact (Question 36, 37 and 38)	
Part 4 Practice transfer results (dependent variables)	Burt (2015) and Krackhard (1992). This section provides the information to practice transfer results from managers and participants separately to reduce bias.	Combining managers view and general participant's (employees who are not managers) view to reduce bias about the practice transfer results

Table 4.6 Validity of the questionnaire (the full questionnaire is in Appendix)

Part of the questionnaire	**Validity**
Part 1 Profile	Double check
Part 2 Network (independent variables)	Symmetric answers from person A and B in a dyad connection between person A and B
Part 3 Practice transfer works (control variables)	The most common Likert scales are used in the previous research are: 3 degree Likert scale for Question 1 4 degree Likert scale for Question 2 4 degree Likert scale for Question 3 6 degree Likert scale for Question 4 4 degree Likert scale for Question 5 4 degree Likert scale for Question 6 – 27 Also the double questions are used in each theme
Part 4 Practice transfer results (dependent variables)	Double questions and separate results from managers and participants The most common Likert scales are used in the previous research are: 4 degree Likert scale

The questionnaire consists of 4 parts. Each part's validity check needs be included in the questionnaire design to make sure the accuracy of the data. Table 4.6 above summarises the validity of the questionnaire. The details and rationale of each item in the questionnaire are

discussed in the following variables sections. The next few sections are to discuss these questionnaire items as variables in this study's network modelling.

4.10 Independent variables: measuring three types of brokerage actors

The previous sections discussed network analysis and how to collect the data for this research's analysis purposes. This section deals with how to measure networks. In order to measure networks, this research needs to quantify the patterns in networks. As discussed in the theoretical framework, these network patterns are three types of brokerage. These network patterns are the independent variables in this research.

This study's independent variables are about brokerage in networks. As discussed in the theoretical framework, the brokerage can reflect the broker roles in a given network. Thus, this research uses brokerage as a set of independent variables. A brokerage is a person who connects people in a network (Burt, 2010 and 2015). Brokerage as a variable reflects how many times a person connects the other people as a broker in a network (Gould, 1987; Burt, 2015). Thus, these brokerage variables represent the brokerage roles.

Independent variable 1: Translating information brokerage actor measured by betweenness centrality

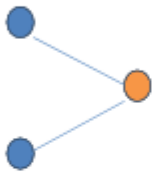


Figure 4.4 Independent variable 1: Translating information brokerage actor

Betweenness centrality measures how many times that an actor connects two others as the shortest path in a given network (Freeman, 1979; Borgatti, 2011). This measure can reflect the person's control in the network path (see Figure 4.4). A person's betweenness centrality is expressed by the number of shortest paths in the network passing through that person. Thus, this research uses betweenness centrality to measure people's network location advantages in translating information brokerage actor.

Independent variable 2: Bridging institution brokerage actor measured by triad count

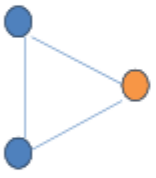


Figure 4.5 Independent variable 2: Bridging institution brokerage actor

According to Freeman (1979) and Borgatti (2011), triad count measures the number of times that an actor has connections to the others as a triangle (see Figure 4.5). Triad represents the inter-connected actors in a given network, on the other hand, triad reflects that each person has direct connections to the others. In contrast to translating information brokerage actor measure by indirect connections, bridging institution brokerage actor is measured by the direct connections. This can help to distinguish people's brokerage actor roles. Thus, this research uses triad count to measure bridging institution brokerage actor.

Independent variable 3: Embedding codified practice brokerage actor measured by closeness centrality

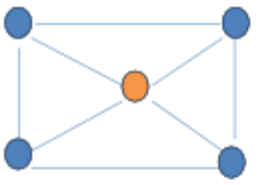


Figure 4.6 Independent variable 3: Embedding codified practice brokerage actor

Closeness centrality measures the number of embedded structures (see Figure 4.6) (Freeman, 1979; Borgatti, 2011). This measure can reflect a person's embedded structures, which have direct connections to the others. To measure this, closeness centrality measures an actor's network distance from all others. Also, closeness centrality measures the optimal paths a person has. When a person is embedded in a network (see Figure 4.6), this person has the overall shortest network distance to the others. This distinguishes embedding codified practice brokerage actor from the others in a network. Also, it is regarded as an indicator of

the degree of embedding for a person to spread information to all others in the embedded network structure. Thus, this research uses closeness centrality to measure embedding codified practice brokerage actor.

This section discussed how the independent variables are measured. As discussed in the theoretical framework, they are the three types of brokerage which can influence practice transfer outcomes. The next section is to discuss how the outcomes of the practice transfer project are measured.

4.11 Dependent variable: measuring practice transfer outcomes

In the theoretical framework, this research defined the dependent variable as practice transfer outcomes following the previous research (Amabile, 1996; Burt, 2007 and 2015). The proposed research questions require analysis about the relationships between the three types of brokerage actors and practice transfer outcomes. In order to test the relationships, this research needs to measure both the three types of brokerage actors as network patterns and practice transfer outcomes at the individual level. Thus, this research uses each participant's project work outcome in the selected practice transfer projects as the dependent variable (see Table 4.7).

Table 4.7 Dependent variable (measured by 4 degree Likert scale, the full questionnaire is in Appendix)

	Questions in managers' survey	**Questions in participants' survey (employees who are not managers in the project)**	**Question related to**
1.	Overall, to what extent is this person performing his/her job the way you would like it to be performed.	Overall, to what extent does this new practice is useful to you?	Contribution and quality
2.	To what extent has he/she met your expectations in his/her roles and responsibilities?	To what extent is this new practice meets your expectations?	Contribution and quality
3.	To what extent are you satisfied with the total contribution made by this person?	To what extent has your role and responsibilities in the project met your expectations?	Contribution and quality
4.	To what extent is this person particularly creative: someone able to come up with novel and useful ideas?	Comparing to the previous practice, is this new practice better?	Contribution and quality
5.	To what extent would you suggest this person to keep the manner in prompting new ideas?	To what extent would you keep the manner in prompting new ideas?	Contribution and quality
6.	To what extent is this person good at implementing new	To what extent is this practice particularly	Contribution and quality

	practice?	creative novel and new?	
7.	To what extent this person satisfied with what he/she gained in this project?	Do you think you are benefited from this new practice?	Personal achievement
8.	This project offered expected financial incentives (e.g. salary and bonus).	This project offered expected financial incentives (e.g. salary and bonus).	Personal achievement
9.	This person can be benefited from the project in their (future) promotion.	You can be benefited from the project in your (future) promotion.	Personal achievement

As shown in Table 4.7, each participant's work in the practice transfer project is evaluated by managers and participants separately. Both sets of data from managers and participants are collected after each project completion. To avoid bias, two sets of questions are used to measure the practice transfer project outcomes, one for the managers' survey and the other for participants who are not managers in the project. Thus, each participant has one score evaluated by mangers and the other score evaluated by participants, these two scores are used as two separated dependent variables in regression modelling to avoid bias. This research measures each participant's project work outcomes from both managers' and the participant's views. Previous research (Cross and Cummings, 2004; Rodan and Galanic, 2004) applied this approach to avoid the bias in evaluating project work outcomes. The managers' views about project outcomes tend to focus on how novelty is made, especially the processes supporting the project. The participants' views about project outcomes tend to focus on the results of the project. To avoid this bias, this research includes both managers and participants' views. Also, the questions include two aspects, 1) work contribution and quality (question 1 to 6), and 2)

personal achievement (question 7 to 9). Previous research (Amabile, 1996; Burt, 2007 and 2015) suggested project work outcomes at the individual level can be measured from two aspects, 1) work contribution and quality, and 2) personal achievement. Thus, each participant's work in a practice transfer project can be measured as how well-done and beneficially to the person. These individuals' contributions to the practice transfer project can be aggregated to influence the project outcome. Overall, the data about all participants' project work can help to analyse the distribution of practice transfer outcomes in each project's network. Thus, each person's score measures that person's project work outcomes.

The questions are based on a 4 degrees Likert scale from 1 as 'Not At All' to 4 as 'Totally'. The scores for each participant from these 9 questions are assigned to the person who participated in each project. Each score from either managers or participants' evaluation is the average of all the scores received from the questions. Each participant's contribution to the practice transfer outcome is categorised as items among managers' feedback reports and each participant's feedback survey by using a 4 degree Likert scale, which is considered as the most common Likert scale used in the previous research (Krackhardt, 1992; Burt, 2015). This section discussed practice transfer outcomes as the dependent variable. The next section is to discuss other factors that can influence transfer outcomes, which are the control variables.

4.12 Control variables

Control variables are the other potential influences on the dependent variables. Those influences should be taken into account alongside the independent variables. This research uses the control variables to rule out those alternative influences on practice transfer outcomes (reliabilities of these variables measured by Cronbach alpha scores and a correlation matrix for all variables in the regression are in the Appendix). The control variables used in this research are drawn from this study's literature review about practice transfer. The control variables are 1) seniority, 2) tenure with the firm, 3) education level, 4) participant's intrinsic motivation (self-determination, competence, task involvement, curiosity, enjoyment, and interest), and 5) participant's extrinsic motivation (competition, evaluation, recognition, money or other tangible incentives, and constraint by other people).

1 Seniority

As discussed in the literature review, senior managers may have more power in terms of directly providing enabling business resources and making decisions (Edwards and Ferner, 2004; Ciabuschi, Forsgren, and Martín, 2011). Also they can order a subsidiary to share its practice companywide and allocate decision-making rights during the practice transfer (Tempel, 2001; Thory, 2008; Arp and Lemański, 2016). In contrast, lower level managers have less power in practice transfer. Seniority as authoritative rank reflects people's position in an organisational hierarchy. This variable represents people's authority in an organisation.

Authoritative rank measures the individual level of power in the hierarchical pecking order. Individuals who have senior positions tend to have more power and access to resources in practice transfer project activities and afterwards will bring better results (Gelfand, et al., 2005; Kavanaugh, et al., 2005). Especially, top managers tend to have more power and access to resources to support their works, thus, they are more likely to have better results (Edstrom and Galbraith, 1977; Shapiro, 1987; Paldam, 2000; Rodan and Galunic, 2004; Hatchuel, 2005; Walther and Bunz, 2005; Dell'Era et al., 2013). Since people's authoritative rank can have impacts on their practice transfer results, yet it is not network impact from brokerage actors, therefore this research includes seniority as a control variable. This research measures the authoritative rank variable by an ordinal scale as below. People who are formally designated a position in each project, junior level = 1, middle level= 2, top level = 3.

2 Tenure

The literature review discussed that participant's work experiences in the company can contribute to practice transfer's success (Fortwengel, 2017). Fortwengel (2017) showed that people with longer working experiences are more likely to gain supports internally in practice transfer. Also, people with longer working experiences are more likely to have knowledge about the company's business environment and strategy, which can contribute to practice transfer's success (Fortwengel, 2017). Tenure measures how long a person has been working in a job. For instance, how long a human resource staff has been working in a human resource related job, or the number of years a manager has been working as manager. The

long-term served professionals tend to have more experiences, and consequently, they tend to have better results in project works (Stolle, 1998; Stolle and Rochon, 1998; Reagans and McEvily, 2003; Rodan and Galunic, 2004; Hatzakis, et al., 2005; Landsperger, et al., 2012). Since people's tenure can have effects on practice transfer results, yet it is not network impact from brokerage actors, therefore this research uses tenure as a control variable. Tenure is measured by the length of employment that an individual has been designated as his or her position. The people working in the selected projects are asked to answer the question, how long you have been appointed as your position in years and months.

3 Education level

As discussed in the literature review, practice transfer is about knowledge sharing and the result can be decided by participants' knowledge (Haak-Saheem et al., 2017; Kianto et al., 2017; Ling and Juan-ru, 2017). Participant's knowledge is related to their perceptions of the strengths and weaknesses of different national business systems (Hayden and Edwards, 2001), and the ability to bridge the communication flow between headquarters and subsidiaries (Ahlvik et al., 2016; Harzing et al., 2016). Education level measures participant's academic accomplishment in knowledge. Previous research suggests that participant's education level is positively associated with project outcomes (Knack and Keefer, 1995; Ellis, 2000; Watson

and Papamarcos, 2002; Reagans and McEvily, 2003; Joshi, 2006; Lissoni, 2010). Rodan and Galunic (2004) discovered a positive relation between the participants' education level and their innovative work results. Since education level can have impacts on practice transfer results, however, it is not a network effect from brokerage actors, thus, this research includes education level as a control variable.

Education level is measured as each individual's highest academic accomplishment. All participants in the selected projects were asked to choose the most suitable description about their highest academic accomplishments from an ordinal scale (1 = high school, 2 = bachelor degree, 3 = master degree, 4 = doctoral degree).

4 and 5 Intrinsic and Extrinsic

Amabile (2005) suggested that project participant's motivation can influence their work results. Such motivation has two aspects: intrinsic motivation including motivation from self-determination, competence, task involvement, curiosity, enjoyment, and personal interest, and extrinsic motivation including motivation from competition, evaluation, recognition, money or other tangible incentives, and constraint by other people (Amabile, 2005). This study uses the question items from Amiable (2005), which includes goal oriented (as Question 6, 7 and 8 in questionnaire part 3), structured work preference (as Question 9, 10 and 11), problem solving (as Question 12, 13 and 14), and teamwork (as Question 15, 16 and

17). As complements to intrinsic and extrinsic, extra question items are used to improve the accuracy of control variable measures as previous research suggested. These include job satisfaction (as Question 18, 19, and 20) from Quinn and Shepard (1974), Cummings, Armeli, and Lynch (1997), and Grant (2008), need for autonomy (as Question 21, 22 and 23) and need for competence (as Question 24, 25 and 26) from Gagne et al. (2015), need for relatedness (as Question 27, 28 and 29) from Vanden Broeck et al. (2010), prosocial motives (as Question 30, 31 and 32), prosocial behaviours (as Question 33, 34 and 35), and Prosocial impact (as Question 36, 37 and 38) from Bolino and Grant (2016). Since the previous literature suggested these items can be used to improve the accuracy of intrinsic and extrinsic motivation (Grant, 2008; Vanden Broeck et al., 2010; Gagne et al., 2015; Bolino and Grant, 2016), this research uses them in the questionnaire items.

This research includes five control variables: 1) seniority, 2) tenure, 3) education, 4) intrinsic, and 5) extrinsic. These five control variables are related to individual attributes. These five variables are chosen from those that have been used in the related previous research. In general, these five variables are the elements which can have impacts on project work results, yet they are not network impacts from brokerage actors. These control variables are set up to distinguish brokerage actor and non- brokerage-actor impacts on practice transfer results.

4.13 Data analysis

The previous sections discussed the variables in this research. These variables are three types of brokerage actors as independent variables, practice transfer outcomes as dependent variables, and non-brokerage-actor factors influencing practice transfer as control variables. This section discusses how to test the relationships between brokerage actors and practice transfer results. This discussion covers the regression technique and network visualisation used in this research. In other words, which regression modelling technique fits the research purpose and the data? Also, how networks can be presented as snapshots?

Network data can be analysed and visualised as snapshots by using software Ucinet and Netdraw. Comparing to alternative software packages PAJEK, VISONE, and ORA, there are three reasons for using this Ucinet and Netdraw. First, Ucinet is one the most well-recognised network analysis software. It has the functions of analysing brokerage and network structures for this research's analysis purposes. Second, Netdraw is one the most well-recognised network visualisation software. It can generate network snapshots for visualising, network dynamics and structures. Third, Ucinet and Netdraw have the same data input structure. Therefore, it is more reliable and compatible for analysis and visualisation using the same dataset.

Network dynamics are presented as a series of network snapshots. Comparing to alternative methods stage model (Fombrun, 1982; Scott, 1991), stochastic actor-based model (Snijders, et al., 2010), and actor-orientated model (Snijders, 2017), network snapshots can show the overall structure of network at each stage of a practice transfer project. These network snapshots consist of two elements: (1) individuals as the actors (or nodes) and (2) interactions between individuals as the ties (or links). Complex networks usually have regular patterns in structures and dynamics, these patterns can be observed from the network snapshots. In a network snapshot, the network has general patterns in its evolution which can be observed and analysed at the interpersonal level. Network snapshots provide the depictions of network patterns. It is important to analyse networks from snapshots, for example, by stages and structures. Stage models conceptualise the process as a sequence of events (Fombrun, 1982; Scott, 1991; Portes, 1998; Sydow and Windeler, 1998; Watts, 2004). Network structure changes in each stage representing the shift of communications and interactions among people in the network (Portes and Sensenbrenner, 1993; Putnam, 1993, 1995 and 2000; Ibarra et al., 2005). The tendency of those changes in network data represents the complexity of the network. A series of network snapshots can provide the sequence of network development. Also, those network snapshots can contain information about network patterns and help to understand the overall structure of the network (Nohria and Eccles, 1992).

Broker scores for measuring each type of brokerage actor are generated by using a GF test (Gould and Fernandez Test), which contains the measures for the three types of brokerage actors discussed in the independent variables section. A GF test is well known as a technique for measuring to what extent a node is a broker (Gould and Fernandez, 1989; Burt, 2007; Lee,

2009). Each person's broker scores are calculated based on the person's connections in the network. This analysis can distinguish and analyse three distinct brokerage actors mentioned in this research's theoretical framework. Thus, the results of a GF test show who the brokerage actors are and what types of brokerage actors they are.

The data is analysed as directed networks. The analysis of directed networks shows the directions of relational ties (Snijders, et al., 2010; Snijders, 2017). In this research these directions are marked as arrows in each relational tie to distinguish activities of sending and receiving information. It is noted that (later on in the analysis results) the activities of sending and receiving information usually are symmetric. An information exchange tie is usually like a 'dialogue' between two people consisting of both sending and receiving information. Thus, the use of directed relational ties in the analysis does not show much difference in the directions of relational ties.

As mentioned before, the words 'tie' and 'relationship' appear a lot of times in this research. In this research, the word 'tie' refers to the network connections among people. The word 'relationship' refers to the cause and effect relation between networks and practice transfer outcomes in analysing network influences.

Regression modelling can help to understand the cause-effect relationships in networks (Bogartti, 2011). Thus, this research chooses them as the analysis approaches. This study chooses randomised permutation regression to test the relationships between three types of brokerage actors in networks and practice transfer results. Comparing to one of the most

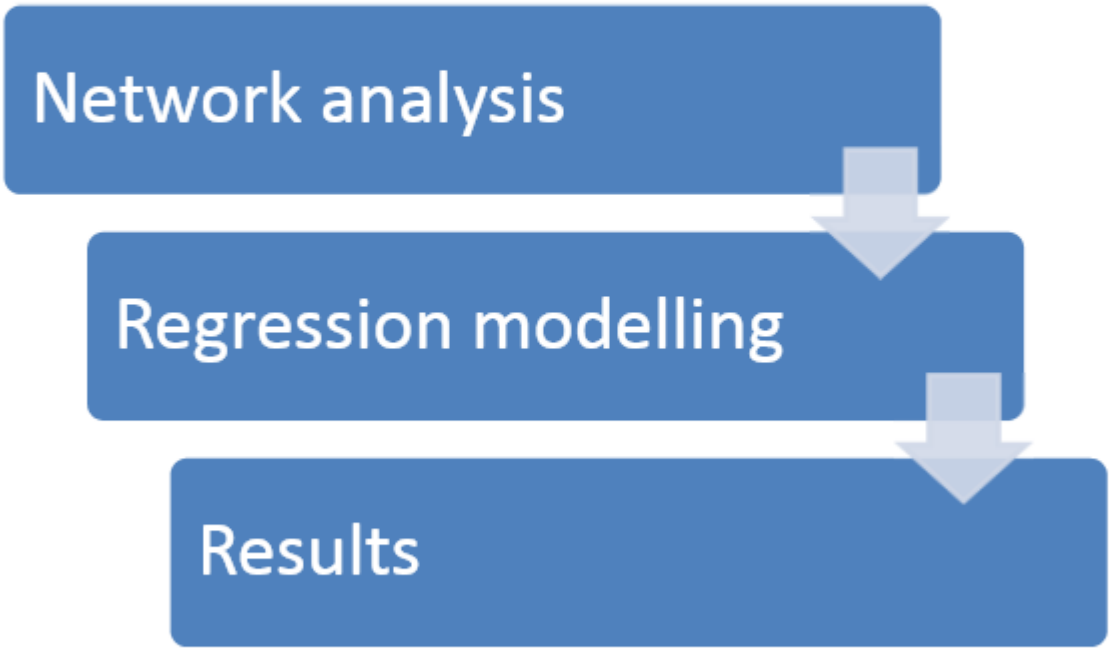
common regression choice ordinary least squares regression (OLS), network data can be analysed more accurately by using randomised permutation regression (Burt and Minor, 1983; Hanneman and Riddle, 2005). Randomised permutation regression can produce a better estimation of the model coefficients, especially for analysing networks which usually have some outliers in the data (Borgatti and Everett, 1999; Hanneman and Riddle, 2005; Snijders, 2017). Network data with outliers can overly influence the regression modelling results in OLS regression due to the normality assumption (OLS regression assumes the data is normally distributed). Comparing to OLS regression, randomised permutation regression fits better to network data distribution by testing the data against random distributions. This will provide more accurate analysis results and robust model.

Normality of the data distribution and goodness of fit in the modelling results are the other reasons for using randomised permutation regression to test network influences. First, in terms of normality of the data distribution, network data are binary data. 0 represents no connection between two people and 1 represents a connection. Thus, the network data is not normally distributed. This can overly influence the regression modelling results. To resolve this issue, this research chooses randomised permutation regression which does not have normality assumption. Randomised permutation regression tests the data against random distributions rather than normal distribution to resolve the normality issue in the data (Hanneman and Riddle, 2005). Thus, randomised permutation regression is discussed in the later part of this section. Second, turning to the goodness of fit in the modelling results, R square is often used to represent the goodness of fit in regression modelling. The issue with R square is that it is an absolute number. It is difficult to tell if the model is robust or not by judging the value of R squared. To resolve this issue, this research uses R squared (R^2)

changes by testing multiple models. Each model has at least one new variable added in it. Then, the results of R^2 changes can show the goodness of fit by comparing different models (Wasserman and Faust, 1994). Thus, this research uses randomised permutation regression also due to: 1) normality of the data distribution and 2) goodness of fit in the modelling results.

In order to find the brokerage actor influences on practice transfer outcomes rather than other factors influencing the outcomes, this research tests the relationship between three types of brokerage actors in networks and practice transfer outcomes with control variables. These control variables are discussed in the previous control variables section including 1) seniority, 2) tenure with the firm, 3) education level, 4) intrinsic, and 5) extrinsic. Thus, this research can compared the brokerage actor influences with other influences in practice transfer. In the regression model, the value of R^2 indicates to how networks can influence practice transfer outcomes. If the value of R^2 increases after adding the independent variables (three types of brokerage actors) in the regression model, it indicates brokerage actors can influence practice transfer outcomes, otherwise not. Figure 4.7 shows a summary for this data analysis sections (reliabilities of these variables measured by Cronbach alpha scores and a correlation matrix for all variables in the regression are in the Appendix).

Figure 4.7 Data analysis



Research Question	**Related theory in theoretical framework**	**Analysis and expected outcomes**
Research Question 1	Network dynamics	Network visualisation provides network snapshots at each stage of practice transfer project
Research Question 2	Network structures	Network analysis focuses on broker scores and centralities
Research Question 3	Network influences	Regression modelling tests the relationships between broker scores and practice transfer outcomes (from both managers' and participants' views)

4.14 Generalisation, reliability and validity

The reliability of network analysis results can be examined by 1) R^2 increases, 2) P value, and 3) using a large sample size (Wasserman and Faust; 1994; Hanneman and Riddle, 2005). R^2 indicates to how robust and accurate the overall model is. The higher R^2 increase, the more robust and accurate the overall model is. The R^2 increase presented in the later finding chapter, which suggests the proposed model and analysis results have good reliability and robustness with about 30 percent of R^2 increase. In contrast to R^2 increase, the value of P indicates how robust each variable in the model is rather than the overall model. A more strict definition, the value of P is to determine whether each variable in the model can be supported by the data. The lower P value, the more significant influence a variable has. The rule of thumb about P value (Wasserman and Faust; 1994; Hanneman and Riddle, 2005) is lower than 0.05. In the later findings chapter, all proposed independent variables about brokerage actors have a P value lower than 0.01. Again, the P value in the results also confirms the reliability. To avoid ensuring the data are not merely reflecting extreme outlier cases and to make sure there is consistency, the ideal sample size for network analysis is between 120 to 250 (Wasserman and Faust; 1994; Hanneman and Riddle, 2005). The regression modelling procedure is run on an ideally large sample size with 162 people in total. This also confirms the results are reliable and robust.

The validity of network analysis results can be examined by the 'symmetric' answers from both sides of a connection in networks (Wasserman and Faust; 1994; Hanneman and Riddle,

2005). To avoid the overstated connections between people in the network, the network data should be confirmed from both parties' questionnaires to avoid the exaggerated connectedness. Thus, each connection between two people in networks is confirmed from both of their questionnaires with consistent answers. Also, this research confirms the data with the meeting logs from each organisation.

The generalisation for network studies is crucial to this research's implications. The generalisation of network studies can be achieved by choosing an ideal sample size or representative networks as cases (Scott, 1991; Nohria and Eccles, 1992; Burt, 2007; Borgatti, 2011). The ideal sample size for network studies is discussed in the section about data collection and sample size. This section discusses how to generalise the results through representative networks as cases. Each network can also be treated as a case to explore the specific characteristics in practice transfer. Networks as cases can help to examine the not clearly evident phenomenon in the practice transfer context. If the great details of phenomena can be observed in the cases, the findings will be helpful in adding content to the existing theories or building new theories (Lin, 1999a and 1999b; Blaikie, 2007). Networks as cases can provide considerable analysis, especially appropriate in exploring new research topics, such as network dynamics and new broker roles. The generalisation for network studies can be achieved in the following ways:

1. The choices of 'cases' are crucial to generalisation (Weller and Romney, 1988). The cases should be representative in the selected conext so that other studies using

similar methods can find similar results (Gobo, 2009). Thus, this research selected common rather than unique network cases.

2. The generalisation of network studies relies on how the research defines or refines the research questions (Payne and Williams, 2005). The more precisely focused and described research questions, the better chance of generalisation (Williams, 2000 and 2004). In this research, the proposed research question is articulated and refined into three sub-questions through the literature review.

3. The generalisation of network studies also relies on the context of the research topic (Williams, 2000 and 2004). Generalisation can be achieved if the findings from the selected cases are explicitly formulated with context at the fore. In this research, all the selected cases have detailed descriptions about how practice transfer activities are progressed.

4. The generalisation of network studies is limited to a certain time period (Payne and Williams, 2005). The research topic needs to cover the future tendency (Williams, 2000 and 2004). In other words, is the study cutting-edge? In this research, the selected projects are the representative and leading cases in practice transfer.

5. Finally, the generalisation of network studies relies on the type of research question (Donmoyer, 2008). The research questions in this study are about exploring 'what is network dynamics, structure and influence'. These significant features of networks can be described in the findings from the selected practice transfer projects.

Networks as cases are also recognised as particularly useful in the early stages of new exploratory investigations (Meredith, 1998; Lewis and Brown, 2012). The advantage of case studies is an in-depth observation to the details of a phenomenon (Voss, Tsikriktsis and Frohlich, 2002). This can help to identify the weaknesses in existing theories and make conceptual contributions (Siggelkow, 2007). The network cases can provide illustrative examples of how practice transfer projects are organised. The network cases also provide arguments and new ideas to the existing network theories in the later finding discussion sections.

4.15 Research philosophy of this study's research design

This section discusses what we can know from network analysis research (ontology) and how we know things from network analysis research (epistemology). Ontology is about 'what' can be known (Blaikie, 2007). Epistemology is about 'how' to know (Blaikie, 2007). Then, this section discusses the philosophical perspective in this study.

Ontology-wise, what can be known about networks? Blaikie (2007) suggests that network is unembroidered evidence of the senses. A philosophical question here is not just what networks are, but is the network a cause of practice transfer outcomes or a result of practice

transfer activities. To answer this question, Burt's (2007 and 2015) explanation is that individual's knowledge and skill differences shape the structures of networks. Kilduff and Brass's (2010) argument is that the structures of networks cause individual's knowledge and skill differences. Another explanation from Borgatti's paper On Network Theory (2011), is the argument that the correlation between network structures and individual performance can disappear when controlling for past performance. Thus, he suggests that a significant part of the variance in individual performance is caused by the variance in network structures rather than the other way around. In this study, the networks are formed with the progress of teamwork. The network did not exist before people collaborate together or it can be conceived as network with no relation among the people. Then, the network was building up while the teamwork was progressing. Therefore, this study suggests that networks are formed by teamwork, which requires people across different functional roles working together.

Epistemology-wise, how can we get to know about networks? Networks reflect the activities that occur in collaborations (Blau 1982; Castells, 2000). This study uses networks as the independent variables, it actually reflects and represents the patterns of network structures in practice transfer. Then, this study uses practice transfer outcomes as the dependent variables to test the relationship between networks and practice transfer outcomes. In other words, this study treats networks as one of the causes of practice transfer outcomes. Thus, this study's research design is to explore network dynamics, structure and the impacts of networks. In addition, the unit of analysis is each connection between people in the networks. The variance of people's connection structures causes the differences in practice transfer outcomes.

Then, what is the philosophical perspective of the network analysis? In other words, where is it located in research paradigms? Is network analysis positivism or structuralism? In terms of research philosophy, the research design of this study is network analysis with positivism rather than structuralism. Network analysis focuses on the structural patterns of social exchange (Wasserman and Faust, 1994). And the analysis of network is to describe the characteristics of networks. The results from network analysis are usually descriptive. For example, network analysis can be adopted to quantify network position and the connectivity in networks (Branco and Valsiner, 1997, Amaral and Uzzi, 2007). However, this study uses the results of network analysis to test the relations between network and practice transfer outcomes. In other words, the data in regression modelling are the results of network analysis. Positivism emphasises hypothesis testing to discover the cause-effect relations (Booth et al., 2008). Thus, this study's research philosophy position is a combination of network analysis and positivism. Based on above discussion, this study's research paradigm is located within positivism.

4.16 Research ethics

The access to the selected practice transfer projects was gained through previous work relationships. Every organisation was asked to provide a name list of who are formally

appointed or involved in each project. Those people in the name lists are the participants in the questionnaire survey. People who are not in the list but named by the participants in the survey are also included. An information sheet is provided to every participant to explain the purpose of this research. A consent form was also provided to every participant.

The survey for each participant was about 15 minutes. Every participant answered questions about his or her work in practice transfer. The participants have the rights not to answer any questions. They are also allowed to withdraw from this research.

Each participant's identity remains confidential at every stage of this research. Their names and all personal information are removed from the data and transcripts. The only individuals who can access the data are the researcher and supervisors.

Each participant's questionnaire is available on request and any changes which the participants request can be made. All the collected data are safely stored in line with UEA GDPR guidelines. The collected data are used for academic research only. Copies of this research's results will be available on request to all participants. This research has passed the ethics approval review and given the approval by the University's Norwich Business School Research Ethics Committee.

4.17 Summary

Networks in these practice transfer projects are highly complex. To achieve practice transfer success, people from both subsidiaries and headquarter are involved in the selected projects. This research chooses network analysis to analysis approach to reveal brokerage actor's network dynamics, structure and influences. This analysis includes:

- GF test for brokerage: A GF test provides the analysis of the brokerage activities in each network. It can distinguish and analyse three distinct brokerage actor types in each network. Each person's broker scores are calculated based on the person's connections in the network. Thus, the results of a GF test can help to find out who the brokerage actors are and what types of brokerage actors they are in each network.

- The brokerage actor influences on practice transfer outcomes are tested by using randomised permutation regression. This analysis is to test if networks have a significant influence on practice transfer outcomes, especially whether the brokerage actors have more influences on practice transfer outcomes than the control variables.

- Analysis of network dynamics: the data analysis about network dynamics provides more detailed information about how brokerage actors in networks evolve. Network dynamics has been a cutting-edge topic in network research. The data collected can be used for analysis of network dynamics to find out some regular patterns of network

evolvement in practice transfer. In the finding chapters, the results are presented at four stages: planning, design, development, and delivery.

- Network visualisation: this research uses Ucinet and Netdraw to provide network snapshots about 1) the brokerage actor roles and 2) the structure of network. Each brokerage actor's network location and the overall structure of each network can be visualised in those network snapshots.

Chapter 5 Findings

5.1 Introduction

The practice transfer projects selected for this study are related to the recent development of staff relocation and product redistribution in two multinational companies TCL and Inspur. These projects were concerned about the introduction of new practices in the UK in relation to:

1. Staff relocation in TCL and Inspur
2. Product redistribution in TCL and Inspur

These practice transfer projects are to introduce new practices about staff relocation and product redistribution. The findings cover the whole period of each project. And the findings include all relevant participants in each project, which include: directors, subsidiary staff, headquarter staff, advisors, project managers, budget managers, assistant project managers, and administrators. Therefore, the findings have proper coverage to explore the complexity of brokerage actors.

In terms of comparing between the different transfer practice projects, each network can be treated as a case to explore the specific connection characteristics of brokerage actors. The network cases provide illustrative examples of how brokerage actors are connected, the consistency between different projects can help to generalise the findings. Networks as cases

can help to examine the not clearly evident phenomenon (Burt, 2007 and 2015). If the different details of phenomena can be observed between cases, the findings will be helpful in adding content to the existing theories or building new theories (Nohria and Eccles, 1992). This includes differences in 1) network dynamics at each project stage (see Section 5.2) and 2) the number, roles, and network locations of brokerage actors (see Section 5.3). Networks as cases are also recognised as particularly useful in the early stages of new exploratory investigations. The advantage of network studies is an in-depth observation of the details of a phenomenon, which can help to identify the weaknesses in existing theories and make conceptual contributions (Haythornthwaite, 1996). Thus, networks as cases can provide considerable analysis, especially appropriate in exploring new research topics, such as network dynamics and structures.

The findings focus on revealing the dynamics of brokerage actors, the structure of brokerage actor connections and the impact of brokerage actors. In the following sections, this study presents the findings in three parts: Section 5.2 presents the dynamics of brokerage actors, activities and processes in each project, which is to answer the first research question about the dynamics of brokerage actors in practice transfer, Section 5.3 presents the structure of brokerage actors including the roles in the process and the overall network structure, which are to answer the second research question about what the roles and structures of brokerage actors are in practice transfer, and Section 5.4 presents the impact of brokerage actors on practice transfer outcomes, which is to answer the third research question about to what extent brokerage actors can influence the results of practice transfer.

5.2 The dynamics of brokerage actors

This section is to provide the answer to the first research question about the dynamics of brokerage actors in practice transfer. The data is collected from the four practice transfer projects. In the theoretical model from existing literature (Szulanski, 1996; Ajmal and Koskinen, 2008; Evans, 2017), practice transfer project consists of four stages (see Figure 5.1): planning, preparation, design of new practice, and implementation and acceptance of new practices. The analysis here identifies the dynamics of brokerage actor relationships in these four stages. Section 5.2.1 discusses how planning prompts the value of practice transfer to become the decision makers' common value of the project. Section 5.2.2 explores preparation which is a process preparing a series of documents. Practice design and implementation are discussed in Section 5.2.3 and 5.2.4.

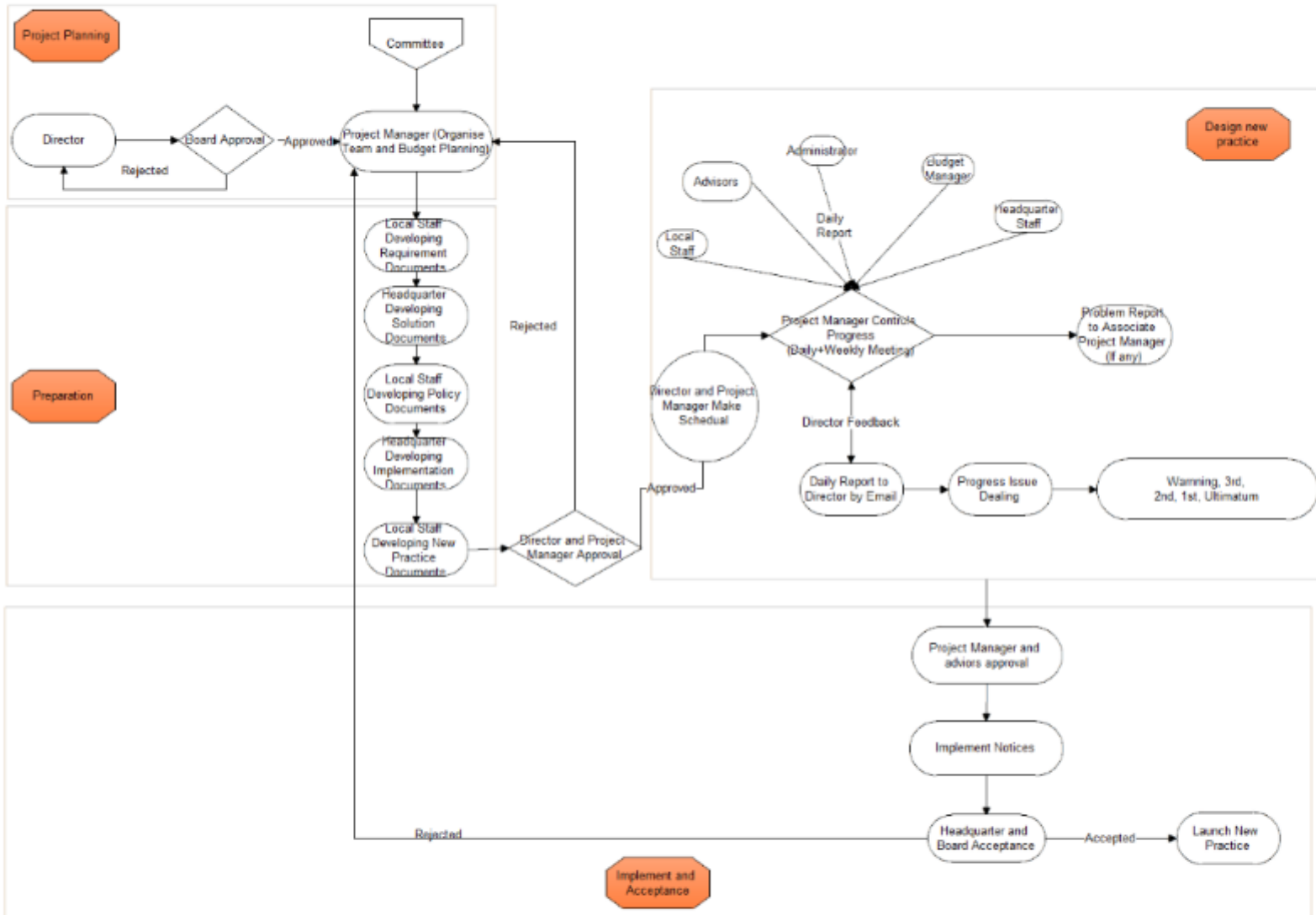


Figure 5.1 The overall activities of practice transfer project (adapted based on Szulanski, 1996; Ajmal and Koskinen, 2008

Figure 5.1 is the theoretical model from existing literature based on the four stages of practice transfer: planning, preparation, design of new practice, and implementation and acceptance of new practices (Szulanski, 1996; Ajmal and Koskinen, 2008; Evans, 2017). The details of events at each stage were provided and elaborated by project managers during the data collection. In order to understand why there are brokerage actors in these projects and why they are important, it is necessary to describe the complexity of practice transfer processes in these projects with network analysis data. The following sections will discuss these features in each part of practice transfer processes. In each section of the findings, this study will focus on the network features behind each project stage, who are involved, how they interact with each other, and what is the interaction content.

5.2.1 Planning

Planning is a 'persuading' process, to make sense of the value of the project to stakeholders and then get the project approved. The data shows that project planning (see Figure 5.2) involves getting the project approved, organising the team and setting the budget. Convincing people to make a decision is the theme of the planning stage. Convincing people about the value of practice transfer is the most important part to get the project approved. Thus, planning is a process to prompt the value of the practice transfer to become the decision makers' common value of the project.

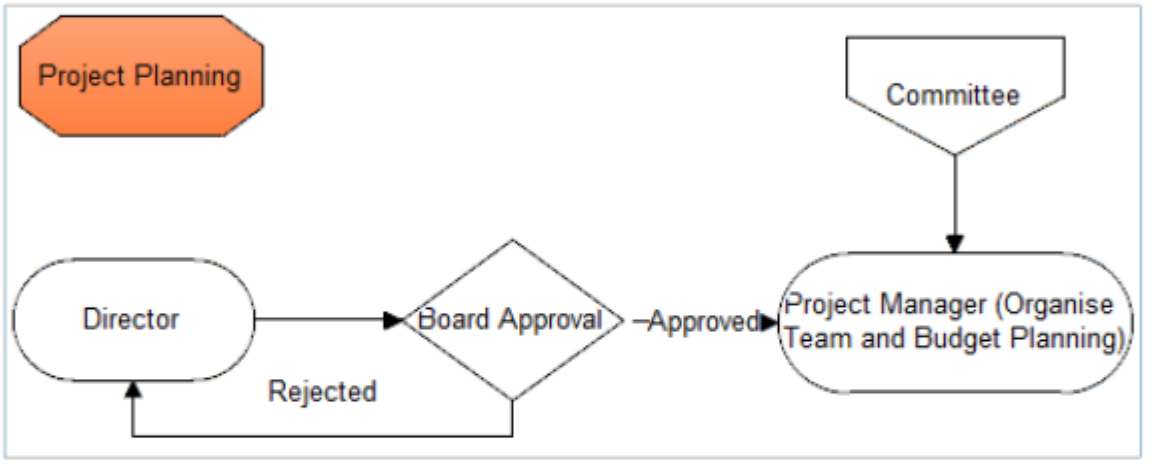


Figure 5.2 Project planning

Figure 5.2 provided by the project managers shows a useful insight into project planning. In this stage, the key issue is how to gain permission for a project based on the resources and capabilities available. The project offers many opportunities for employees to participate, however, it does not mean everyone get involved in the planning stage as shown in Figure 5.3a and 5.3b. Figure 5.3a and 5.3b show the network analysis result at the planning stage. These network snapshots show how people are connected to each other in the planning stage. In Figure 5.3a and 5.3b, we can see at this stage, the network leaders form pairs as one to one communication is the only pattern in this network.

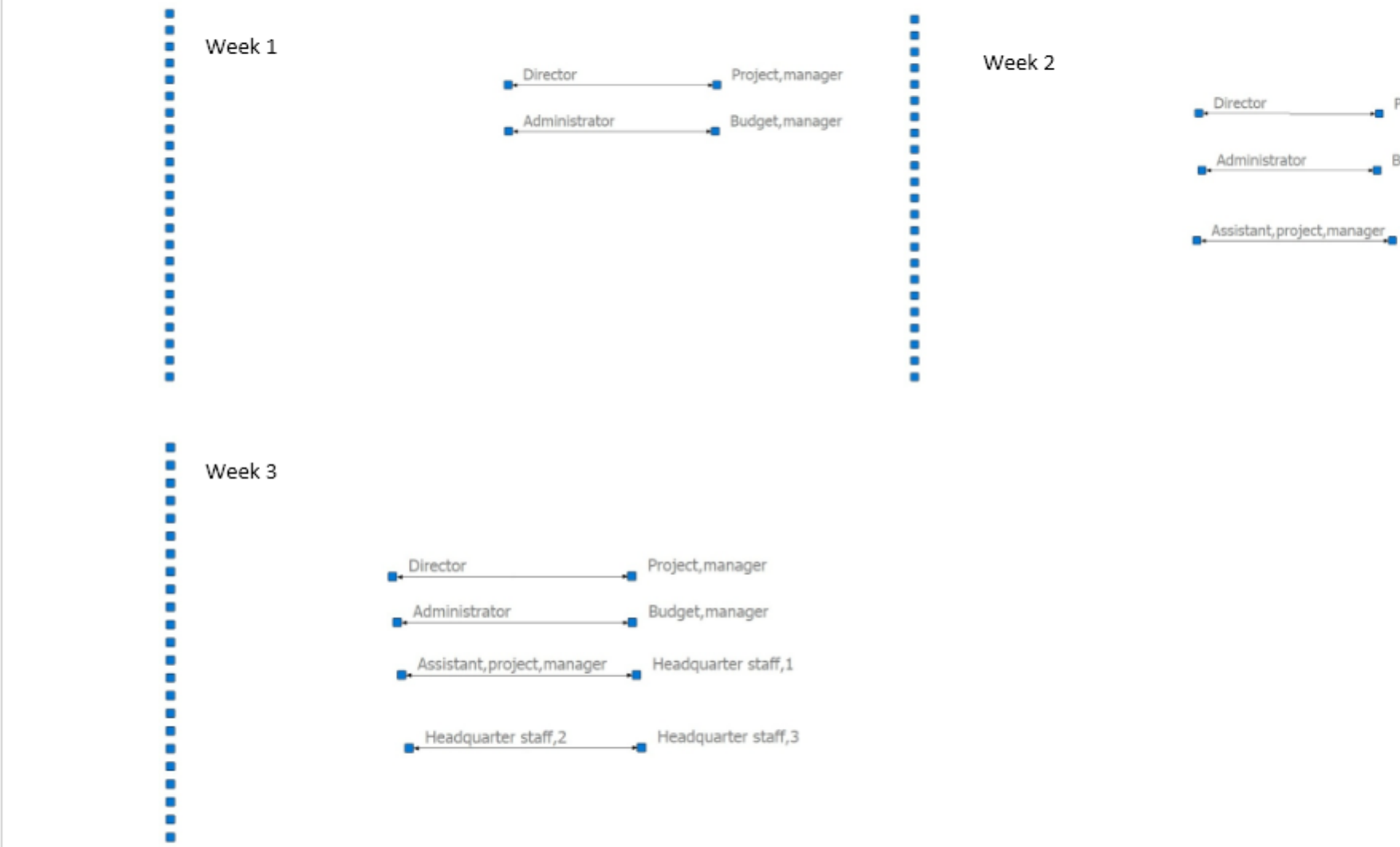


Figure 5.3a Planning in TCL staff relocation (clockwise week 1 to 3 of the whole project)

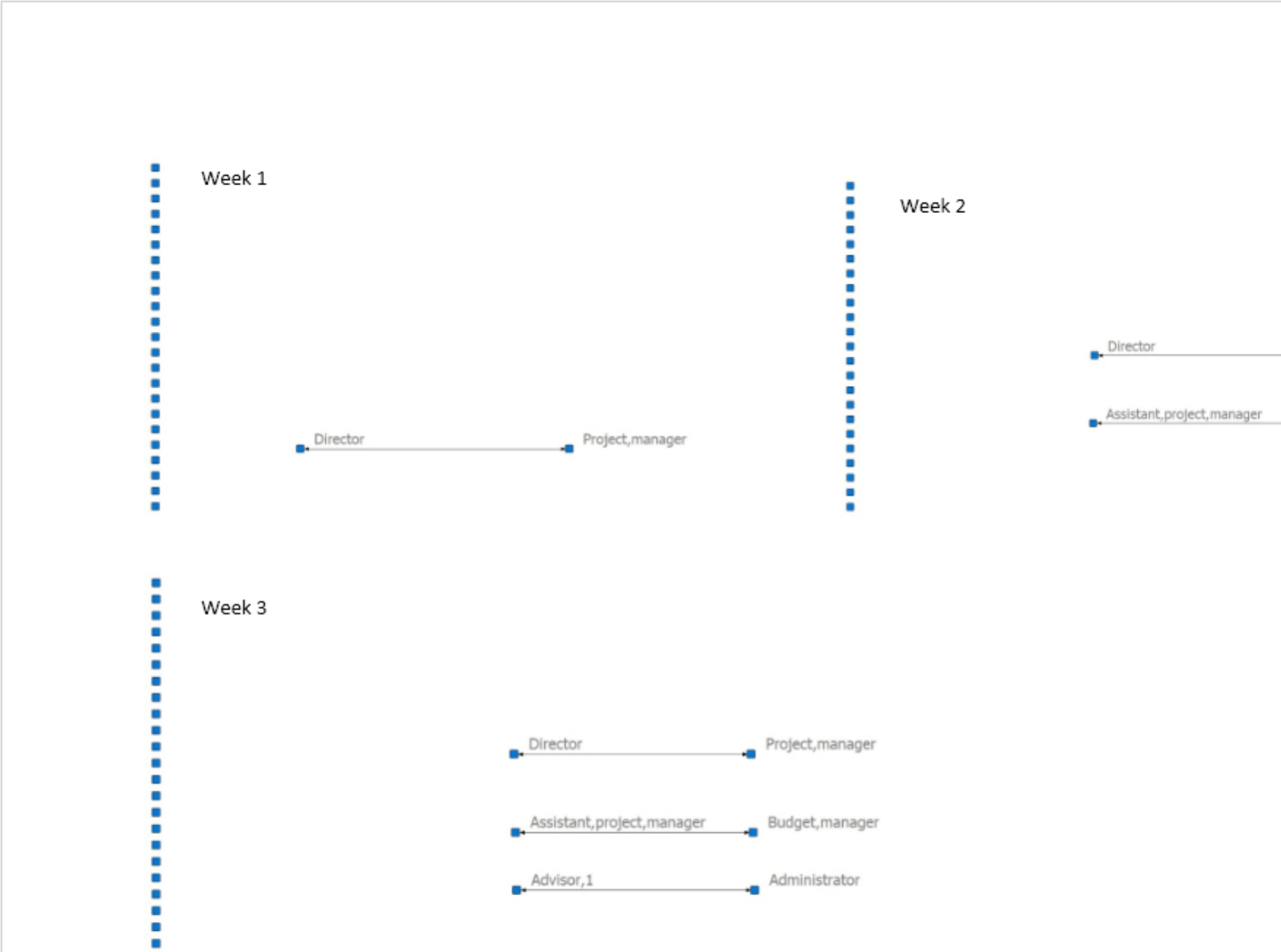


Figure 5.3b Planning in Inspur product redistribution (clockwise week 1 to 3 of the whole project)

The data show that information exchange in the planning stage is like a QandA sessions. At his stage, there is no brokerage actor in the network, since there is not any part of the networks having three people connected together. In the data, the questions about the nature of interactions show that phone chat, conversation, online video chat, and email between the director and a group of expert panellists from the committee are far more frequent than a formal meeting. Figure 5.2 shows the tasks in the planning stage. And the network analysis data in Figure 5.3 shows the interpersonal level interactions at this stage. Thus, it is clear that the planning stage is to prompt the importance of the practice transfer to convince the decision makers to approve the project. In this stage, very few people are involved, mainly the decision makers. And one to one communication is the pattern in the networks. In the data, the questions about the interaction content show that the communications are mainly about the value of the practice transfer project. Comparing the networks formed in the projects at this stage, there are slight differences are 1) the number of ties and 2) number of people involved. This is due to the number of information sources needed for each project's planning and decision making. The similarities are 1) paired communication in the networks and 2) only few people involved at this stage. A more detailed discussion about this is provided in Chapter 6 finding discussion.

5.2.2 Preparation

The process followed by planning is preparation. After the 'persuading' process, it is the time to clarify the work that needs to be done. The aim at this stage is to turn the entire practice transfer plan into executable actions based on the answers from project managers in the open

questions about the nature of the project. To achieve this, clear statements about each person's work are the most important. Thus, preparation is a process to get the detailed instructions ready for the following practice design stage.

The preparation stage focuses on preparing the documents for the later practice design stage. These documents include requirement documents, solution documents, policy documents, implementation documents, and new practice documents. Project design is not only about brainstorming, but also, more importantly, it is about preparing the documents. The works at this stage are about document writing. The project is complex, thus there are many documents that need to be ready before the practice design. Without those well prepared documents, the practice design cannot move forward smoothly.

The data collected from project managers (in the open questions about the nature of project) shows that preparation (see Figure 5.4) includes: developing requirement documents, solution documents, policy documents, implementation documents and new practice documents. Due to the very high complexity of the projects, the preparation has to be carried out with people from both subsidiaries and headquarter together. At first, subsidiary staff makes requirement documents which provide all the demands and requirements of practice changes. In order to meet the demands and requirements, headquarter staff will meet together to put down solution documents which list all solutions they can offer. Then headquarter staff are responsible for writing up the policy documents, which will be every employee's guide during new practice design. Subsidiary staff writes up implementation documents, which list the entire implementation plan. Finally, subsidiary staff will make the new practice documents based on the implementation documents. The new practice documents will be the manual for every subsidiary employee based on their jobs.

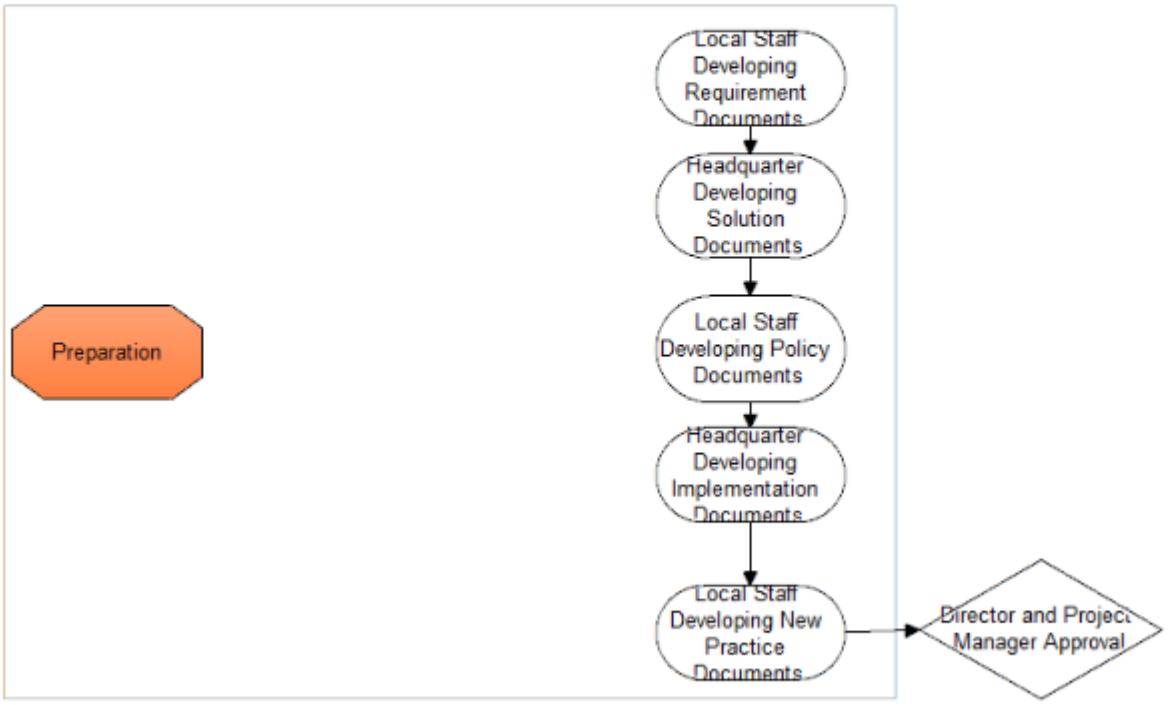


Figure 5.4 Preparation stage

Figure 5.4 shows the structure of tasks in the preparation stage. At this stage, the brokerage actors for translating information emerge in the networks. In this stage, the ideas have been spread out to everyone in the network, but usually through lots of people (see Figure 5.6a and 5.6b). The original information senders are usually quite far away from the receivers. The information arrives at the receivers having been translated into their language. And these translations are done by the people linking the receivers and the senders. Therefore, the network in preparation (see Figure 5.6a and 5.6b) starts with people forming pairs, and ends up with these pairs forming a chain in the week 6 network snapshot in both of Figure 5.6a and 5.6b. This is how the network develops into a chain. Project managers also mentioned (in questions about the nature of the interactions) that computer images such as videos, pictures and diagrams, have been used almost everywhere during communications. This is because

computer images are able to visualise the differences between the existing practices and the new practices, and also give an opportunity for people to get involved in the conversation, ask and answer questions, even develop into discussions sometimes.

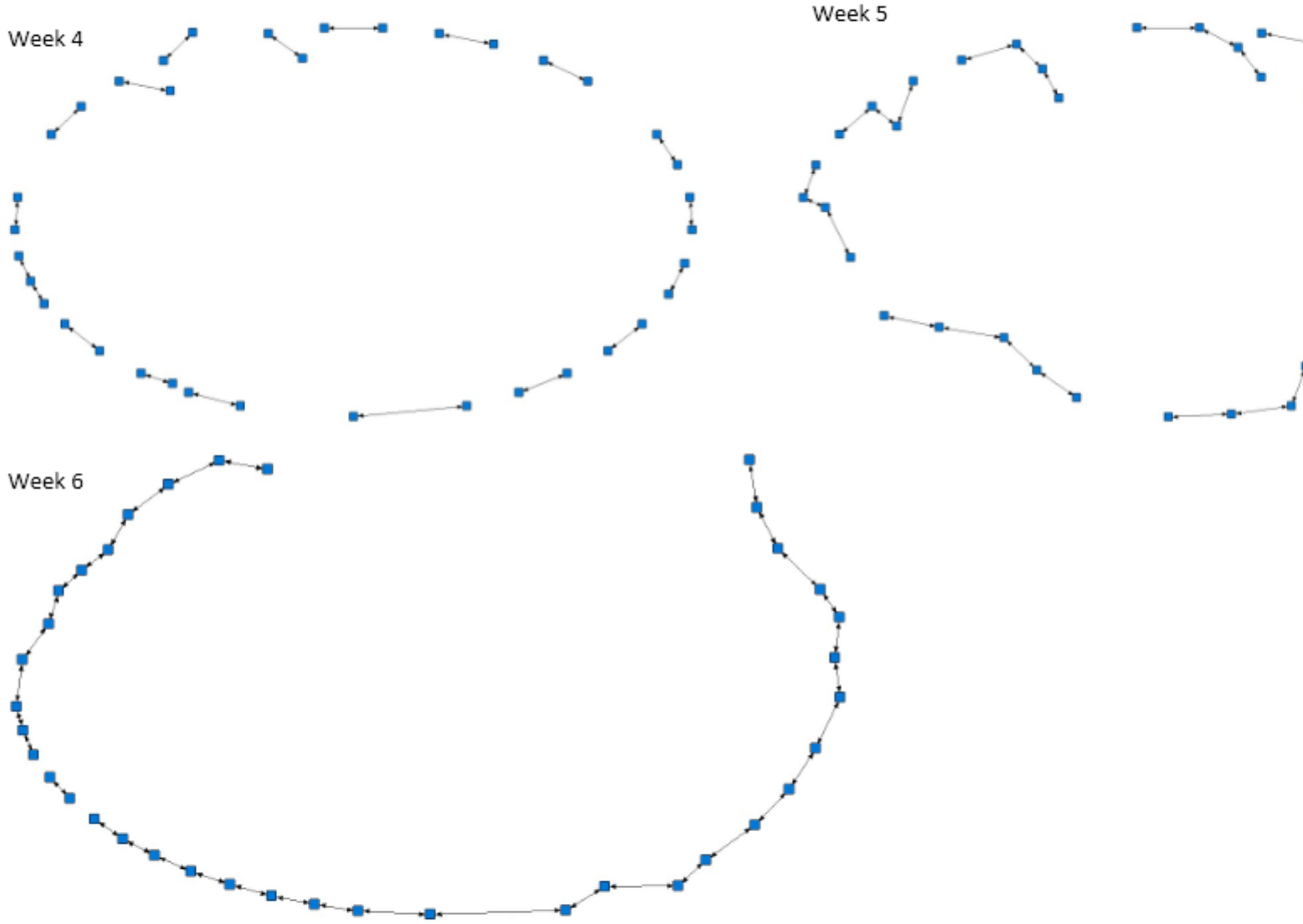


Figure 5.6a Preparation in TCL staff relocation (clockwise week 4 to 6 of the whole project)

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In sum, it is clear that the preparation stage is concerned with turning the entire plan into executable and detailed instructions for the following practice design stage. In this stage, everyone in the project is involved, and the network looks like a chain. The cause is that most of the communications are translated and passed around by brokerage actors rather than direct communications. Therefore, the network paths of communications are long. Further, when we look at the communication content in the data, it shows that these communications mainly consist of images and email texts. It suggests that visualisation is important in the translation and virtual communications among the team members are also important.

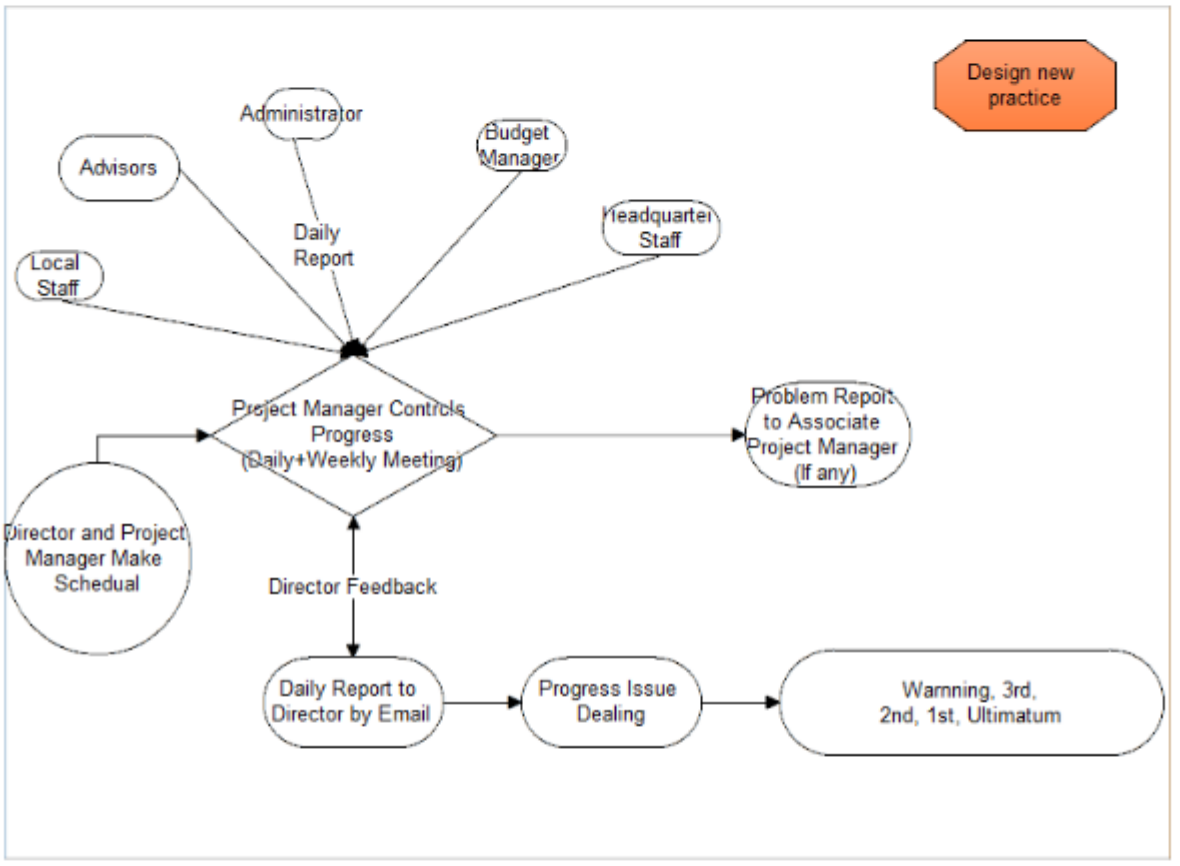
5.2.3 Design of new practice

The process following by preparation is the design of new practice. Figure 5.7 shows that it is organised in a way of in-between of distributed and centralised work. In other words, the work are organised as neither totally individual work nor collaborative work. The data shows new practice design (see Figure 5.7) in practice transfer includes: making a development schedule, daily reporting between staff and project manager, problem reporting, feedback, and issue dealing. It is a quasi-distributed project because, on one hand, the project is done across multiple tasks separately and concurrently, on the other hand, the project team members have face-to-face meetings regularly, and they are still working collaboratively through email and FTP (File Transfer Protocol, it is used for computer file exchanges) as a virtual team but sitting together every day.

The data about participant's profile also suggests that people involved at this stage are located in the same office area, however, the data about communication content suggests that they

mainly communicate with each other as a virtual team through email and File and Transfer Protocol Sever (FTP). Thus, new practice design is a process which deploys team members at the same location, but their communications rely on technologies.

Figure 5.7 New practice design



Why have a virtual team but be based on the same worksite? In the preparation stage, all the documents needed are well prepared. Requirement documents tell people the requirements they need to meet. Solution documents list all the potential solutions to fulfil the requirements. Policy documents are the guide for the participants during new practice design and tell them what to do. For example, how salary is calculated after staff relocation to match the currency and living cost change. So at the new practice design stage, the participants mainly work following these documents. Most of the peer-to-peer communication at this stage is to

confirm if someone's task is accomplished. The network in this stage (see Figure 5.8) shows that the network starts as a chain and ends up as a very dense network. The network distance between people is getting shorter, which means people in the network can reach anyone through fewer people in the middle.

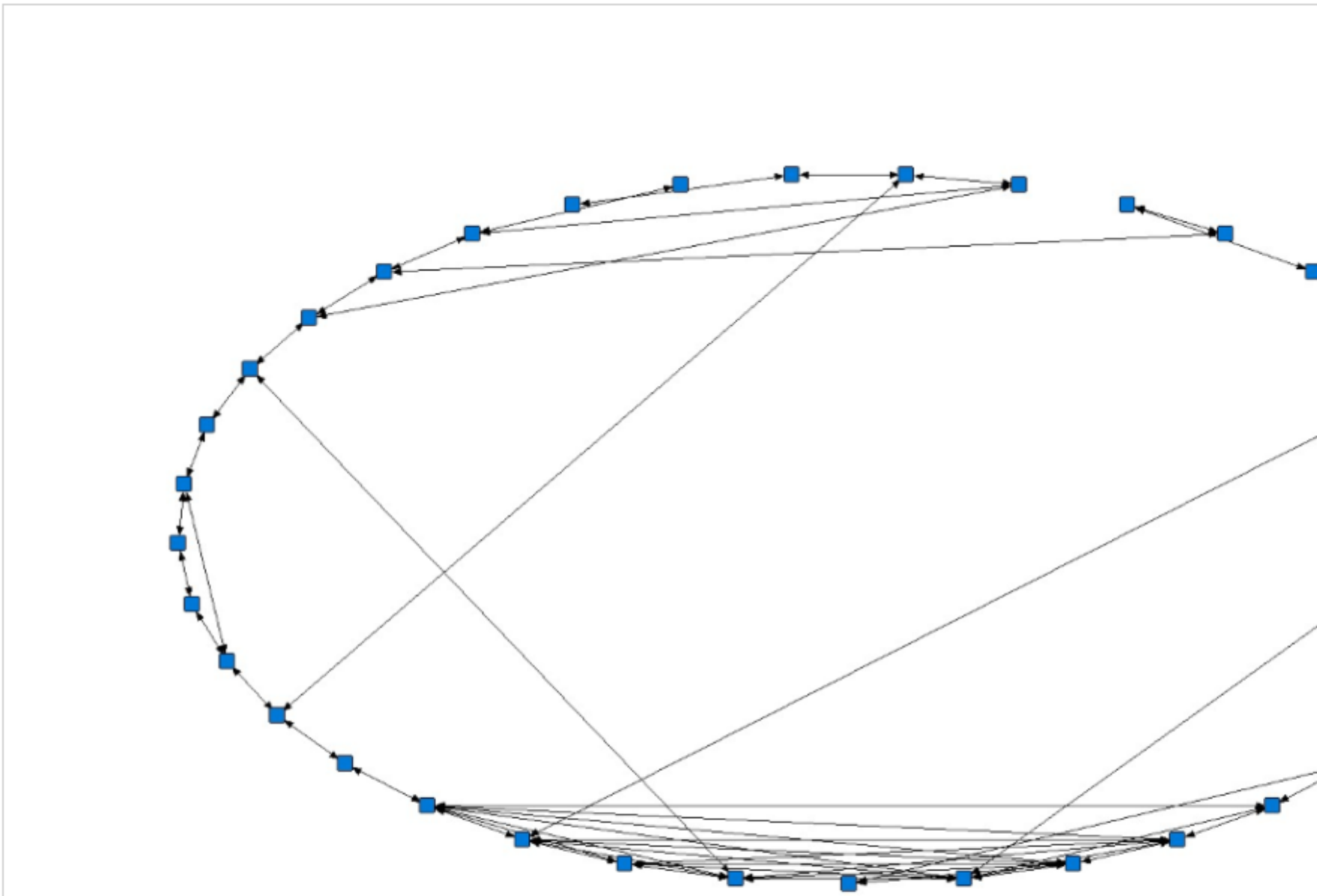


Figure 5.8a New practice design in TCL staff relocation (week 7-8 of the whole project)

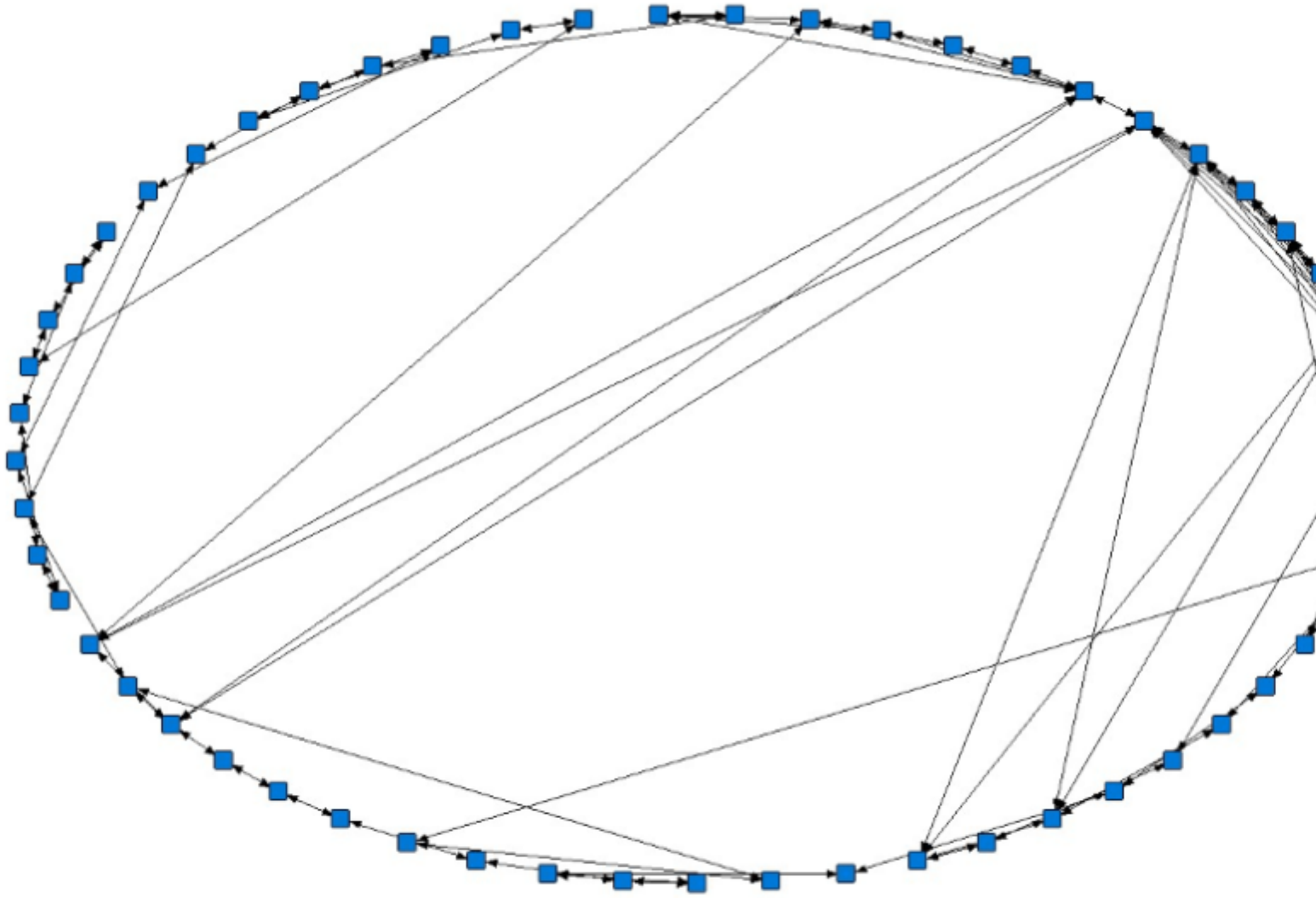


Figure 5.8b New practice design in Inspur product redistribution (week 7 of the whole project)

In order to organise the project team, the project managers have to give task profile and skill requirements for each team member on board. Table 5.1 below shows an example of participant's task profile and skill requirements. Although the requirements for becoming a team member are usually very high, the competition for becoming a member of the team is usually very high. People are motivated not only by the project bonus but also most likely by the opportunity to add a successful project work experience to their CV.

Table 5.1 Participant's task profile and skill requirements

Participant's task profile and skill requirements
Task profile: • Responsible for practice transfer projects • Supporting each phase and giving creative input • Requirements analysis • Project communication • Implementation and deployment • Collaboration with the team • Improving the internal work process
Skills and Qualifications: • Degree in Human Resource Management or well-founded working experience • Preferably three years of work experience or more • Very good Microsoft Office skills • Very good Mandarin and English language skills • Creative, analytic and strategic abilities • Ability to work independently • High motivation and personal engagement

Source: Project documents from Inspur

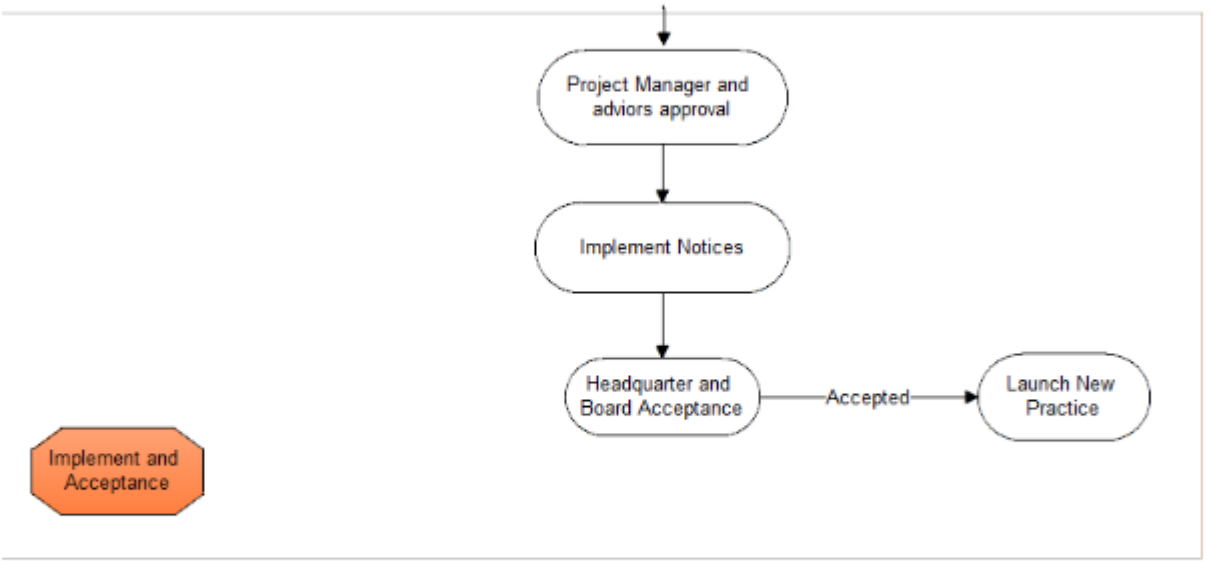
At this stage, the communications among the project team rely on various communication technologies due to the complexity of the project and documentation purposes. Brokerage actors for bridging institutions emerge at this stage. They build direct communication ties between people, so that the networks appear direct communication ties in the middle. In this stage, the network grows from a chain to a complex network, from a very lean network to a very dense network, from a network without any redundancy (options of network path) to a

network with lots of redundancy. The major interactions between people in this stage are file exchanges through email and FTP. Most of the communications are about the confirmation and clarification of information, for example, to ask people if this is the right thing, if this is what they need, and if this is what they mean in the documents. Thus, this stage is about clarifying and codifying the practices in the form of new organisation's (the subsidiaries) codes and frameworks.

5.2.4 Implementation and acceptance of new practices

The last process is implementation and acceptance of new practices. This process cannot be seen as simply delivering a project. It has hundreds of employees as stakeholders. The data shows that the implementation and acceptance stage includes: project managers and advisors approval, implementation notices, headquarter and board acceptance, and launching new practices. Implementation and acceptance starts with project managers and advisors making an approval report. Meanwhile, notices are given to employees about expected date of changing practices. Then this report goes to the board. After several rounds of reviewing, a decision of whether or not to launch the new practices is made.

Figure 5.9 Implementation and acceptance



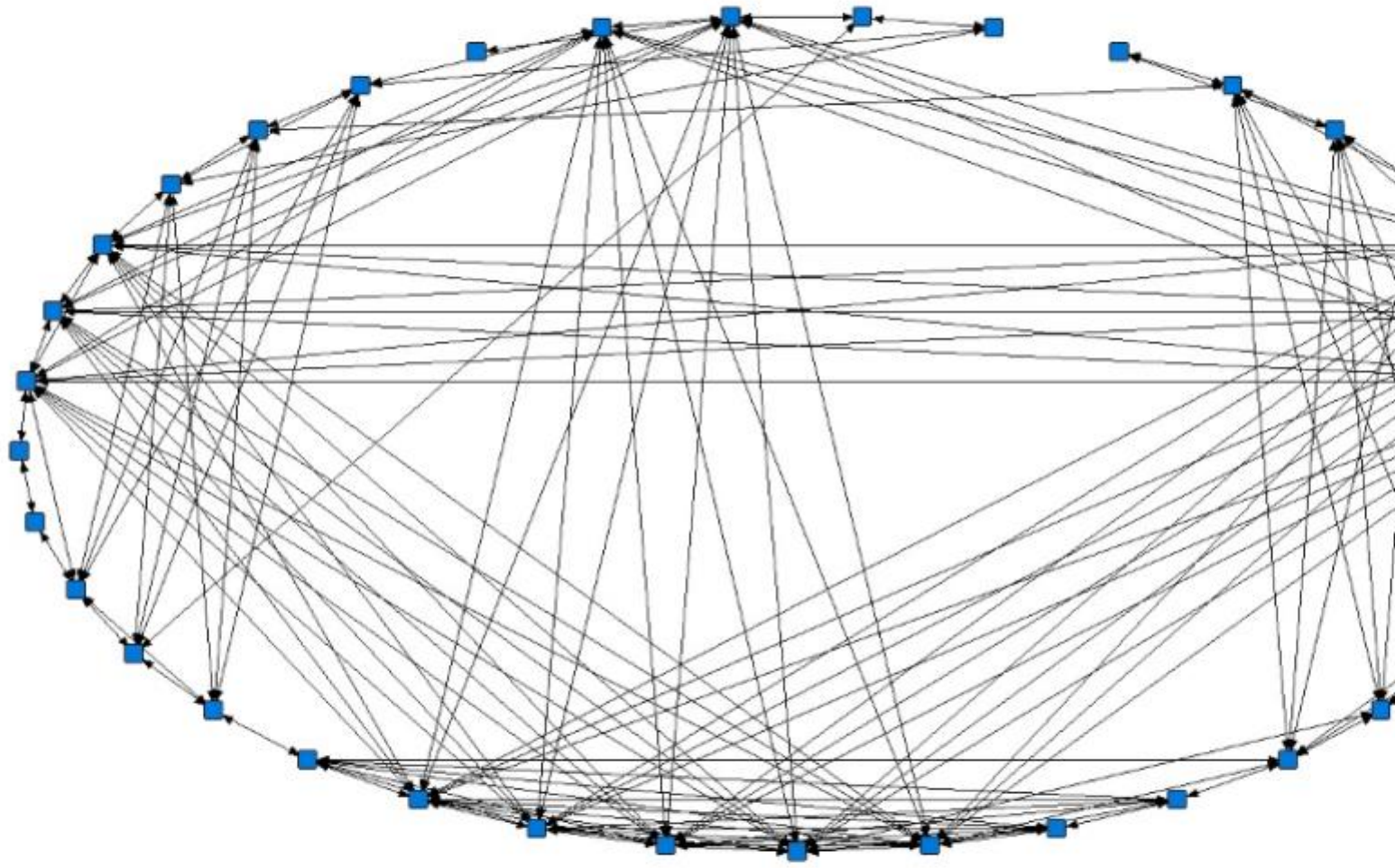


Figure 5.10a Implementation and acceptance in TCL staff relocation (week 9 of the whole project)

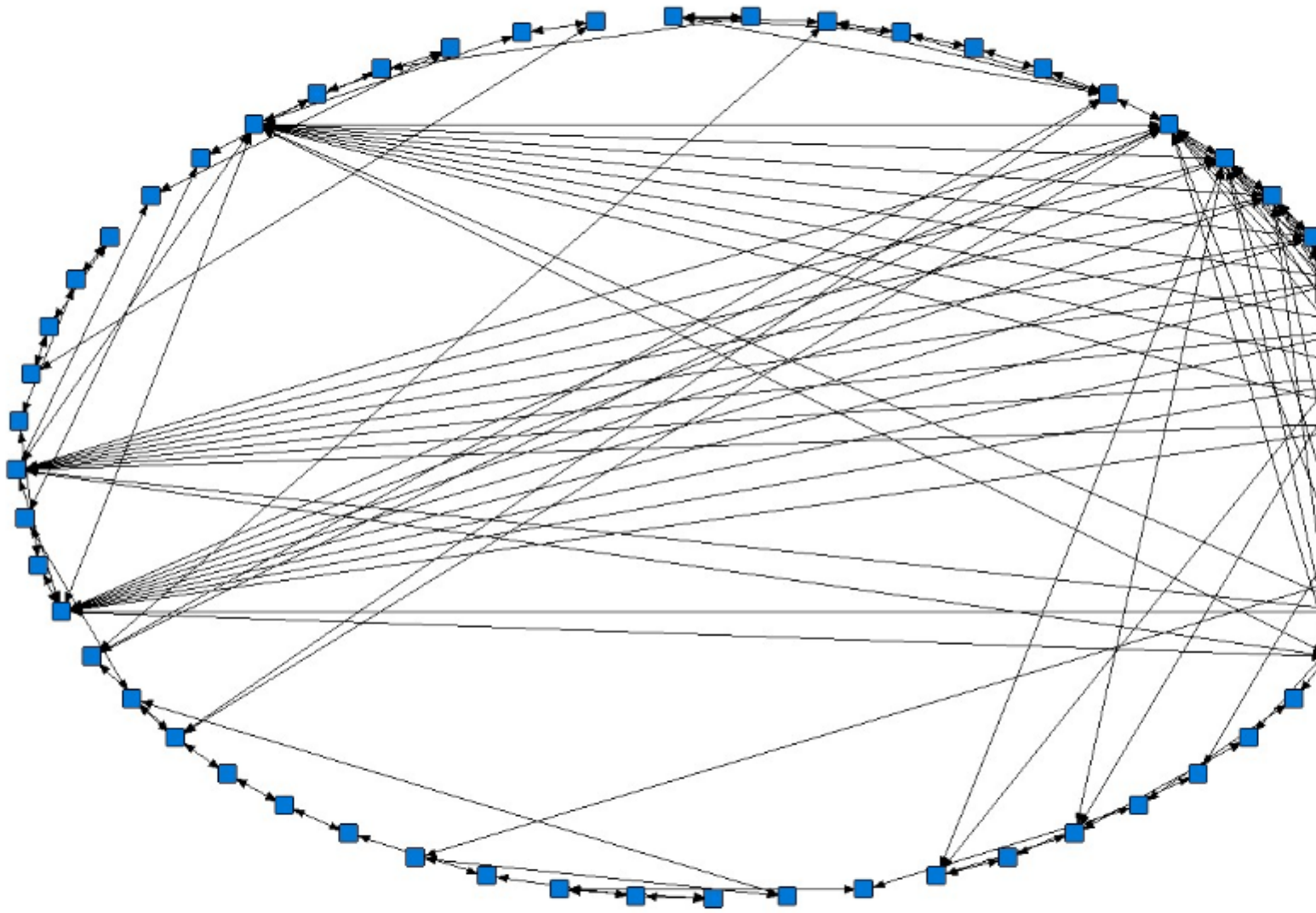


Figure 5.10b Implementation and acceptance in Inspur product redistribution (week 8 of the whole project)

The network in implement and acceptance stage shows more direct communication in the network. Brokerage actors for embedding codified practice emerge at this stage. The data about communication content shows that connections in the middle of the network are about confirming decisions. Thus, people in the network frequently and directly communicate (through the middle of the network) with each other until they reach a decision. And these people are embedded (inter-connected) in the communication ties. The networks in this stage have more direct communications than the previous stages. It is clear that implement and acceptance is to make sure the new practice works in the organisation. The new practice needs to be reviewed and approved meanwhile considering hundreds of employees as stakeholders. Thus, the network at this stage appears as frequent communication in the middle, people have more direct communication (see 5.10a and 5.10b).

To answer the first research question about network dynamics, the findings suggest the dynamics appear as brokerage actors connecting headquarter and subsidiary together during practice transfer, brokerage actors for translating information emerge at the preparation stage to connect people in communication, brokerage actors for bridging institutions emerge at the practice design stage to build direct connections between people, and brokerage actors for embedding codified practice emerge at the stage of implementation and acceptance to connect people in embedded network structures. These brokerage actors bridge the gaps and shorten the information path between people in practice transfer, meanwhile, the networks evolve towards to that brokerage actors are getting well-connected and inter-connected. A more detailed discussion about this is provided in the finding discussion chapter.

5.3 The roles and structures of brokerage actors

This section is to provide answer to the second research question about what the roles and structures of brokerage actors are in practice transfer. Three types of brokerage actors were defined in the literature review. However, questions remain about brokerage actors:

- Which types of brokerage actors exist in practice transfer?
- Who are the brokerage actors?
- What is the proportion of brokerage actors in a network?
- Can a person play different brokerage actor roles in a network?

This section will discuss the findings from each of these four aspects and try to make a connection with the existing theories.

5.3.1 Who are the brokerage actors?

Who are the brokerage actors has been an important question in this study. If this puzzle can be resolved, this will help people in practice transfer to organise their activities more efficiently. The reason is that well-organised practice transfer can reduce the financial and time costs of headquarter and subsidiary participation (Schmitt and Sadowski, 2003; Lertxundi and Landeta, 2012). Thus, a better practice transfer can be more efficient in terms of financial and time costs. The aggregation of network across the four stages of each practice transfer project is presented in Figure 5.11a, 5.11b, 5.11c, and 5.11d. These networks show that practice transfer activities are not organised in a hierarchical structure. The blue nodes represent headquarter staff, the black nodes represent UK subsidiary staff, and the nodes in other colours represent people in management roles. The nodes in the middle of the network

are brokerage actors. As mentioned in the methodology, the brokerage actors are identified by performing the G&F test in network analysis. The size represents to what extent a person is a brokerage actor. It shows how many times a person can bridge information exchange and act as a brokerage actor on the shortest path between two other people in the network. These brokerage actors are the:

- Project managers
- Director
- Advisors
- Budget manager
- Administrator
- Subsidiary staff (in the centre of each network)
- Headquarter staff (in the centre of each network)

It should be noted that not only people who have the management roles act as brokerage actors but also subsidiary and headquarter staff do so (Figure 5.11a, 5.11b, 5.11c, and 5.11d). This finding is new and builds on previous research that only identifies managers as brokerage actors. Thus, this study suggests in the context of practice transfer, brokerage actor roles are performed by different employees according to their expected contributions to the practice transfer, rather than performed by managers alone.

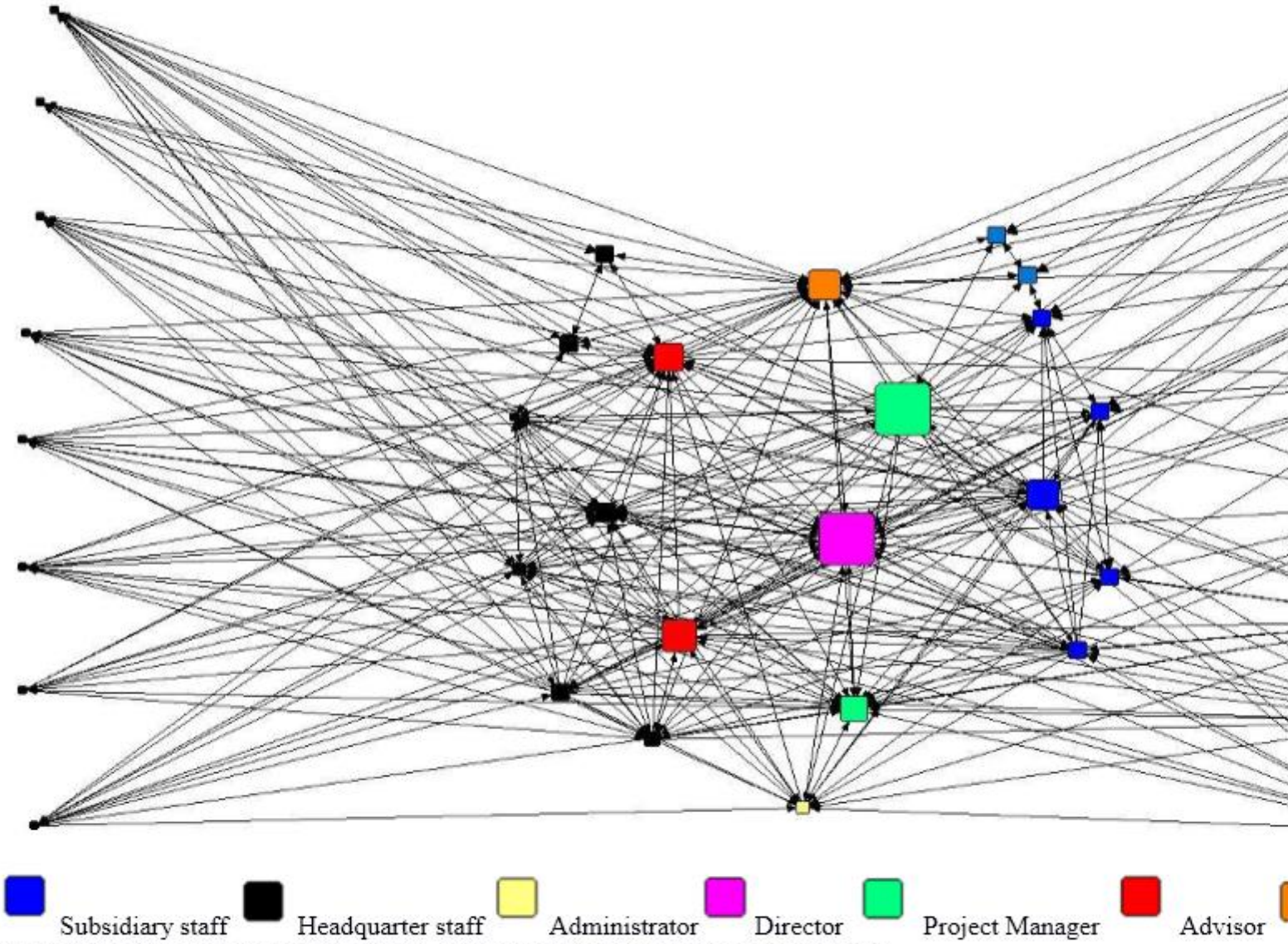


Figure 5.11a The overall network in TCL product redistribution, 37 people, 356 ties

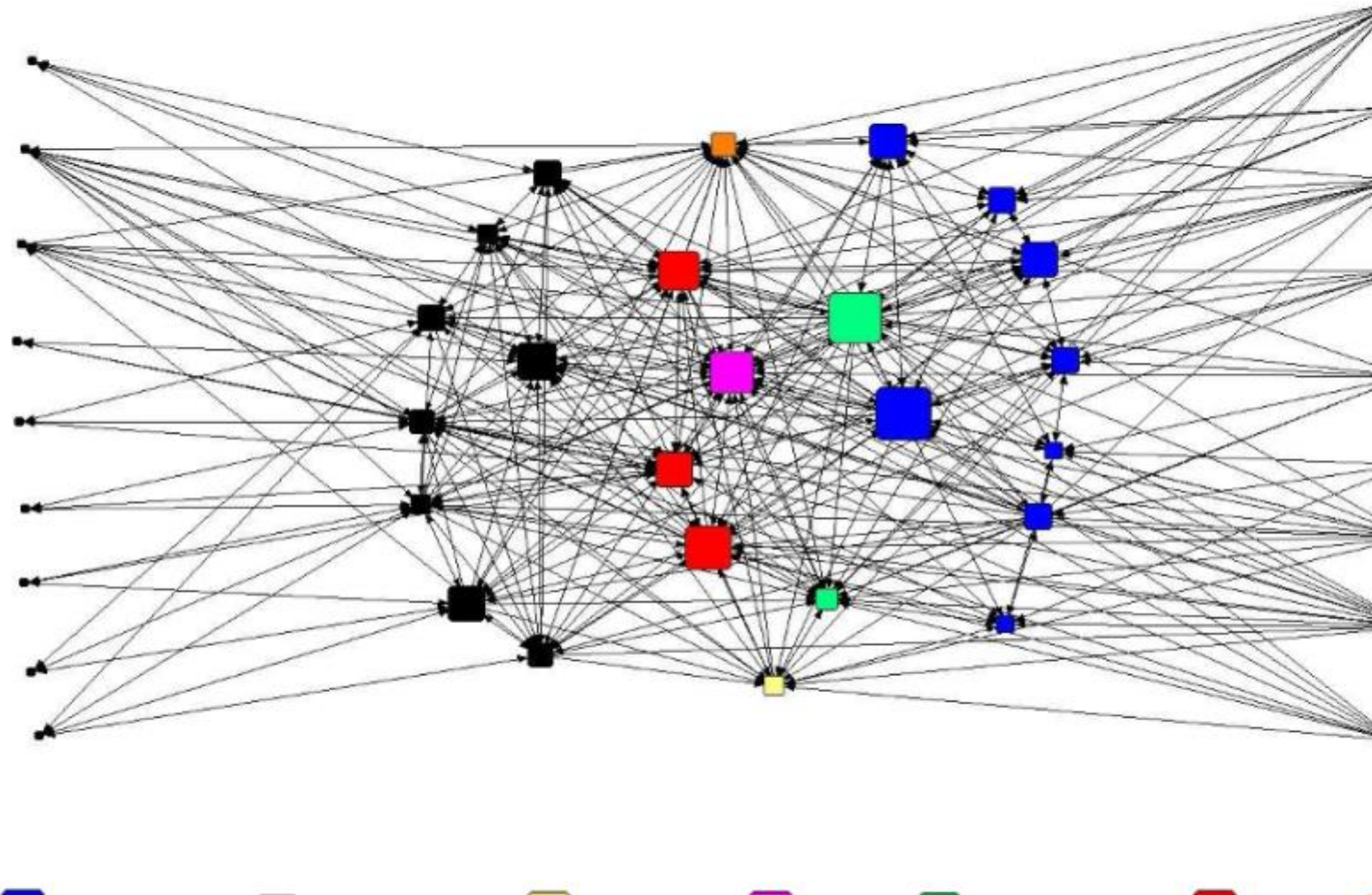


Figure 5.11b The overall network in TCL staff relocation, 42 people, 453 ties

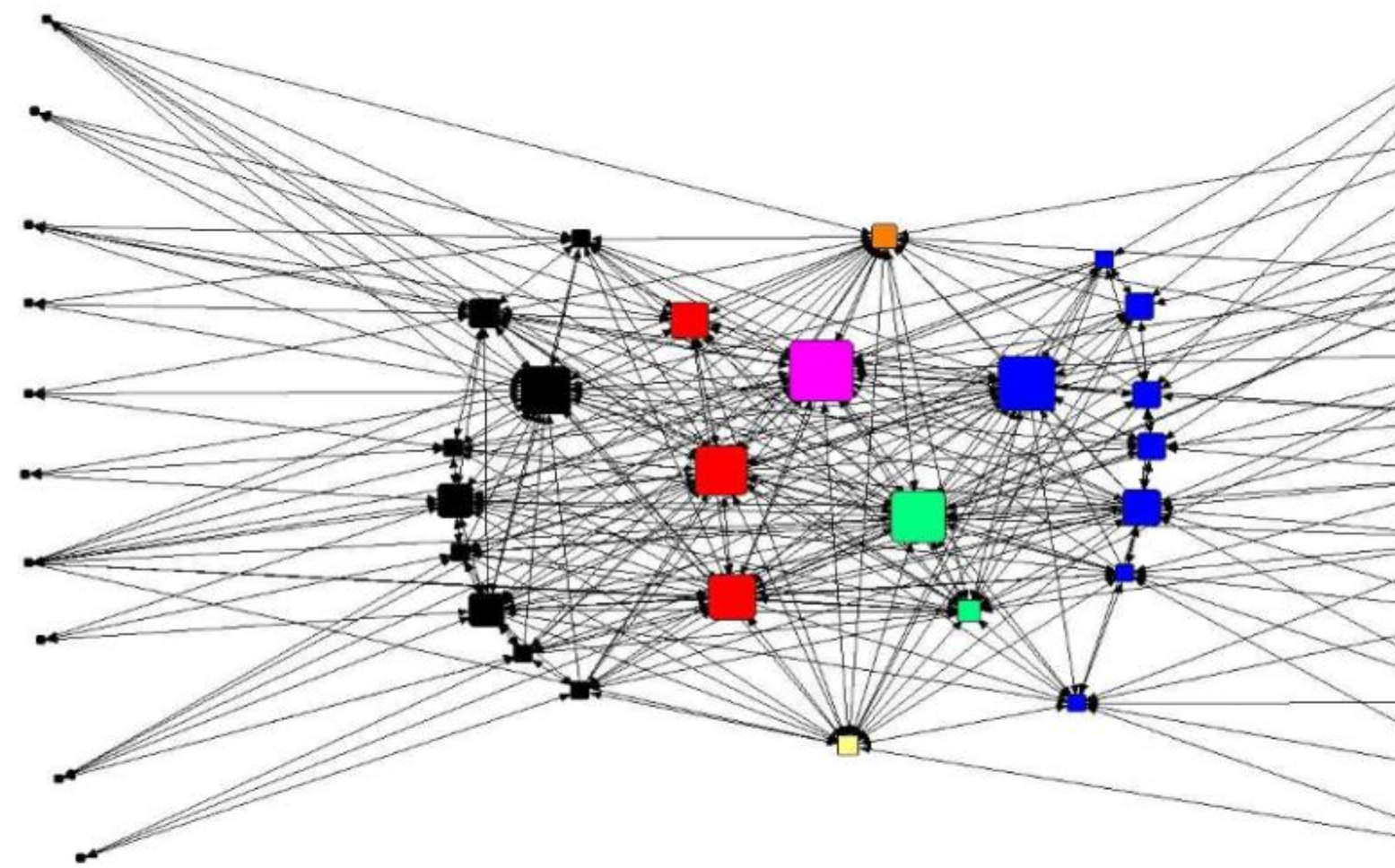


Figure 5.11c The overall network in Inspur product redistribution, 47 people, 635 ties

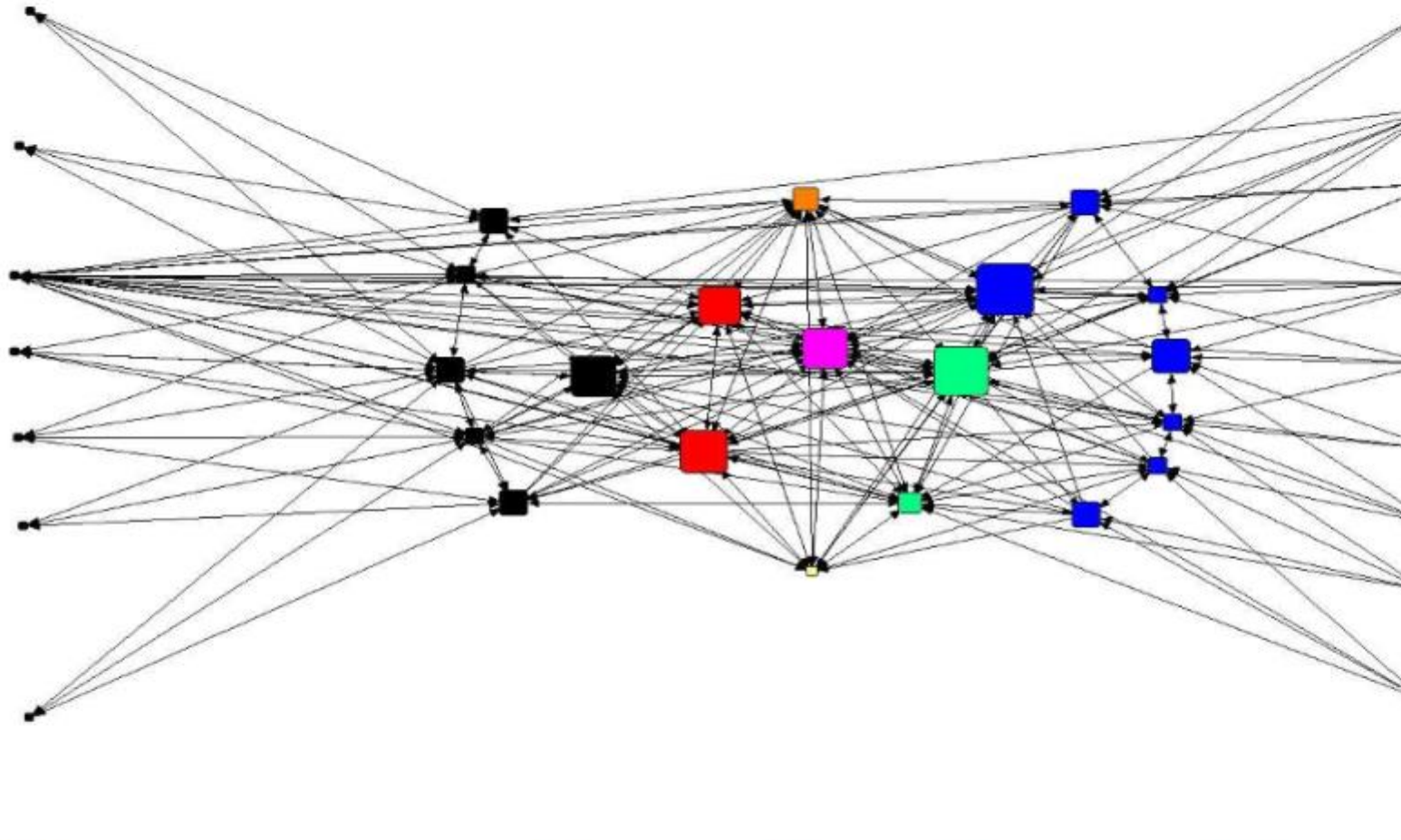


Figure 5.11d The overall network in Inspur staff relocation, 36 people, 422 ties

In Figure 5.11a, 5.11b, 5.11c, and 5.11d, brokerage actors grouped in the centre of each network occupy unique and valuable connection. This finding is consistent with the previous findings (Burt, 1992, 2007 and 2015), which suggested that brokerage actors occupy the network positions connecting to the others. Therefore, a network can fall apart without these brokerage actors. This finding draws attention from two aspects that need to be considered as below.

First, it is necessary to have brokerage actors (in the centre of each network) to connect headquarter (on the left of each network) and subsidiary (on the right of each network). Also, this is confirmed in the later on regression modelling results in this chapter. As discussed in this study's literature review, brokerage actors are likely to be located in a network position, where a cutting point can connect or disconnect a large number of others (McEvily and Zaheer, 1999; Burt, 2015). Figure 5.11a, 5.11b, 5.11c, and 5.11d show that brokerage actors are in the network positions where they can choose to connect or disconnect the headquarter and subsidiary.

Second, brokerage actors in practice transfer can be distinguished from the other participants by the network positions they have. The information received from their connections can be related to their network position, therefore, it is important for brokerage actors to occupy the path in their network and control the connectivity (Burt, 2007). Figure 5.11a, 5.11b, 5.11c, and 5.11d show the connectivity in each network. Without the connections with those brokerage actors in the centre, the networks can fall into disconnected parts and disconnect the headquarter and subsidiary. Clearly, under this circumstance, the degree of collaboration can be limited. This suggests that brokerage actors occupying network connectivity and their

connections cannot be substituted or bypassed, which distinguish them from the other participants.

Based on the above discussion, brokerage actors are likely to be related to the outcomes of practice transfer, since they have advantages positions in their networks. To confirm this, the next section is to present more details about brokerage actors.

5.3.2 The number of brokerage actors

It also should be noted that the network snapshot presents a large number of people acting as brokerage actors located in the middle of the network. The brokerage actors take over half of the network. This finding is once again in contrast to those existing studies that suggest brokerage actors are only a few of people in the network. The findings show that brokerage actors are not only a few people in the network, they are a large group of people in the network (see Table 5.2). TCL product redistribution project and staff relocation project have 51.2 and 52.4 percent of participants are brokerage actors respectively. Inspur product redistribution project and staff relocation project have 53.4 and 47.2 percent of participants are brokerage actors respectively. In total, there are 51.2 percent of participants are brokerage actors in all of the projects. There are more than half of the participants are brokerage actors in these four practice transfer projects. Thus, this study suggests in the context of practice transfer, brokerage actors are a large group of people rather than a few.

Table 5.2 Number of brokerage actors in each network

Network	Number of brokerage actors
TCL product redistribution	51.2 percent of participants are brokerage actors 19 brokerage actors out of 37 people in the network
TCL staff relocation	52.4 percent of participants are brokerage actors 22 brokerage actors out of 42 people in the network
Inspur product redistribution	53.4 percent of participants are brokerage actors 25 brokerage actors out of 47 people in the network
Inspur staff relocation	47.2 percent of participants are brokerage actors 17 brokerage actors out of 36 people in the network
Total	51.2 percent of participants are brokerage actors 83 brokerage actors out of 162 people in the networks

5.3.3 The proportion of brokerage actor roles

As discussed in the literature review, there are three potential brokerage actor roles: "Translating information", "bridging institution", and "embedding codified practice". The result of GandF test is presented in Table 5.3. This result suggests that all three types of

brokerage actors (see Figure 5.12) identified in the theoretical framework appear in the same network. They are "Translating information", "bridging institution", and "embedding codified practice" brokerage actors. 96.4% of brokerage actors play all three roles at the same time. The finding suggests that all three types of brokerage actor roles exist in the network are almost equally in number. This indicates that practice transfer projects should take all these three types of brokerage actor roles rather than just some of them.

Figure 5.12 Three types of brokerage actor roles

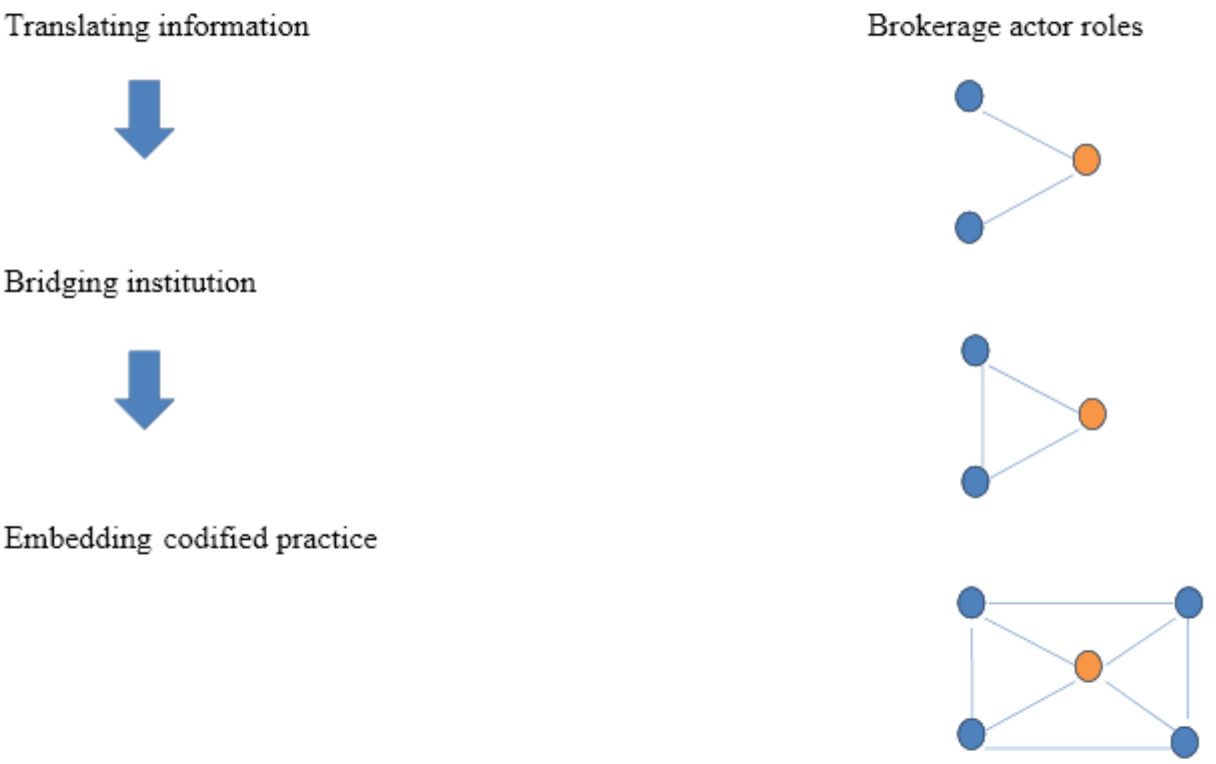


Table 5.3 The roles of brokerage actors (by frequency and including brokerage actors who are cross-over between the roles)

	Translating	Bridging	Embedding
TCL product redistribution	19	19	18
TCL staff relocation	22	22	21
Inspur product redistribution	25	25	24

Inspur staff relocation	17	17	17
Total	83	83	80

There are three types of brokerage actors in the data (see Figure 5.12). They are "Translating information", "bridging institution", and "embedding codified practice" brokerage actors. "Translating information" brokerage actors are people connecting those otherwise disconnected people. These brokerage actors are like bridges between the others. Without them, some participants would lose their connections to the project team. "Bridging institution" brokerage actors are inter-connected people. Those brokerage actors are connected one to all others. Contrasting to "translating information" brokerage actors, those people do not rely on any third party acting as bridges. "Embedding codified practice" brokerage actors are people with more than one inter-connected structure. It is necessary to explain why brokerage actors have more than one inter-connected structure is a different structure from "Bridging institution" brokerage actors with just one inter-connected structure. The reason is that people with more than one inter-connected structure usually connect well-connected people. In other words, these brokerage actors may not connect with many people, but they are connected with those well-connected people. Therefore, "Embedding codified practice" brokerage actors may benefit from those well-connected people in the project without having to manage large number of connections.

There are debates in the existing literature about what the roles of brokerage actors are and what they do during the practice transfer processes. To resolve this issue, this study's findings provide evidence to support that brokerage actors are not only one type of roles, brokerage actors are a combination of all these three different types of roles. And this study suggests

that there are three roles of brokerage actors. They are "translating information", "bridging institution" and "embedding codified practice".

5.3.4 Multiple roles of each brokerage actor

Previous literature suggested that there could be three types of brokerage actors, but an interesting question remains concerning whether people play multiple brokerage roles. Table 5.5 shows that none of the brokerage actors play only one role, and they actually play multiple roles. This is because brokerage actors naturally came up in the practice transfer process to meet the needs of information exchange and teamwork. Through a practice transfer project, information exchange constantly happens between the local subsidiary and headquarter groups. Thus, most of the brokerage actors have to play multiple roles. The findings show that most of the brokerage actors play multiple roles.

Table 5.5 Multiple roles of each brokerage actor

Brokerage actors play all three roles	Brokerage actors play two roles	Brokerage actors play only one role
96.4%	3.6%	0%

In sum, the importance of brokerage actor is due to exchange and circulation of information between the local subsidiary and headquarter groups during practice transfer projects. In this research's literature review, the existing literature suggested each brokerage actor role separately and assumed that brokerage actors only plays one of these roles. This research's finding suggests that brokerage actors can play multiple roles and more likely play multiple

roles. Thus, this study's findings are complementary to the three types of brokerage actor model.

5.3.5 Well-connected people in the network

The findings of network structure also have features as below:

1) Most of the people in the network are well connected.
2) Only a few of brokerage actors have information control power in the network.
3) People are very close to each other in the network.
4) Brokerage actors are inter-connected and non-brokerage actors are only connected by brokerage actors.

The results show that all these four different types of network structures appear in this practice transfer. The following sections below will discuss these findings respectively.

Degree centrality shows to what extent a person in the network is well-connected. Table 5.6 shows each person's centrality in the network. As discussed in the methodology part, centrality measures can be used to describe the network structure. The result in Table 5.6 shows that most of the brokerage actors are well-connected with an average of 22 connections to each person and non-brokerage actors with an average of 6 connections to each person in the network, which can be seen in the degree centrality.

Table 5.6 Centrality (the average in all projects and the average in each project)

	Degree	Closeness	Betweenness	Eigenvector
Brokerage actors in total	22	23	67	252
Non-brokerage actors in total	6	36	47	47
TCL product redistribution brokerage actors	21	22	69	244
TCL product redistribution non-brokerage actors	6	40	43	43
TCL staff relocation brokerage actors	23	22	62	253
TCL staff relocation non-brokerage actors	6	35	48	49
Inspur product redistribution brokerage actors	22	25	68	255
Inspur product redistribution non-brokerage actors	6	35	49	48
Inspur staff relocation brokerage actors	22	23	66	256
Inspur staff relocation non-brokerage actors	5	34	48	48

Thus, this study suggests that the network structure (considering the network as an aggregation of the four stages of practice transfer project) is in a form of that brokerage actors are more well-connected than non-brokerage actors. In this study's literature review about structural hole theory and network structures, structural holes are the disconnected gaps between people in a network, the practice transfer network is suggested as either not-well-connected as it has lots structural holes (Burt, 2004), or well-connected as it has few structural holes (Uzzi, 1996). This new finding will challenge the existing literature about the practice transfer network is either not-well-connected (Burt, 2004) or well-connected (Uzzi, 1996). This study suggests neither of these points fits the context of practice transfer in this

case. In the context of practice transfer, this study suggests that the connections are not evenly distributed in practice transfer networks and it appears that brokerage actors are more well-connected than non-brokerage actors.

5.3.6 Information control in the network

Betweenness centrality shows the power of information control in the network. The high score means that individuals in the network have great power of information control which can be seen in the betweenness centrality. The result in Table 5.6 indicates that there is no big difference between brokerage actors and non-brokerage actors, considering the score 67 is less than the double amount of score 47 (Burt, 2007). Although there are lots of brokerage actors in the network, but none of them can control the network. The highest scores are the director 69 and project manager 67. This suggests the director and project manager's information control is not absolutely high. Neither of them has total control of the network. This finding confirms the existing literature (Szulanski, 1996; Burt, 2007) that people exchange information freely and do not rely on a small number of brokerage actors to pass the information in practice transfer projects.

5.3.7 Network distance between people

Table 5.6 shows that people are very close to each other in the network, which can be seen from the closeness centrality. The longest distance (considering the network as an

aggregation of the four stages of practice transfer project) to send information to someone in the network is through no more than two people in the middle. The result in Table 5.6 shows that people are very close to each other in the network at the end of the project or toward to be closer to each other in the network during the project, which can be seen from the closeness centrality. Due to a large number of brokerage actors in the network, this network is a very dense network with short network distance between people. Information transfer between the local subsidiary and headquarter can be completed by going through just one brokerage actor. More important, this study suggested that brokerage actor network is a "small world" network characterised by short path lengths. This study applied the network perceptive to analysing practice transfer activities. The result suggested the "two degrees of separation" in network that any two individuals in the project may be linked by no more than two brokerage actors in the middle. This means communication path are short in practice transfer, any information exchange between headquarter and the local subsidiary does not need to go through more than two brokerage actors in the middle.

5.3.8 Inter-connected brokerage actors

Table 5.6 indicates that brokerage actors in the network are not only well-connected but also are connected to the well-connected people in the network. This can be seen in the eigenvector centrality. Brokerage actors have much higher eigenvector centrality value than non-brokerage actors. Well-connected brokerage actors are also inter-connected like a cluster.

In the context of practice transfer, this study suggests that the network appears that those well-connected brokerage actors are also inter-connected. All brokerage actors tend to have high eigenvector centrality scores. Also, brokerage actors are not only bridging people otherwise disconnected, brokerage actors are also inter-connected like a cluster. This new finding fills the gap in the literature about the relationships between brokerage actors.

In summary, the findings of network structure are:

1) Most of the people in the network are well connected.
2) Only a few of brokerage actors have a high power of information control in the network.
3) People are very close to each other in the network.
4) Brokerage actors are inter-connected.

5.4 The influence of brokerage actors

This section is to provide answer to the third research question about to what extent brokerage actors can influence the results of practice transfer. As discussed in the theoretical framework part, brokerage actors can influence practice transfer outcomes. The results of the regressions are shown in Table 5.7. This study uses two sets of data about the practice transfer outcomes. They are managers' view and participants' view of practice transfer outcome. Managers' view of practice transfer outcomes is the dependent variable in Models 2, 3 and 4, while in Models 5, 6 and 7 participants' view of practice transfer outcomes are the dependent variables. Model 1 includes only the control variables. The result suggests brokerage actors have a significant influence on practice transfer outcomes. Especially the

brokerage actors have more influence on practice transfer outcomes than individual characteristics.

Table 5.7 Multivariate regression models

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
	Manager's view				Participant's view		
Constant	−0.538	−0.435	−0.237	−0.177	0.1236	0.0225	0.0121
	(0.785)	(0.886)	(0.695)	(0.855)	(0.869)	(0.858)	(0.917)
Tenure	−0.025**	−0.0392**	−0.0288**	−0.0216*	−0.0225*	−0.0296**	−0.0223**
	(0.018)	(0.016)	(0.015)	(0.023)	(0.018)	(0.019)	(0.016)
Education	−0.0058	−0.009†	0.0028†	0.0032*	0.0315	0.0318*	0.0396*
	(0.028)	(0.025)	(0.023)	(0.019)	(0.025)	(0.028)	(0.023)
Intrinsic	0.0592	0.1568*	0.1633	0.1629	0.1629*	0.3893*	0.2585*
	(0.123)	(0.122)	(0.129)	(0.136)	(0.158)	(0.292)	(0.23)
Extrinsic	0.085	0.0096	0.0518	0.0321	0.2112	0.0815	0.0509
	(0.125)	(0.122)	(0.198)	(0.156)	(0.189)	(0.162)	(0.153)
Seniority	0.2323	0.2819	0.2966	0.2892	−0.6532†	−0.6122†	−0.6496†
	(0.322)	(0.325)	(0.352)	(0.338)	(0.392)	(0.355)	(0.368)
Group–Local	0.2258	0.0598	0.0923	0.0875	−0.5692	−0.549	−0.401
	(0.282)	(0.329)	(0.362)	(0.388)	(0.385)	(0.398)	(0.302)
Group–Headquarter	0.2988	0.2823	1.098†	1.004†	−0.6982	−0.2931	−0.2001
	(0.568)	(0.629)	(0.585)	(0.587)	(0.665)	(0.692)	(0.602)
Translation		0.2892*	0.3868**	0.3357**	0.2953*	0.3829**	0.3363**
		(0.165)	(0.152)	(0.168)	(0.189)	(0.192)	(0.169)
Bridging			0.2992**	0.2862**		0.4918**	0.4692**
			(0.185)	(0.132)		(0.152)	(0.151)
Embedding				0.1723** (0.071)			0.1607** (0.063)
R^2	**0.4426**	**0.5618**	**0.6772**	**0.6996**	**0.5767**	**0.7117**	**0.7211**

$N = 162$; †$p \leq 0.1$; * $p < 0.05$; ** $p < 0.01$; two-tailed tests, robust standard errors in parentheses

Model 2 adds translating information using each person's GandF test score. As predicted in the theoretical framework, brokerage actors of translating information have positive and significant practice transfer outcomes ($\beta = 0.2892$, $p = 0.042$). Model 3 adds bridging institution using each person's structural hole score. As Model 3 shows, the influence of bridging institution on managers' view of practice transfer outcome is similar to that of translating information ($\beta_{translating} = 0.3868$, $p = 0.007$ vs. $\beta_{bridging} = 0.2992$, $p = 0.004$ respectively). There is similar result in model 4 after adding embedding codified practice into the model. Of interest is the relative magnitude of the effect of three types of brokerage actors, translating, bridging, and embedding.

Models 5, 6 and 7 focus on the participants' view of practice transfer outcomes. Model 5 suggests support for brokerage actors of translating information contributes to practice transfer ($\beta = 0.2953$, $p = 0.041$). More significantly, once the model 6 includes brokerage actors of bridging institution, the influence on participants' view of practice transfer outcomes increased ($\beta_{translating} = 0.3829$, $p = 0.006$ vs. $\beta_{bridging} = 0.4918$, $p = 0.005$ respectively). There is similar result in model 7 after adding embedding codified practice into the model.

R^2 indicates to how accurate the model is. A more strict definition, R^2 indicates the total variation of dependent variable can be explained by independent variables. In this study, the differences of R^2 between each model will show the influence of brokerage actors. For example, Model 1 includes only the control variables. Model 2 adds brokerage actors of translating information. As predicted in the theoretical framework, adding globalizing actors of translating information in the model can increase model accuracy by increasing R^2 from

0.4426 to 0.5618. Model 3 adds both brokerage actors of translating information and bridging institution to the model. Then, the R^2 increases from 0.5618 to 0.6772. The similar increase happens in model 5, 6 and 7 which testing against the participants' view about practice transfer outcomes.

Here, while individual characteristics matter for practice transfer outcomes, their influence is less than that of brokerage actors. Moreover, the fact that the influence of brokerage actors is more significant when all three types of them are added to the model suggests that each type alone is of less benefit. The result suggests brokerage actors have a significant influence on practice transfer outcomes. As a different influence comparing to individual characteristics, the brokerage actors have more influence on practice transfer outcomes than individual characteristics.

5.5 Summary

The findings of this study consist of three parts:

1) The dynamics of brokerage actors is to answer the first research question about what the dynamics of brokerage actors is in practice transfer.
2) The roles and structures of brokerage actors are to answer the second research question about what the roles and structures of brokerage actors are in practice transfer.

3) The influences brokerage actors have on practice transfer outcomes i.e. the third research question, are tested by gathering the data together from the four projects.

These findings are:

1) The dynamics of brokerage actors:

   - This study presented the network patterns at each stage of the practice transfer process, planning, preparation, new practice design, and implement and acceptance.
   - The dynamics appear as brokerage actors are connecting headquarter and subsidiaries together during practice transfer, brokerage actors bridging the gaps and shorten the information path between people, meanwhile, the networks evolve towards to that brokerage actors are getting more well-connected and inter-connected than non-brokerage actors.

2) The roles and structures of brokerage actors:

   The roles of brokerage actors:

   - Brokerage actors are a large group of people rather than a few.
   - All the three types of brokerage actor roles identified in the theoretical framework appear in the same network. They are "translating", "bridging" and "embedding" brokerage actors.

- Most of the brokerage actors do not only play one of those three roles, they play multiple roles. Also, brokerage actors roles are performed by all employee groups, they are not restricted to managerial authority positions. These present how brokerage actors collectively work together in the networks during practice transfer.

Also, the structures of brokerage actors include:

- Most of the people in the network are well connected.
- Only a few brokerage actors have a high power of information control in the network.
- People are very close to each other in the network.
- Brokerage actors are inter-connected and non- brokerage actors are not loosely connected.

3) Brokerage actors have a significant influence on practice transfer outcomes. Especially the brokerage actors have more influence on practice transfer outcomes than individual characteristics. This can be observed from the R^2 increase in the model.

As discussed in the literature review, this study argues that the outcomes of practice transfer depend on not individual characteristics, but rather how project teams are organised as a network. The findings will fill the gap in how brokerage actors have an impact on practice transfer outcomes. Through a network analysis of the recent practice transfer projects, this study examines the relationship between brokerage actors and the practice transfer outcomes. In particular, this study analyses the network patterns among subsidiary staff, headquarter

staff, and management team who participate in the projects. Thus, this study's findings are helpful to provide understandings about how to organise practice transfer activities, improve collaboration and reshape the ties between participants. Above sections presented the findings, the following section is to discuss this study's findings.

Chapter 6 Discussion of findings

6.1 Introduction

This study's findings fill the gap in how brokerage actors have an impact on practice transfer outcomes. This study argues that the outcomes of practice transfer do not only depend on individual characteristics, but also depend on how projects are organised as a network to enable brokerage actors to connect people. This research proposed three research questions about how brokerage actors influence practice transfer outcomes. The purpose of this research is to expand the understanding of how brokerage actors operate in networks and how they can shape the outcomes of practice transfer. This discussion of findings makes connections between the results of data analysis and existing theories. Also, this discussion considers to what extent the findings can answer the research questions.

The unique contribution of this study is the inter-personal level analysis of practice transfer. Practice transfer is unlikely achieved by individual work, instead, it required people work as a team. Thus, the analysis needs to focus the relationships among team member in practice transfer. To do so, three research questions proposed in this study focus on the inter-personal level, in other words, connections among people. To answer the research questions, this study has developed a conceptual framework and using network analysis to explain how brokerage actors contribute to practice transfer outcomes. This framework identifies three types of brokerage actors and their impact. In the analysis of networks, this study suggests that brokerage actors are crucial to practice transfer. This study starts with analysing the network

dynamics during the practice transfer process. The discussion of findings first focuses on network dynamics to explain how brokerage actors emerge. The discussion then focuses on the roles and structures of brokerage actors to explain why networks in practice transfer appear to have both well-connected and loosely connected people. Finally, this study suggests the impact of brokerage actors on the practice transfer outcomes. Thus, this discussion of findings covers three aspects: the dynamics of brokerage actors, the roles and structures of brokerage actors, and the impact of brokerage actors.

6.2 The dynamics of brokerage actors

To answer the research question of how brokerage actors influence practice transfer outcomes, this study starts with exploring the practice transfer processes and network dynamics to find the regularities. This study's findings speak directly to the long-time argued question what is the mechanism in practice transfer. In other words, this study shows the regularity in practice transfer activities. The regularity here means those frequently appearing network structures, including brokerage actors for translating information as open structures, and brokerage actors for bridging institutions and embedding codified practices as closed structures. They appear in the four stages of practice transfer processes. This study unpacks the networks in four stages of practice transfer processes - planning, preparation, new practice design, and implementation and acceptance. The findings in practice transfer processes and network dynamics show how the practice transfer process and the network evolve in tandem. Practice transfer processes show the sequence of events. Network dynamics shows the interactions between people in the project. Together with these four stages and the dynamics of networks, this study also found out the patterns of network dynamics in each stage as below.

First, this study suggests the planning of practice transfer is a 'persuading' process, a 'persuading' process to make someone's value become a common value. In this stage, there are only a few 'one on one' ties in the network. These 'one to one' ties are the persuasions, for example, the one to one tie between director and project manager, the tie between budget manager and administrator, and the tie between associate project manager and headquarter staff in the planning stage. This finding explains why at the planning stage the network does not require a lot of participations. It also explains what happened behind the process chart.

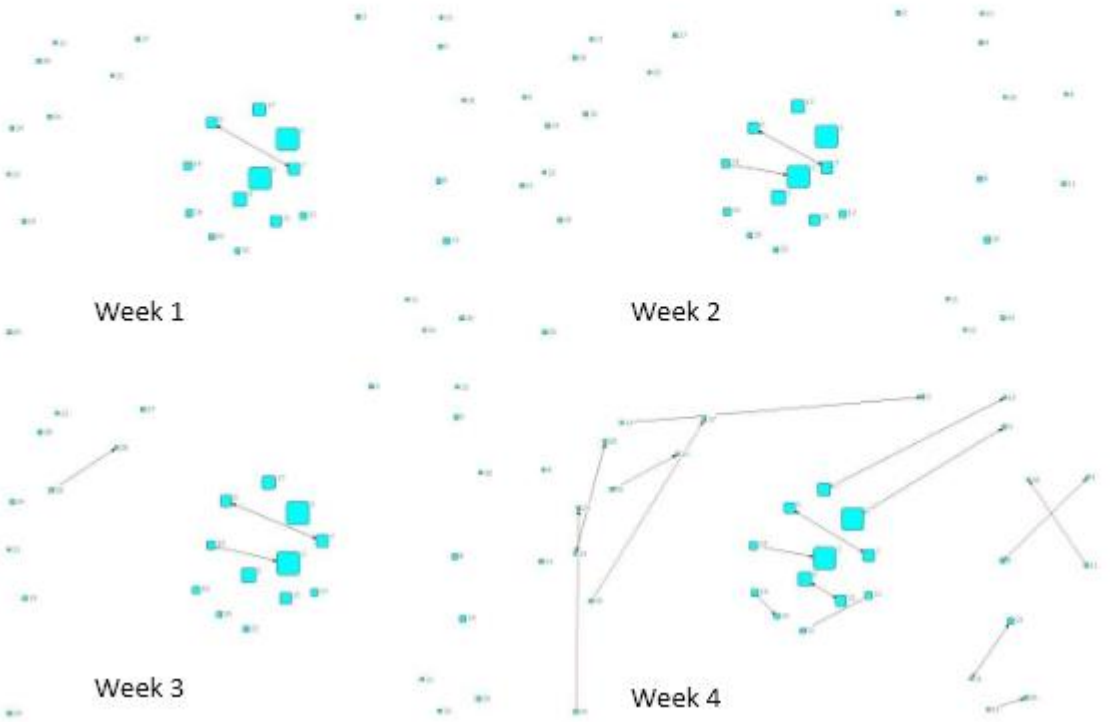
Second, the preparation stage is not only about brainstorming, but also, more importantly, getting all the documents ready in hand. This study also suggests that preparation is a process that consists of making the following documents, requirement documents, solution documents, policy documents, implementation documents and new practice documents. The whole preparation process is a well-planned execution rather than only brainstorming. A sequence of discrete tasks formed this process step by step. However, the network at this stage evolves in its own way. People form small teams as two people each team. Then these small teams form bigger teams as four people each team. At the end of the preparation stage, the network appears as a chain, the leanest network. This means when they finish preparing all the documents they need for the new practice design, everyone in the project is connected. But these connections are not strong enough for the new practice design stage because it is a chain. Information has to go through a lot of people to reach the target person. This is because here the number of brokerage actors is basic, and not sufficient.

Information exchange between different subsidiaries and headquarters is the major activity in the brokerage actor dynamics. These information exchange activities appear as links or ties

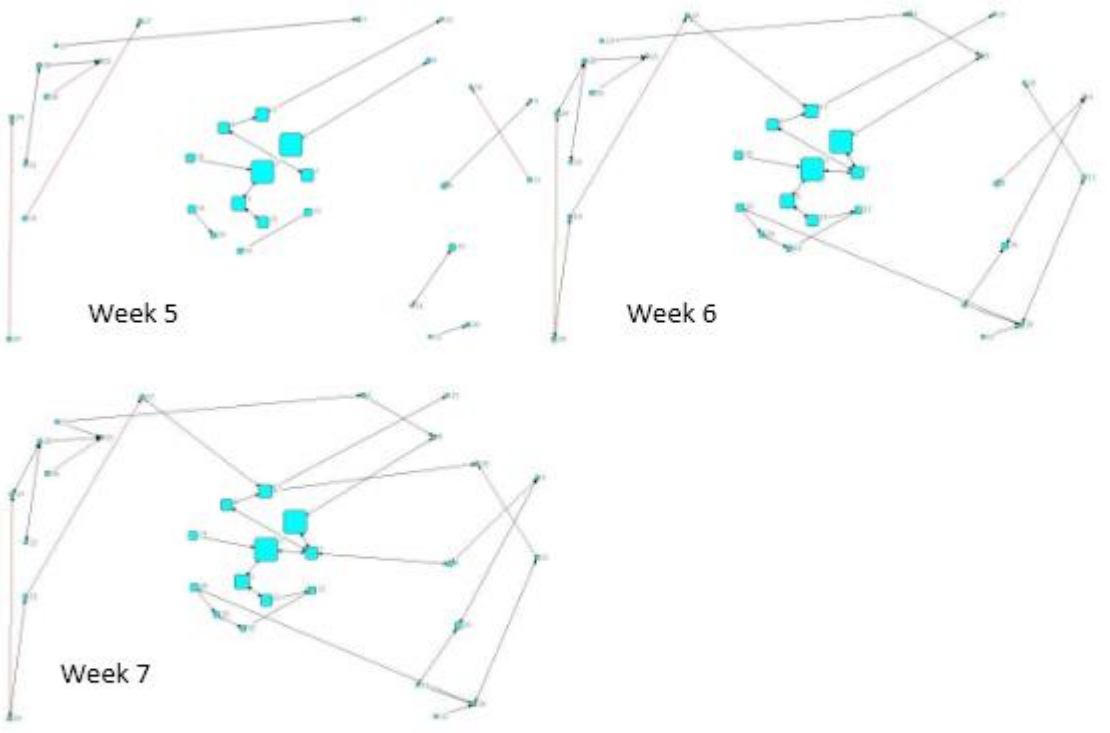
between people in the network snapshots presented in the data analysis. In network dynamics, these information exchange activities appear as a 'pairing'. This study noticed that there is a large amount of 'pairing' activities in the network dynamics. Figure 6.1 provides a simulated network to summarise this regular pattern in brokerage actor dynamics.

Figure 6.1 A simulated network to present the regular patterns in brokerage actor dynamics (for the details of each network, please refer to the original network snapshots in Section 5.2)

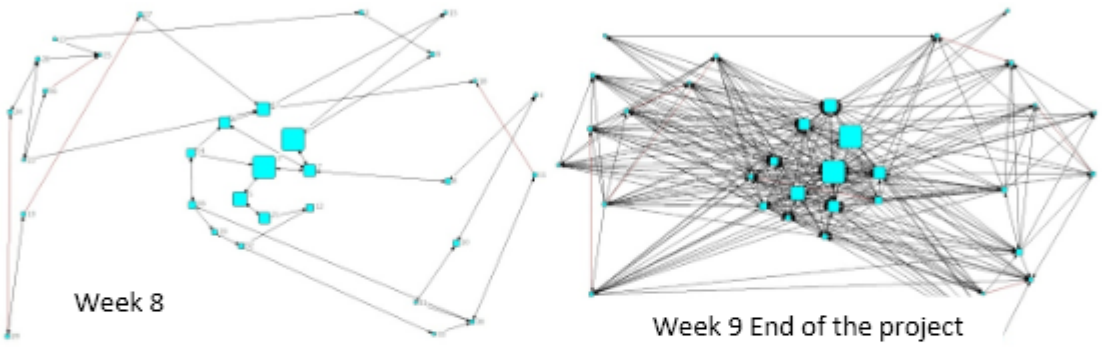
Stage 1



Stage 2



Stage 3



These 'pairing' activities are can be seen in the network as three stages below. In the first stage, people exchange information in pairs in the network at the beginning of each project. Each pair normally consists of two people. At the end of this stage, almost all the people in the network are connected as pairs. This 'pairing' stage can be seen in the network snapshots from the beginning of planning stage until the early preparation stage.

In the second stage, each pair of people form a component in the network. Each of these components normally consists of two pairs. And then, each two network components form a bigger component in the network and these 'pairing' activities repeat again and again until the network appears as a chain. At the end of this stage, everyone is connected in the network. The network appears very lean and almost without redundancy. By almost without redundancy, this study means there are almost no interconnected links between more than two people in the network. This 'pairing' stage can be seen in the network snapshots in the preparation stage.

In the last stage, the 'pairing' activities are more active in the core than the periphery in the network. 'Pairing' is faster at network core than periphery at this stage. In other words, the brokerage actors are more active than the non- brokerage actors in the network. At the end of

this stage, the network appears as a fully connected core with the loosely connected periphery. The core consists of the brokerage actors in the network. The periphery consists of the people who are connected by the brokerage actors; otherwise, they are disconnected from the network. This stage can be seen in the network snapshots from the new practice design and implement and acceptance stage.

Thus, this study suggests the 'pairing' activity as a regular pattern of brokerage actor dynamics. There are a large number of connections between people in practice transfer. These connections are created by the 'pairing' activities in the network. This finding confirms Obsfeld (2005) and Burt's (2007) theories discussed in the theoretical framework. Network dynamics is about bridging the gaps between people in the network. However, this study's finding is also different from these existing theories. This study suggests that network dynamics is about bridging the gaps between people through 'pairing'.

This study identified the 'pairing' activities in brokerage actor dynamics. Comparing to the previous research in network dynamics (Obsfeld, 2005; Burt, 2007; Ibert and Müller, 2015; Buchmann and Pyka, 2016), this study suggests that the regular patterns of network dynamics is not only bridging the gaps between people, but also pairing people together. The previous network theories (Obsfeld, 2005; Burt, 2007) focused on bridging the gaps between people. They do not offer information about which gaps need to be bridged in practice transfer. A network usually has a large number of gaps. This study's finding shows that information exchange does not bridge all the gaps in the network. Instead, because of 'pairing', only the gaps between a pair of network components are bridged. These network components are usually of equal size in the network, for example, bridging between two individuals, two

pairs of connected people, or two network components with a similar number of people in each.

The network in the new practice design stage shows that the network starts as a chain and ends up as a very dense network. But these connections are not strong enough at the beginning of new practice design stage because it is a chain. Information has to go through a lot of people to reach the target person. This is because here the number of brokerage actors is insufficient (Haak-Saheem et al., 2017; Nadayama, 2019). With more and more people becoming brokerage actors in the network, the longest distance between people in this dense network is no more than two people in the middle, which means people in the network can reach anyone through no more than two people in the middle.

This study also suggests that networks evolve towards heterogeneous clusters connecting with brokerage actors. A network usually consists of several groups, also known as clusters. Distinguishable clusters are also called heterogeneous clusters in network analysis. The heterogeneous clusters are the subsidiary and headquarter staff in the periphery of the network. These heterogeneous clusters are connected by the brokerage actors located in the centre of the network. Information exchange ties are frequently and densely placed at the intersection between heterogeneous clusters in the networks.

The networks presented in the findings are highly complex with a large number of brokerage actors and connections among participants in each network. These highly complex networks were simply made of 'pairing' activities between the participants. These 'pairing' activities in networks represent the information exchanges among people at each stage of the practice transfer project. In this study's findings, 'pairing' activities are throughout all the project

stages (see Figure 6.2). At planning stage, participants start forming a few of the pairs by connecting with each other in the practice transfer network. This represents the activities about persuading decision makers and convincing stakeholders. Then, at preparation stage, these 'pairing' activities make the network appear as a chain, which connects everyone in the project. At this stage, brokerage actors emerge for translating information. In the next stage, design of new practice, pairing between brokerage actors is more frequent to form a densely and inter-connected network core, which connects the other participants at the network periphery. At this stage, brokerage actors emerge for bridging institutions. At implementation and acceptance of new practices stage, the network forms a core-periphery structure. At this stage, the emerging brokerage actors are for embedding codified practices. The complexity of practice transfer network is created by such 'pairing' activities.

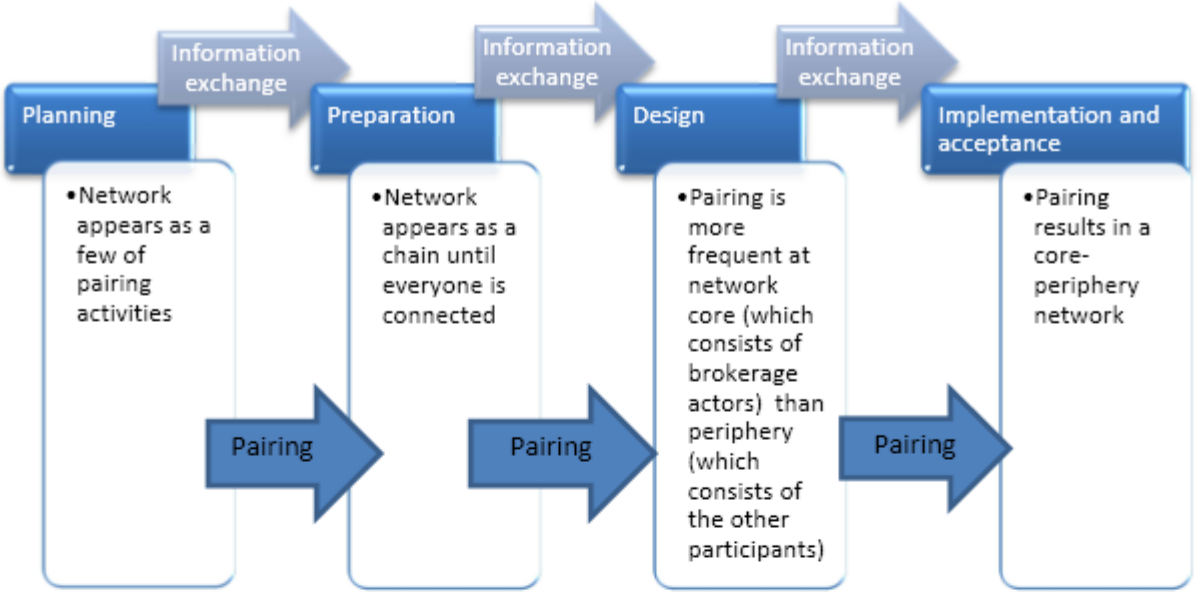


Figure 6.2 The dynamics of brokerage actors in practice transfer

Brokerage actors connect people through a way of 'pairing'. It is nessary to point out that these 'pairing' activities recur, but do not repeat. The subtle difference is an event can recur with different subject and object, but can only be repeated with same subject and object. For

example, if information exchange happens in a way of person A passing a message to person B, then it can 'recur' as Person C passing the message to person D, and the message can also be different. In contrast, this event can be 'repeated' as person A passing the same message to person B again and again. Thus, it is not like repeatable actions of assembling lines. Thus, this study highlights that 'pairing' activities recur rather than repeat, then result in complex networks. This is an important and novel insight for it demonstrates how the network evolves and not just who is connnect to whom.

To sum up, this study suggests that brokerage actor dynamics is a very complex process. A large amount of information exchange between pairs of individuals forms a network. Based on the above analysis, this study suggests that 1) brokerage actor dynamics is about frequent information exchange and pairing people together, and 2) the brokerage actors are in the centre of the network and more active than the people at the periphery of the network. It appears as brokerage actors bridging the gaps in the network. This mechanism creates highly complex networks. This simple mechanism 'pairing' can be seen in those networks, also translating, bridging and embedding happen after it.

6.3 The roles and structures of brokerage actors

This study noticed there are a large number of connections between brokerage actors in practice transfer. The findings suggest that always a certain number of people had prominently central positions in the network. These people are important as brokerage actors.

And more impressively, the connections between subsidiaries and headquarter mostly rely on those brokerage actors. In other words, they are usually connected by the brokerage actors who are centrally located in the network. This study suggests that information is transmitted in practice transfer projects with brokerage actors rather than direct connections between people. Accordingly, the brokerage process is the key part of practice transfer (Myloni et al., 2004 and 2007; Al-Husan et al., 2009). The network structures of brokerage actors in practice transfer in this study are different from the previous research as the points below.

First, there could be three types of brokerage actors. They are "translating", "bridging", and "embedding". The findings of this study suggest that all the three types of brokerage actors exist in practice transfer. Furthermore, it is not clear that each type of brokerage actors exist more than others in practice transfer. This study suggests that these three types of brokerage actors almost exist equally in number. This suggests that brokerage actors could consist of these all three types of roles equally.

Second, who are the brokerage actors? Previous literature (Batjargal , 2003, 2006 and 2007; Svendsen and Svendsen, 2003; Kavanaugh , et al., 2005; Joshi, 2006; Kilduff, et al., 2006; Hinton, et al., 2012; Baker, et al., 2016) suggested that managers and people holding high positions in a project are brokerage actors. This study's findings suggest a different answer to this. Brokerage actors are a group of people with various positions in the project rather than only managers or people holding high positions only.

Third, the findings suggest that practice transfer is in a headquarter-broker-subsidiary collaboration rather than headquarter-subsidiary collaboration. As discussed in the Chapter 2, practice transfer is shifting away from headquarter-subsidiary collaboration to headquarter-

broker-subsidiary collaboration. Figure 5.11a, 5.11b, 5.11c, and 5.11d showed that each practice transfer project has brokerage actors (in the centre of each network) to connect headquarter (on the left of each network) and subsidiary (on the right of each network). This confirms that practice transfer is conducted in a more complex indirect relationship between headquarter and subsidiary involving brokerage actors in the middle (Al-Husan et al., 2009; Rojas, Solis, and Zhu, 2018), rather than a simpler headquarter-subsidiary direct relationship (Kostova and Roth, 2002; Saka, 2004; Vo and Stanton, 2011). Furthermore, are there only a few of brokerage actors or a lot of brokerage actors in practice transfer? This study suggests that brokerage actors are a large group of people rather than a small group in the network comparing to Burt's research (2004 and 2007). This study found 83 brokerage actors out of 162 people working in the projects. Around half of the people in the project acted as brokerage actors in the network and a brokerage actor group exists in each network. Burt's (2004 and 2007) suggests only a few based on structural holes theory and did not consider network dynamics. Other studies (for example, Burt 1992 and 2004; Fernandez, et al., 2000; Fernandez, 2002; Becheikh, et al., 2005; Bernardi, et al., 2012; Cross, et al., 2015; Gargiulo and Sosa, 2016; Schleimer and Faems, 2016) found that brokerage actors only emerge at a certain stage, mainly in implementation stage. In this study's finding, a brokerage actor group exists in all stages after planning stage.

Fourth, there could be three types of brokerage actors, but an interesting question remains that can people play multiple roles remains unclear. Previous literature mentioned it would be possible but rare to have brokerage actors who are cross-over between the roles (Ahlvik et al., 2016; Ling and Juan-ru, 2017). It has been found in this study that most of the brokerage actors do not only play one of those three roles but also play multiple roles of a brokerage actor. A brokerage actor, in this case, came up in the practice transfer process naturally to

meet the needs of information exchange and teamwork. As information exchange and teamwork constantly happens between subsidiaries and headquarter through the project, most of the brokerage actors have to play multiple brokerage actor roles.

Fifth, this study found most of the people in the core and periphery of network are well connected, in contrast to people at the periphery of the network who are loosely connected. This finding suggests a different result about network structure, the core-periphery structure. Network structure theory was put forward by Burt (2007). He insisted there was a paradox in that the open network cannot coexist with a closed network. This study found that the core-periphery structure has the open and closed network co-exist in a way that the core is as fully connected as a closed network and the periphery is loosely connected as an open network.

Sixth, only a few of brokerage actors have a high power over information control in the network. This finding discovered the power distribution in the network. Although there are lots of brokerage actors in the network, only a few of them can control the network. Information exchange in networks can be analysed to reflect individual's power in information exchange (Ibarra, 1993; Aalbers, et al., 2016) and performance outcomes (Podolny and Baron 1997; Candi, et al., 2013). People have a high power of information control which can be seen in the betweenness centrality. Betweenness centrality shows the power of information control in the network. However, it is noticed that the director and project manager's information control is not absolutely high. Neither of them has total control of the network. This finding confirms the existing literature (Burt 2004 and 2007; Cross, et al., 2015; Cano-Kollmann, et al., 2016) that people exchange information freely in practice transfer projects.

Seventh, people are very close to each other in the network. The network distance to exchange information with someone in the network is through no more than two people in the middle. This research suggests that brokerage actors are critical to information exchange. Brokerage actors are not static in information exchange. Previous research from Putnam (1993, 1995 and 2000) suggested that the roles of managers are central in projects. This study suggests that brokerage actors are central in practice transfer projects to shorten the information exchange distance in networks.

Finally, this study discovered inter-connected brokerage actors. This study suggests brokerage actors tend to be connected to the well-connected people. Most of the brokerage actors in the network have high eigenvector centrality. This result together with the degree of centrality suggests that the people in the network are not only well connected but also connected to the well-connected people. Previous literature in brokerage actors has not discovered this. This finding may explain how the theorised relationship between connectedness and higher performance (Uzzi, 1996; Burt, 2007) actually operates in practice. Frequent interactions contribute to the collaborations in projects. This study suggests that the subsidiaries and headquarter are bound together by brokerage actors. Previous studies (Coleman, 1988 and 1990, Walker et al. 1997; Gupta and Maltz, 2016) suggest that highly dense information exchange across groups can lead to superior performance outcomes. However, Burt (2007 and 2015) argued that loosely connected networks with low network density can also lead to superior performance outcomes because the structural holes in the network are valuable to performance. This study suggests that networks in practice transfer require both high and low network density. A network needs a highly dense core and a relatively low dense periphery. The structure of information exchange in the network is important, as strategically connecting participants can change their constraints and

opportunities to access to information. Thus, this study suggests that the network structure in practice transfer is in a form of that most of the people in the network are well connected and brokerage actors are interconnected.

In sum, this study demonstrated the importance of brokerage actors. This is due to the exchange and circulation of information between groups of people in projects. Previous literature found the importance of exchange and circulation of information (Rogers, 1995; Kraatz, 1998; Beugelsdijk and Van Schaik, 2005; Boland, et al., 2007, Fu and Zhang, 2012). Also, some literature highlighted the value of the network (Burt, 2004 and 2007). However, they have not explored the factor of the individual human in information exchange between people. This study's finding provided a better understanding about how brokerage actors bridging information exchange between people. Thus, this study's findings are complementary to the three types of brokerage actors model.

6.4 The influence of brokerage actors

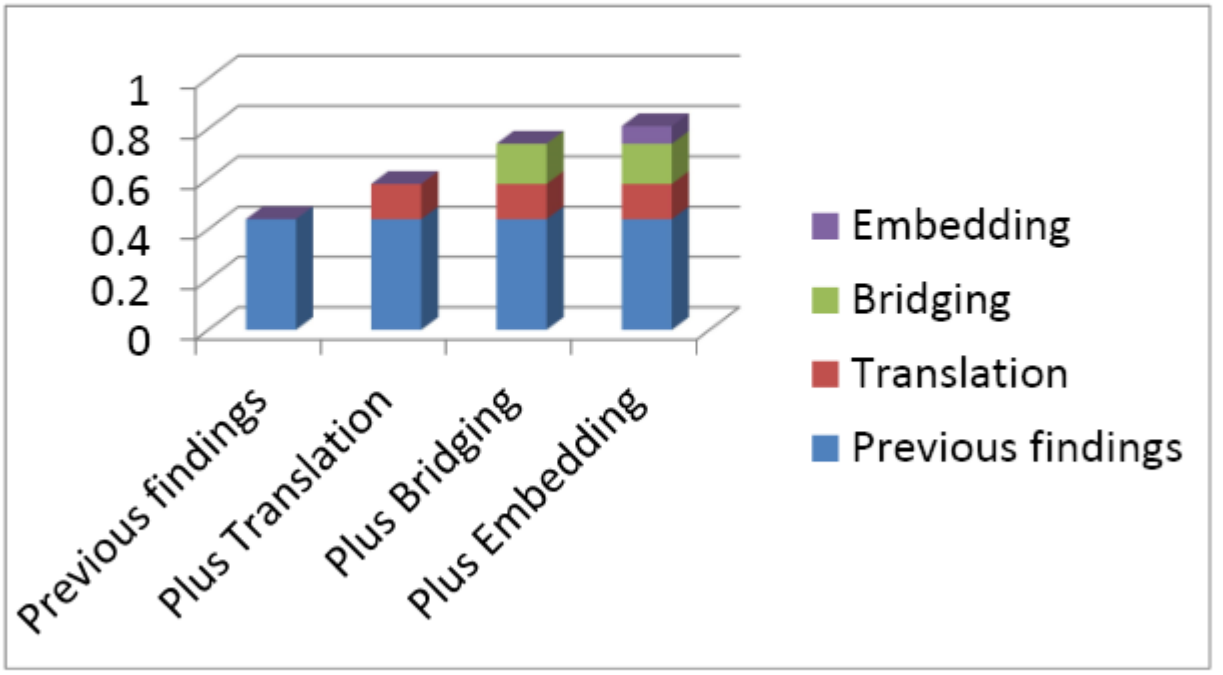
This study's findings are consistent with previous literature in demonstrating that brokerage actors play an important role in practice transfer (Burt, 2004 and 2007). The existing studies explored the relationship between network and performance outcomes (Holti, et al., 1997; Edelman, et al., 2004; Rodan and Galunic, 2004; Burt, 2007), which have implications on how to improve the understanding of networks. The existing measurements in this previous research do not reflect the in-process activities. However, this study's findings add this to previous theory. This study suggests that a brokerage actor who is central in a network is

likely to have better performance in practice transfer. In other words, a brokerage actor's network position is associated with higher performance in practice transfer. These findings indicate that brokerage actors can influence practice transfer outcomes.

Moreover, here each person's work can be purely individual, but the joint work relies on brokerage actors. The qualities of participants are important ingredients of practice transfer, but the relationships between them and outcomes are very weak. In practice transfer, people's knowledge and skills contribute to the outcomes. When people, even specialists, are exposed to unfamiliar knowledge, they can understand only a little or nothing about it. In this situation, they need someone to transform the unfamiliar information to understandable information. Thus, brokerage actors are the catalysts for practice transfer.

Figure 6.3 shows the impact of brokerage actors compared to the findings in previous literature in this study's regression model. The previous literature suggested participant's tenure, education level, individual creativity, and motivation can influence practice transfer outcomes. However, all these previous findings can only explain about 44 percent of practice transfer outcomes. After introducing one type of brokerage actor role in the model, it increases to about 57 percent. After introducing all three types of brokerage actor roles in the model, it increases to about 72 percent. This means brokerage actor roles as variables can explain a large part of practice transfer outcomes.

Figure 6.3 The impact of brokerage actors



In sum, while individual characteristics matter for practice transfer outcomes, their influence is less than that of brokerage actor roles. Moreover, the fact that the influence of brokerage actor roles is more significant when more roles are added to the model suggests that each type of brokerage actor role alone is of less benefit. This study argues that the ability of practice transfer depends on not simply individual characteristics, but rather how projects are organised as a network in terms of the behaviours of the people. This fills the gap in how brokerage actors have an impact on practice transfer outcomes. Through a network analysis of practice transfer projects, this study examines the relationship between brokerage actors and outcomes. In particular, this study analyses the network characteristics of brokerage actors who participate in projects. A network approach can be helpful to provide understandings about how to organise practice transfer activities, improve collaboration and reshape the ties between participants.

This study explored how the brokerage actors at the inter-personal level have an impact on practice transfer outcomes. There is a lack of understanding about what the network patterns are and how brokerage actors at inter-personal level affect practice transfer. When considering practice transfer outcomes, the fact that brokerage actors matter in connecting people would be a different explanation. This relative new magnitude of brokerage actor impact is particularly noteworthy.

6.5 Implications to theories

As discussed in Chapter 2 and 3, the theoretical framework of this study is based on network theories. This study makes contributions to network theories about brokerage actors and practice transfer from three aspects, network dynamics, network structure, and network influence. These contributions include 1) paring activities in network dynamics which fill the gap about how networks evolve before brokerage actors emerge, 2) brokerage actors in network structures which adds more understandings of them, including who they are, the proportion in project teams, and multiple roles, and 3) the positive influences of brokerage actors which fill the gap about how much can they influence practice transfer outcomes by comparing with other factors. Thus, this research contributes to theories about brokerage actors and practice transfer.

In terms of network dynamics, most of the theories in brokerage actors and practice transfer focus on cause and effect. The dynamics and structure details in practice transfer activities are ignored. In addition, most of the theories separate the cause from the process. In those theories, scholars usually explain practice transfer in term of cause-effect. This study shows

that networks and brokerage actors in them as cause and process, which is a way of cause-process-effect, rather than simply causality.

In terms of network structures, this study provided not only the overall network structure of the practice transfer project, but also each person's own sub-network structure. The comparison of each brokerage actor's own sub-network structure provided further analysis about the complexity of practice transfer networks to find out who they are, the proportion of them in the project team, and how many brokerage roles they were performing.

In terms of network influences, this study compared the influences of brokerage actor roles and individual characteristics to show the extent of influence brokerage actors have. The findings suggest that individual characteristics and motivation are less influential than brokerage actor roles on practice transfer outcomes.

6.6 Implications to practices

This study presents three results to improve managing practice transfer. The first one is network dynamics, which shows how people are organised in practice activities. It suggests that the collaborations between brokerage actors are important throughout the whole practice transfer process. The second one is network structures. It shows how brokerage actors connect other people working together. There are three types of brokerage actor roles taking place in organisations to improve practice transfer outcomes. The third one is network influence. The finding shows managers that paying more attentions to organising brokerage

actors can be more beneficial than improving individual's intrinsic and extrinsic motivation in the project team. This highlights how important brokerage actors are to practices.

This study also makes contributions to practices by providing a network model. In practice, managers can use the network model to manage large-scale collaborations across organisational boundaries in practice transfer. In practice, this model shows how networks can be organised, especially, how network structures change when practice transfer projects progress. Also, this model highlights what network structures can influence the outcomes. Thus, the results of this study can be used as a guide on how to organise practice transfer projects.

The last but not least, network is not just a metaphor, because network represents the information-dependent and complex process in practice transfer. Network represents the practice transfer activities. Practice transfer process should be re-considered, moving away from a sequence of events to a complex but manageable structure of interactions. This study proved the existence and importance of networks and brokerage actors in practice transfer. The useful details of networks and brokerage actors can be found in the networks and applied in future practices.

6.7 Summary

Previously in Chapter 5, Section 5.5 provided a summary of the finding. Here, this section highlights the findings which can contribute and add to previous theories, rather than only confirming previous theories. Comparing to the existing literature, the implications of this study consist of three parts:

1) The dynamics of brokerage actors:

- This study discussed the network patterns at each stage of the practice transfer process - planning, preparation, new practice design, and implementation and acceptance.
- This study's finding confirms Obsfeld (2005) and Burt's (2007) theories discussed in the theoretical framework. Brokerage actor dynamics is about bridging the gaps between people in the network. This study also adds the 'pairing' activities to these previous theories. This study suggests that brokerage actors are about bridging the gaps between people in the network through 'pairing' before they emerge as performing brokerage roles.

2) The roles and structures of brokerage actors

Comparing to Burt's (2007) theory about brokerage actor roles, this study adds the following

points:

- This study suggests that brokerage actors are a large group of people rather than a few; brokerage actors are not managers exclusively.
- This study suggests that all the three types of brokerage actors identified in the theoretical framework appear equally in the same network.
- This study suggests that most of the brokerage actors do not only play one of those three roles, they play multiple roles.

Comparing to Burt's (2007) theory about network structures, this study adds the following points to the roles and structures of brokerage actors:

- This study suggests that most of the people in the network are well connected.
- This study suggests that only a few of the brokerage actors have a high power of information control in the network.
- This study suggests that people are very close to each other in the network.
- This study suggests that brokerage actors are inter-connected and non-brokerage actors are loosely connected.

3) Brokerage actors have a significant influence on practice transfer outcomes which is more than individual characteristics.

Chapter 7 Conclusion

7.1 Introduction

This chapter discusses the final conclusions of this study, including the implications of this study's findings, its strength and limitations, and recommendations for future work. Chapter 5 and 6 presented and discussed the main findings of this research. This conclusion chapter is to summarise the early chapters and show the significance of this research for knowledge and practice.

Section 7.2, 7.3 7.4 and 7.5 identify and demonstrate the implications of this research. They are to answer the question what this research's findings mean to practice, theory, and research method. Section 7.6 discusses the strength and limitations of this research. While presenting confidence regarding this research, this section discusses methodological restrictions and issues in practical realities. Section 7.7 summarises the distinguish features of this research from previous research. This section does not only point out what this study adds to theory, but also the differences between this study's findings and that of others. Finally, Section 7.8 offers some recommendations for future research in this area.

7.2 Implications and contributions for theories

This section provides a summary of the answers to the three research questions about the dynamics, structures, and influences of brokerage actors in practice transfer. And then this section discusses this study's implications to theories about brokerage actors and practice transfer. This study makes contributions from three aspects, brokerage actors' dynamics, structures, and influences. These contributions include:

1) the identification of pairing activities which occur during network dynamics, and help addressing the gap in our understanding of how networks evolve during practice transfer;

2) the identification of three brokerage roles which demonstrate the importance of understanding how the structures around individuals change and are used during practice transfer activities; and

3) the identification of significant positive brokerage actor roles' influences on practice transfer outcomes, which expand our understanding of the extent of brokerage actor influences and particularly the performance effects of brokerage actor roles. These are this research's contributions to theories about brokerage actors and practice transfer.

The dynamics of brokerage actors in practice transfer

This part is to summarise the answer to the first research question about the dynamics of brokerage actors in practice transfer. In the findings, this is presented as a series of network changes, which shows how brokerage actors connect people in networks. These results about

network dynamics provide insights about how people are connected and organized in practice transfer projects. The network dynamics in this research represents the whole practice transfer processes at interpersonal level. The findings present the interpersonal connection changes in each network from the beginning to end of each practice transfer project. The networks grow from no or only a few connections to highly complex structures during practice transfer progress. Thus, these findings demonstrate how brokerage actors help to shape the network structures through the roles that they perform in connecting the disparate information during practice transfer.

This study suggests that the brokerage actor dynamics is complementary to the causality. The causality of practice transfer and its outcomes has been discussed in this research's literature review. In network theory, cause and effect are contained in the process. They are not the beginning status and ending status at two ends of the process. Thus, causality without considering the process has inherent defects. Samuelson (1999) notes that just because an event happens at a time point before another does not necessary mean causality. In this study's findings, brokerage actors emerge in a complex process, which takes the whole time period of the project. Thus, this study suggests that the brokerage actor dynamics is complementary to the causality.

The roles and structures of brokerage actors in practice transfer

This study suggests that information exchange in practice transfer rely on a combination of three brokerage actor roles, which are centrally located in the network, translating information, bridging institutions, and embedding codified practices.

The practice transfer process cannot be treated as the process of assembly lines by increasing repeatable actions and tasks to increase productivity. To deal with complex tasks in practice transfer, this study shows the various network structures which contain three brokerage actor roles. Although practice transfer is complicated, these three brokerage actor roles in the network can make it progress. In terms of the regularity in practice transfer activities, information exchange happens almost all the time, which frequently requires these three brokerage actor roles.

Increasing connections between people does not necessarily improve connectivity in information exchange. To improve such connectivity, it requires a combination of three brokerage roles. And this study suggests that broker actors are centrally located in the networks. This point is reflected in the centrality findings. A practice transfer network is devised for explaining how to organise practice transfer projects. Thereby, this study suggests organising a practice transfer project can follow three principals below:

- Managing a group of brokerage actors with all three roles in the centre of the network.

- Analysing a specific type of interpersonal connections, especially information exchange in both ways of conventional communication and using technologies.

- Monitoring specific network structures, especially connectivity through well-connected

and inter-connected brokerage actors.

The influences of brokerage actors on practice transfer outcomes

This section is to summarise the answer to the third research question what brokerage actor influences are. The answer is that brokerage actors in practice transfer networks can significantly influence the outcomes. In practice transfer projects, active collaborations between headquarters and subsidiaries can contribute to the project outcomes. In order to keep most of the collaborations active, brokerage actors transfer information between headquarters and subsidiaries. These brokers keep transferring information to facilitate the communication between headquarters and subsidiaries. Then the headquarters and subsidiaries can understand the information from each other's organisational settings. Thus, brokerage actors can influence practice transfer outcomes. Through this brokerage mechanism, brokerage actors facilitate practice transfer activities. Otherwise, the barrier between headquarters and subsidiaries would make most of the participants sedentary, silent, and lost. Thus, this study suggests the brokerage actors are crucial in practice transfer.

Based on above discussion, this study makes contribution to theories about brokerage actors in practice transfer. This study showed the brokerage effect in the findings. The findings do not deny individual attributes can contribute to practice transfer outcomes. For example, a highly experienced team with creative and motivated people may perform better than a team without all of these valuable attributes. However, these individual-level attributes can only influence around 40 percent of practice transfer outcomes, as the regression model showed in

the findings. In other words, in order to predict and explain practice transfer outcomes, there have been several pieces of the jigsaw missing. This study found a large missing jigsaw piece, perhaps one of the largest pieces. With this piece of the jigsaw, the regression model in this study shows that a model can be built with brokerage actors in networks confidently to predict and explain over 70 percent of practice transfer outcomes. Thus, this study identified and demonstrated the importance of brokerage actors in practice transfer.

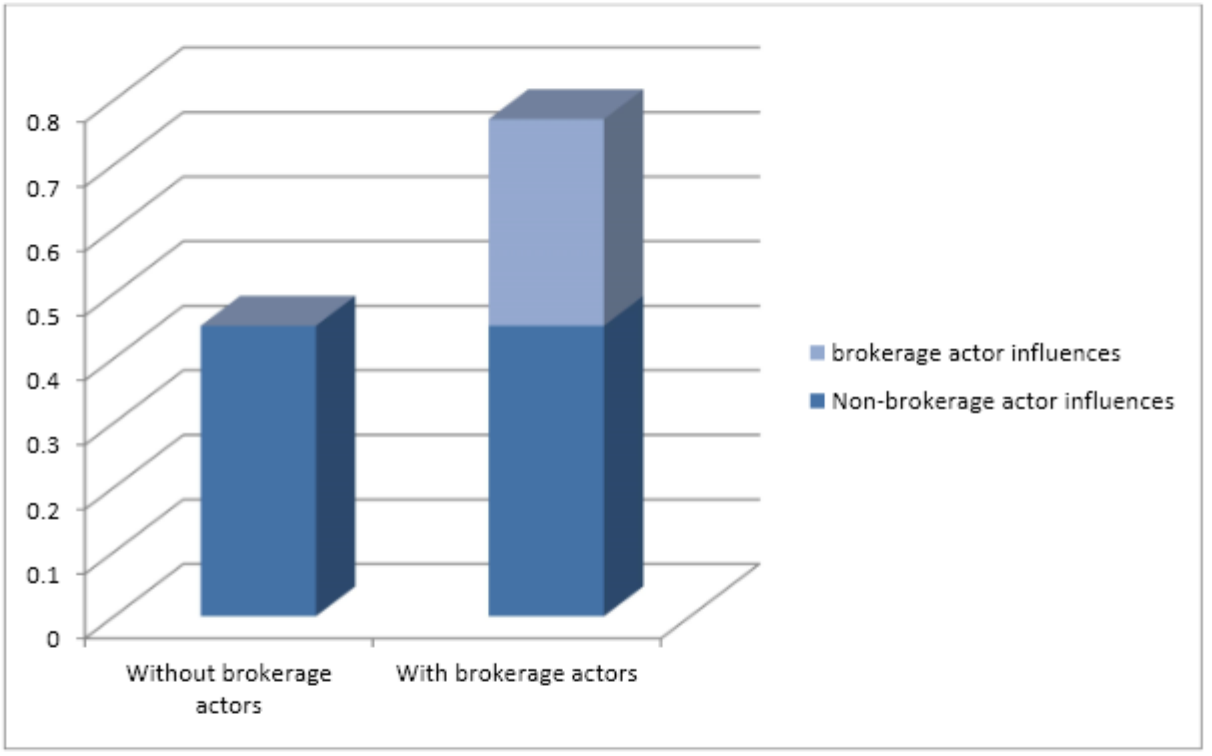


Figure 7.1 Brokerage actor influences on practice transfer outcomes

This study also makes contribution to network theories (Burt, 1992, 1997, 2004, 2007, 2014 and 2015; Uzzi, 1996 and 1999) by finding out how brokerage actors in networks can influence practice transfer outcomes. The importance of managing people from organisations and different knowledge backgrounds as networks has been recognised by scholars (Burt, 1992 and 2004; Podolny et al., 1996; Reagans and Zuckerman, 2001; Tsai, 2001; Leven, et al., 2014). A gap in the theories is how such networks can be organised. Consistent with these

previous studies, this study's method is based on network analysis. This study adopts network analysis as the method to investigate practice transfer networks, which involve participants from organisations and different knowledge backgrounds. This study showed the structures and dynamics of collaborations among the participants practice transfer by presenting the networks that consists of participants in the project as nodes and information exchange as relational ties, especially highlighted the regular patterns in network structures and dynamics. Also, comparing the previous studies focusing on some specific moments or part of networks, this study's results cover the entire practice transfer process to reveal the network dynamics, structures and influences. The survey was conducted with all the participants in these four practice transfer projects, thus the findings show the overall network rather than partial. Thus, this study improves the understanding about how to organise the collaborations between people from practice transfer. In particular, how these collaborations are organised at each stage of practice transfer and three brokerage actor roles as the important network structures. Thus, the results of this study show how to organise the collaborations between people as networks in practice transfer.

7.3 Implications and contributions for research methods

This section discusses this study's implications for research methods. The analysis conducted in this research is a possible way of predicting network dynamics and structures at each stage of practice transfer. This study suggests that practice transfer can be organised in a network way. Practice transfer as a process took place in a way like, planning, preparation, new practice design, implementation and acceptance of new practices. Practice transfer networks

as dynamics took place through three brokerage roles emerging to connect the participants. Network analysis can be used to predict and elaborate what will happen in each stage of the practice transfer process. The practice transfer process marked these activities as events. Network analysis marked them as changes in network structures. Studies treating the network as a theory (Burt, 2004 and 2006; Uzzi, 1996 and 1999), suggested that network could be an important indicator of practice transfer progress. To complement this view, this study has provided evidence to show that network can be used to as an indicator of practice transfer progress. Thus, this study suggests that the application of network analysis can reveal the inter-personal interactions in each event of practice transfer. And the process of practice transfer as a sequence of events can be revealed as network dynamics at the inter-personal level. Such application of network analysis can help to improve understandings about the inter-personal level business activities.

Philosophically, this research adopts a 'three-layer analysis' paradigm, which combines network analysis and regression modelling together. This 'three-layer analysis' is based on conceptualising networks, the analysis of network data, and regression modelling with the network analysis results. This study used network analysis as the base of this analysis to analyse the collected data first. And then, this study uses regression modelling to analyse the network analysis results. Most of the research only analyse collected data. This study not only analysed the collected data, but also analysed the results generated by the collected data. In this study, regression modelling was used to analyse the results generated by network analysis rather than the collected data. Thus, this 'three-layer' paradigm offered a converging position of positivism, which has hypothesis testing, and network analysis, which has descriptive details.

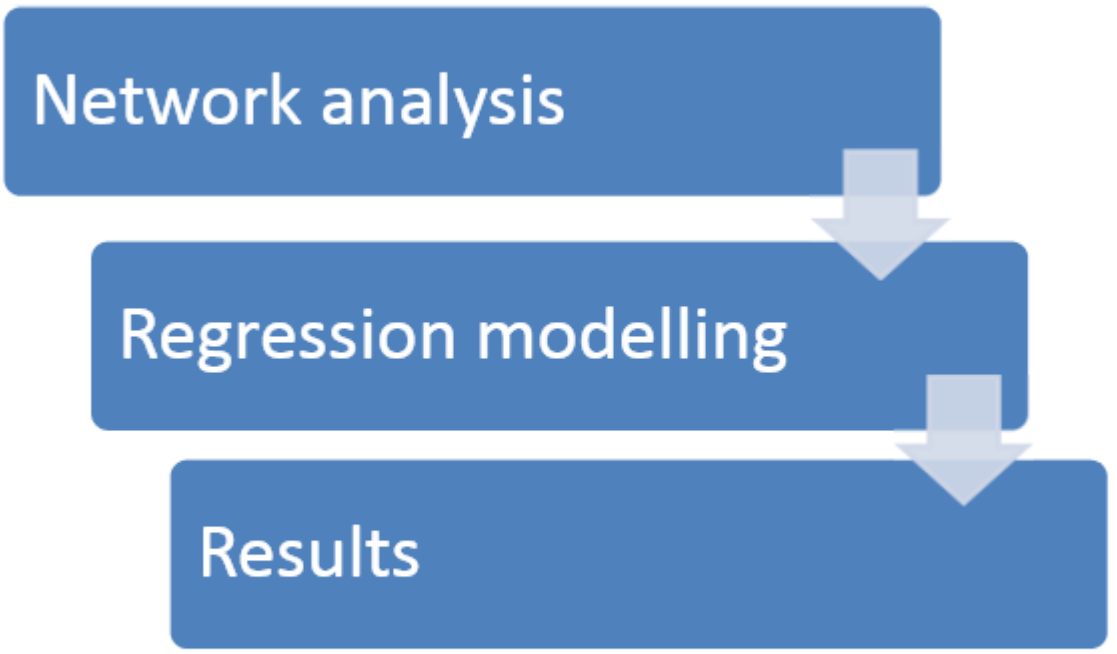


Figure 7.2 'Three-layer analysis' in this study

What is the advantage of the three-layer analysis? The advantage of the three-layer analysis is similar to the idea of big data. Big data as an idea has become very popular in the recent years. The fundamental advantage of big data is not the amount of data. It is the analysis of data generated by data. Those data generated by data is also called smart data. In this study, the network data was generated from the collected data by using network analysis. Then, the network data was used in regression modelling. With the obsession of prediction, it has been proved that results from big data are usually more accurate and contain more information. This also transfers the focus from cause-effect to the process, and links the practice transfer process with the outcomes. Thus, this study suggests that a 'three-layer analysis' structure can provide further analysis to improve understanding about business activities.

7.4 Implications and contributions for practice

This section discusses this study's general implications for management practice. This study provides information about how brokerage actors in networks influence practice transfer outcomes. This study also suggests that organising three brokerage actor roles is important to practice transfer. Practice transfer networks present how to organise collaborations between headquarters and subsidiaries in practice transfer. Thus, this research's results can be a guide for managing practice transfer.

This study presents three results which can be used to improve practice transfer outcomes. The first one is the network dynamics, which shows how people are organised during practice transfer activities. It suggests that the information exchange between people as 'pairing' in a network is essential throughout the whole practice transfer process. This means one-to-one information exchange in practice transfer should be encouraged throughout the whole practice transfer process. The second one is the network structure. It shows that the people who play three brokerage actor roles connect other people working together. These three roles performed by brokerage actors can be placed in organisations to improve practice transfer outcomes. The third one is the network influence. The regression modelling results show that the brokerage actors can potentially improve 30 percent practice transfer outcomes. This highlights how important they are to practices.

This study makes contributions to managing practice transfer projects by providing a network model. In practice, practice transfer projects can use the network model to manage large-scale collaborations across organisational boundaries. In practice, this model can show how the structures of information exchange among participants influence practice transfer outcomes.

Especially, how network structures change at each stage during the progress of a practice transfer project. Also, this model highlights which network structures can influence outcomes. Thus, the results of this study can be used as a guide on how to organise collaborations between people practice transfer projects.

Information exchange as connections in practice transfer networks is the vital part of the practice transfer process. This study highlighted this in the literature review and findings, and then made connections between practice and theory. This study argues that the network does not only represent those important activities in the practice transfer process, but also how participants interact with each other as a network. Here, it is necessary to highlight the network model offers insight on networking practices relating to: 1) brokerage actor roles in interpersonal interactions in business activities and 2) work flow dynamics in practice transfer.

First, the network is not just a way of presenting interpersonal interactions in business activities, because the results of this study showed the influences of brokerage actor roles in networks rather than just interpersonal interactions in practice transfer. Managing brokerage actor roles provides a new way of managing interpersonal interactions in business activities. Studies treating network as a tool for managing interpersonal interactions in business activities (Tsai, 2001; Perry-Smith and Shalley. 2003; Brass et al., 2004; Kilduff and Brass, 2010), emphasised relations between people in networks, the interaction in social relations, dyadic relations, complex structures of connectivity can be considered as business performance indicators. From this view, this study suggests network as a tool for managing interpersonal interactions in business activities, especially, through utilising the brokerage actor roles.

Second, the network is not just about structure, because the processes of practice transfer and its network dynamics suggested the networks are not static. In other words, networks certainly exist in a dynamic way rather than a static image. Studies treating the network as a way of thinking (Podolny and Page, 1998; Podolny, 2001), argued that project teams can be studied as networks. The entire business project team may be viewed as a network of a temporary organization (De Bresson and Amesse, 1991). This network form of organisation could not be classified as static or Hierarchical. As a result of this study, we now know that network form of organisation fosters practice transfer, enables the information exchange activities in it, provides a variety of information sources, facilitates the acceptance of new practices, and provides considerable freedom for participants, then leads to the good outcomes. In the discussion of this study's findings, the dynamics, structures and influences of brokerage actors in networks are explored from this way of thinking, so that highlighted the complex inter-personal dynamics which leads to practice transfer outcomes. Thus, network is not just a metaphor of a project team, instead, it is a tool to represent the information-dependent and complexity in practice transfer.

Based on the discussion above, this study suggests managing practice transfer should be re-considered, moving away from managing a sequence of events to complex but manageable interactions as networks. And those three brokerage actor roles in networks need to be the focus.

7.5 Strengths and limitations

This section discusses the strength and limitations of this study. This study might have over-simplified complex practice activities into a series of boring and exhausting information exchange between people. However, the content of information in each information exchange is not the same. Each information exchange may add new information to the practice transfer team. This is how a new practice starting with a couple of lines ends up as a document with a few hundred pages in new practice design. Everyone in the project contributes to this process by using their knowledge and skills. This study is not able to explain what knowledge and skills the project teams have.

This study is incapable of explaining why some practice transfer projects failed. Practice transfer is about putting people from different organisations together and facilitating them to exchange information until they fully understand each other, and then let them make it happen, based on a condition of that they avoid the failure factors. Practice transfer failure could be caused by competition, policy change, or simply just some accidents. Game theory may help to resolve the first one. The other two might still need qualitative research to be carried out.

Network data as a fundamental issue has been mentioned. The structure of the network is represented by numbers. Network data usually are binary data, contain only 0 and 1. 0 means no tie between people. 1 means a tie between people. 0 and 1 here are also probabilities in modelling. The issue about network data is that the equation of probability about an active tie or no tie implies interpersonal connections sometimes can simultaneously exist and not exist.

For instance, 0.75 means there is 75 percent chance of a tie between two persons. However, this also indicates that this connection is simultaneously existing and not existing, because it is neither a tie as 1, nor no tie as 0. There is 0.75 relation between two people rather than a relationship. This is because integers can be broken into decimals after several rounds of analysis. The question here is how to interpret the network modelling results. The more analysis added to the model could possibly because that the more results indicate that networks simultaneously exist and disappear. Trying to round the numbers will lose accuracy. Thus, further research is required to find out how to interpret or avoid this.

7.6 Differentiating this research from previous research

This study has similarity to research about network theories (Burt, 1992, 1997, 2004, 2007, 2014 and 2015; Uzzi, 1996 and 1999) which suggested networks can influence collaborative business activity outcomes. This study also has similarity to research about managing people from different orgnisations as networks (Burt, 1992 and 2004; Podolny et al., 1996; Reagans and Zuckerman, 2001; Tsai, 2001; Leven, et al., 2014). Consistent with these previous studies, this study's method is based on network analysis. This study adopts network analysis as the method to investigate collaborative business activities.

Different from these previous studies, this study provided the findings more systematically. Firstly, this study provided findings of network dynamics at each stage of practice transfer projects. It is recognised that network analysis is particularly useful in the early stages of

"new exploratory investigations (Borgatti, 2011). The findings of network dynamics demonstrated the regular patterns of the network. Secondly, the findings of network structure provided the descriptive details about the practice transfer network. Network analysis has advantages in providing greater opportunities for in-depth observation of collaborative activities. Finally, this study provided results about network influences.

Also, different from these previous studies, this research identified the weaknesses in the existing network theories and provided a conceptual contribution. This study suggests that the existing network theory has weaknesses in explaining network dynamics. And this study demonstrated that network dynamics is not only about bridging people but also pairing people together in the network. This study also suggests that the existing network theory has weaknesses in explaining each individual's network structure. This study suggests that research needs to consider each individual's network structures, rather than each individual's network structure as a whole. This study breaks down each individual's network structure into more detailed structures, and found a brokerage actor playing three roles. Thus, this study is different from these previous studies.

7.7 Future research

Network analysis findings are usually like paintings. They are so easy to attract people at the first glance. And it seems so easy to understand. But as a wonderful piece of painting, the subtle constructions may take ages to be comprehended. The vivid visualisation of a network has so many puzzled secrets waiting for people to unpack them. This research uses network

analysis to discover the regular patterns of networks. Every single detail of a network can be a potential future research topic.

First, further research can improve this study's model with more data across different industrial sectors and types of practice transfer. This research's results show the importance of combining various inter-personal connection structures in the context of practice transfer. These results can be more generalised with similar data from different business contexts. This study began with the idea using network analysis to investigate the process in practice transfer to fill the gap in the previous research. This study is about network from method to theory. This study suggests that network should not only be used as a method but also as theory. Although network theory has been suggested by Borgatti (2011) and this study tested it with empirical findings, it still needs more generalisation in the area of network dynamics, structure, and influence.

The second future research direction is about the nature of information exchange ties in networks. The information exchange ties can be classified by the means of communication. This can include face-to-face chat, emails, phone calls, exchanging computer data, and formal meetings. The information exchange ties can also be classified by the content of information. This can include, for example, design related information, planning related information, management related information, proposing new ideas, and confirmation of new ideas.

The third future research direction is the simulation of network dynamics with a large dataset. This can offer a prediction of the sequence of business activities. This study used data based on four stages of each practice transfer project. A larger dataset with more time points in the data can enable this kind of research. This will provide more detailed information about how

networks evolve. Network dynamics have been a cutting-edge topic in network research. A large dataset can be used for analysis of network dynamics to find out more regular patterns in network evolution.

7.8 Summary

This study provided three findings to answer the three research questions about brokerage actor dynamics, structures and influences. These three findings are:

Finding 1: Brokerage actor dynamics

First, this study identified the regular patterns in brokerage actor dynamics. This study suggests the regular patterns in brokerage actor dynamics are not only bridging people but also pair people together to form a network. Particularly, this study identifies the network dynamics in the practice transfer process. This adds to theories in practice transfer and network dynamics.

Finding 2 Brokerage actor roles and structures

Second, this study identified the combination of brokerage actor roles and their network structure. This study suggests information exchange between headquarters and local subsidiaries rely on a combination of three brokerage actor roles, which are centrally located in the network. This finding has a contribution to theories in practice transfer and network

structures.

Finding 3 Brokerage actor influences

Finally, this study showed the extent of brokerage actor influences on practice transfer outcomes. Three brokerage actor roles have significant influences on practice transfer outcomes. With individual attributes, the model can only explain about 40 percent of practice transfer outcomes. After adding three brokerage actor roles as the network variables in the model, the model can explain about 70 percent of practice transfer outcomes, which can be considered as a robust model.

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Appendix A: Questionnaire

1 Profile

Ref No: _____

Project Name:
_____

Name: _____ **Title:** _____

Organisation: _____ **Work address:**

Department: _____ _____

_____

Position: _____ _____

Tel: _____

Fax: _____

E-mail:
_____

Notes:

2 Network patterns (Independent variables)

Instructions: *This survey inquires about your interactions with other individuals in the project named above in section 1. In this questionnaire, you will be asked about your ties to other people in the project. The aim of the survey is to analyse the network in the project. The interaction ties this research is interested in are:*

Content of interaction	***Description***
Teamwork: Cooperation	*People working together with different but complementary goals and responsibilities.*
Teamwork: Supporting	*Taking responsibility of supporting activities in the project. Doing administrative coordination about project time and budget.*
Information exchange: Proposing new ideas	*People giving and receiving new information about knowledge, capabilities and tools.*
Information exchange: Confirming and supporting new ideas	*People confirming and supporting the new information about knowledge, capabilities and tools.*

The attributes of interaction ties this research is interested in are:

The attributes of interaction	***Description***
Frequency	How often this teamwork or information exchange happens. 1 every day, 2 every week, 3 every month, or 4 only once.
Criticality	The importance of the interactions to finishing the project task. 
Project Phase	This teamwork or information exchange happen at which stage of the project. 1. Planning stage, 2 Design and Development, or 3 Implement and delivery

Basically, you'll see a list of everyone's names, and please identify whom you interact with in your project. And if there are people not in the list but you think they are very important to the project, please also include these people in your answer*. In the table below please list every individual involved in the project and your ties with them. Q1. To identify whom you work with. Q2. To identify whom you sent help or information to. Q3. To identify whom you received helped or information from. The results will be used to illustrate concepts of network analysis. This means that the data will be kept* ***confidential****. Please fill in the table to the best of your recollection for the period of the whole project.*

(THE NAME LIST OF PATICIPANTS ATTACHED HERE)

2.1 Teamwork: Who do you WORK WITH in the project?

Please give the names and positions of the people you worked with in the project		**Content of interaction** Please tick √ from below			**The attributes of teamwork** Please follow the instruction below each item		
Names of the Individuals	Position (For example, engineer, manager, or director)	Cooperation	Support	Other (Please fill in below)	Frequency (1 Every day, 2 every week, 3 every month, or 4 only once)	Criticality (From 1 to 7) 1 Very Low — 7 Very High	Project Phase (1. Planning, 2 Design and Development, or 3 Implement and delivery)

2.2 Information exchange: From whom do you RECIEVE INFOMATION in the project?

Please give the names and positions of the people you exchanged information with in the project		**Content of interaction** Please tick √ from below			**The attributes of information exchange** Please follow the instruction below each item		
Names of the Individuals	Position (For example, engineer, manager, or director)	Proposing new ideas	Confirming and supporting new ideas	Other (Please fill in below)	Frequency (1 Every day, 2 every week, 3 every month, or 4 only once)	Criticality (From 1 to 7) 1 Very Low — 7 Very High	Project Phase (1. Planning, 2 Design and Development, or 3 Implement and delivery)

2.3 Information exchange: To whom do you SEND INFOMATION in the project?

Please give the names and positions of the people you exchanged information with in the project		**Content of interaction** Please tick √ from below			**The attributes of information exchange** Please follow the instruction below each item		
Names of the Individuals	Position (For example, engineer, manager, or director)	Proposing new ideas	Confirming and supporting new ideas	Other (Please fill in below)	Frequency (1 Every day, 2 every week, 3 every month, or 4 only once)	Criticality (From 1 to 7) 1 Very Low — 7 Very High	Project Phase (1. Planning, 2 Design and Development, or 3 Implement and delivery)

3 Practice transfer works (Control variables)

Instructions: *In this section, you will be asked questions about 1) rank, 2) tenure, 3) education level, 4) budget available to the participant, 5) participant's working time in the project, and 6) another 30 questions for the works you have done in the project. The results will be used to illustrate concepts of network analysis. This means that the data will be kept* ***confidential****.*

1.	Rank: What position do you hold?	Junior level		Middle level		Top level
2.	Tenure: How many years have you been employed in your profession?	How many years in the current position?		How many years in the company?		
3.	Education level: What is the highest level of your academic achievement?	High School		Undergraduate	Masters	PhD
4.	Budget available: To what extent you believe that the budget to support your work in the project is adequate?	Strongly disagree that the budget available is adequate	Disagree that the budget available is adequate	Slightly disagree that the budget available is adequate	Slightly agree that the budget available is adequate	Agree that the budget available is adequate	Strongly agree that the budget available is adequate
5.	Participant's working time in the project: Your time input in the project.	Only one day or less	Several days every month	Several days every week	Every working day	

6.	I am keenly aware of the goals I have for getting salary or awards.	○ Never	○ Sometimes	○ Often	○ Always
7.	I'm less concerned with what work I do than what I get for it.	○ Never	○ Sometimes	○ Often	○ Always
8.	I am keenly aware of the promotion goals I have set for myself.	○ Never	○ Sometimes	○ Often	○ Always
9.	I enjoy relatively simple, straightforward tasks.	○ Never	○ Sometimes	○ Often	○ Always
10.	I prefer having someone set clear structures for me in my work. I prefer working on projects with clearly specified procedures.	○ Never	○ Sometimes	○ Often	○ Always
11.	I don’t enjoy complex tasks.	○ Never	○ Sometimes	○ Often	○ Always
12.	The more difficult the problem, the more I enjoy trying to solve it.	○ Never	○ Sometimes	○ Often	○ Always
13.	I want my work to provide me with opportunities for increasing my knowledge and skills.	○ Never	○ Sometimes	○ Often	○ Always
14.	I enjoy tackling problems that are completely new to me.	○ Never	○ Sometimes	○ Often	○ Always
15.	I prefer to figure things out for myself.	○ Never	○ Sometimes	○ Often	○ Always
16.	I am not that concerned about what other people think of my work.	○ Never	○ Sometimes	○ Often	○ Always
17.	I enjoy doing work on my own.	○ Never	○ Sometimes	○ Often	○ Always
18.	No matter what the outcome of a project, I am satisfied if I feel I gained a new experience.	○ Never	○ Sometimes	○ Often	○ Always
19.	I am happy with the financial incentives (e.g. salary and bonus) in the project.	○ Never	○ Sometimes	○ Often	○ Always

20.	I can be benefited from the project in my (future) promotion.	Never	Sometimes	Often	Always
21.	I feel like I can be myself at my job. My interests and curiosity are the driving forces behind much of what I do.	Never	Sometimes	Often	Always
22.	It is important for me to be able to do what I most enjoy.	Never	Sometimes	Often	Always
23.	It is important for me to have an outlet for self-expression.	Never	Sometimes	Often	Always
24.	I feel competent at my job	Never	Sometimes	Often	Always
25.	Because I have to be the best in my job, I have to be a performance winner.	Never	Sometimes	Often	Always
26.	I want to find out how good I really can be at my work.	Never	Sometimes	Often	Always
27.	I really feel connected with other people at my job	Never	Sometimes	Often	Always
28.	At work, I feel part of a group	Never	Sometimes	Often	Always
29.	There is someone I can share my thoughts with if I want to do so	Never	Sometimes	Often	Always
30.	I want to help others through my work.	Never	Sometimes	Often	Always
31.	I get motivated by working on tasks that have the potential to benefit others.	Never	Sometimes	Often	Always
32.	I'm concerned about how other people are going to react to my ideas.	Never	Sometimes	Often	Always
33.	I want other people to find out how good I really can be at my work.	Never	Sometimes	Often	Always

34.	I help others with heavy workloads.	○ Never	○ Sometimes	○ Often	○ Always
35.	I believe teamwork can provide me with opportunities for increasing my knowledge and skills.	○ Never	○ Sometimes	○ Often	○ Always
36.	I am very aware of the ways in which my work is benefiting others	○ Never	○ Sometimes	○ Often	○ Always
37.	I believe that there is no point in doing a good job if nobody else knows about it.	○ Never	○ Sometimes	○ Often	○ Always
38.	I feel that my work makes a positive difference in other people's works	○ Never	○ Sometimes	○ Often	○ Always

4 Practice transfer outcomes (Dependent variables)

Instructions: *In this section, the project manager will be asked to evaluate each person's outcome* ***separately****. And to help fill up the user's feedback section based on the information in the project report and user's feedback. The results will be used to illustrate concepts of network analysis. This means that the data will be kept* ***confidential****.*

4.1 Information about practice transfer outcomes (This section is completed by managers only)

1.	Overall, to what extent is this person performing his/her job the way you would like it to be performed.	○ Not at all	○ A little	○ Mostly	○ Totally
2.	To what extent has he/she met your expectations in his/her roles and responsibilities?	○ Not at all	○ A little	○ Mostly	○ Totally
3.	To what extent are you satisfied with the total contribution made by this person?	○ Not at all	○ A little	○ Mostly	○ Totally
4.	To what extent is this person particularly creative: someone able to come up with novel and useful ideas?	○ Not at all	○ A little	○ Mostly	○ Totally
5.	To what extent would you suggest this person to keep the manner in prompting new ideas?	○ Not at all	○ A little	○ Mostly	○ Totally
6.	To what extent is this person good at implementing new practice?	○ Not at all	○ A little	○ Mostly	○ Totally
7.	This person satisfied with what he/she gained in this project.	○ Not at all	○ A little	○ Mostly	○ Totally
8.	This project offered expected financial incentives (e.g. salary and bonus).	○ Not at all	○ A little	○ Mostly	○ Totally
9.	This person can be benefited from the project in my (future) promotion.	○ Not at all	○ A little	○ Mostly	○ Totally

4.2 Information about practice transfer outcomes (This section is completed by all participants).

This survey is related to the part of the project.

1.	Overall, to what extent this new practice is useful to you?	○ Not at all	○ A little	○ Mostly	○ Totally
2.	To what extent is this new practice meets your expectations?	○ Not at all	○ A little	○ Mostly	○ Totally
3.	To what extent has your role and responsibilities in the project met your expectations?	○ Not at all	○ A little	○ Mostly	○ Totally
4.	Comparing to the previous practice, is this new practice better?	○ Not at all	○ A little	○ Mostly	○ Totally
5.	To what extent would you keep the manner in prompting new ideas?	○ Not at all	○ A little	○ Mostly	○ Totally
6.	To what extent is this practice particularly creative novel and new?	○ Not at all	○ A little	○ Mostly	○ Totally
7.	Do you think you are benefited from this new practice?	○ Not at all	○ A little	○ Mostly	○ Totally
8.	This project offered expected financial incentives (e.g. salary and bonus).	○ Not at all	○ A little	○ Mostly	○ Totally
9.	You can be benefited from the project in my (future) promotion.	○ Not at all	○ A little	○ Mostly	○ Totally

Appendix B: Correlation matrix

	Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11
1	Manager view outcomes	2.81	2.12											
2	Participant view of outcomes	3.27	3.16	0.87**										
3	Tenure	9.32	8.61	−0.39**	−0.32**									
4	Seniority	3.60	2.40	−0.27†	−0.02	0.04								
5	Education	4.60	3.40	−0.22†	−0.02	0.05	0.01							
6	Group-Local	0.11	0.27	−0.06	0.02	0.02	−0.06	0.01						
7	Group-Headquarter	0.37	0.41	−0.32	−0.27	0.19*	0.42**	0.21*	0.07					
8	Intrinsic	24.10	12.90	0.36**	0.42**	0.02	0.11†	−0.02	0.12	0.10				
9	Extrinsic	27.60	11.40	0.38**	0.27**	0.07	0.21†	−0.09	0.09	0.04	0.37			
10	Translation	0.25	1.72	0.47*	0.15*	0.00	−0.03	−0.10	0.07	0.24**	0.05	-0.02		
11	Bridging	0.26	1.42	0.21*	0.23**	0.18	−0.29	−0.22	−0.02	−0.07	0.09	0.19	0.12	
12	Embedding	0.22	1.17	0.17**	0.19**	0.11	−0.12	−0.07	−0.21	0.02	0.07	0.09	0.05	0.12

Appendix C: Cronbach alpha scores

Item	Cronbach alpha scores
Amiable (2005): Participants' work and knowledge backgrounds (Question 1-5)	0.875
Amiable (2005): goal oriented (Question 6, 7 and 8)	0.921
Amiable (2005): structured work preference (Question 9, 10 and 11)	0.896
Amiable (2005): problem solving (Question 12, 13 and 14)	0.829
Amiable (2005): teamwork (Question 15, 16 and 17)	0.817
Quinn and Shepard (1974), Cummings, Armeli, and Lynch (1997), and Grant (2008): Job satisfaction (Question 18,19 and 20)	0.815
Gagne et al. (2015): Need for autonomy (Question 21,22 and 23)	0.823
Gagne et al. (2015): Need for competence (Question 24, 25 and 26)	0.858
Vanden Broeck et al. (2010): Need for Relatedness (Question 27, 28 and 29)	0.883