THE ROLE OF INTERPERSONAL RELATIONSHIPS IN SUPPLY CHAIN INTEGRATION

A THESIS BY PUBLICATIONS PRESENTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

IN

LOGISTICS AND SUPPLY CHAIN MANAGEMENT

MASSEY UNIVERSITY, ALBANY, NEW ZEALAND

Bill Wang

May 2018

Abstract

Purpose –This research aims to explore the role of inter-personal relationships within a supply chain integration context. Firstly, it proposes a conceptual model addressing the inter-relationships between interpersonal relationships, inter-organizational relationships, and supply chain integration. Secondly, it investigates the influence of interpersonal relationships on supply chain integration. Lastly, it examines how interpersonal relationships influence inter-organizational relationships to enable supply chain integration.

Methodology/approach – Based on a comprehensive literature review, the study first proposes a series of propositions and establishes a conceptual framework to illustrate the relationship between interpersonal relationships, inter-organizational relationships, and supply chain integration. Then, the study applies an exploratory/investigational approach of multiple case studies and empirically examines how interpersonal relationships affect inter-organizational relationships and supply chain integration.

Findings – The study proposes that interpersonal relationships can indirectly and positively influence supply chain integration, mediated by inter-organizational relationships. Personal affection acts as a relationship initiator, and personal credibility serves as a gatekeeper while personal communication works as a facilitator and plays more important roles than personal affection and credibility. Also, interpersonal relationships can initiate and enhance inter-organizational relationships to enable supply chain integration. In the formative stage of supply chain integration, personal affection and credibility play key roles, whereas personal communication becomes more significant during the operational stage.

Originality/value – The study advances supply chain integration literature by extending the focus from that of firm level to the level of individuals, and introduces interpersonal

relationship dimensions to explore inner mechanisms of supply chain integration. It demonstrates that interpersonal relationships are able to initiate and motivate firm level integration, which modifies the presumption that firm level relationships are predominantly established first in Western cultural contexts. It also sheds light on applying theoretical lenses in supply chain integration. It extends social exchange theory from relationships between parties that are on the same level to different levels of interpersonal and inter-organizational relationships. Meanwhile, it applies resource dependency theory by addressing how interpersonal relationships influence dependence levels on supply chain partners to form firm level relationships. Furthermore, it extends resource orchestration theory by suggesting that inter-organizational relationships and interpersonal relationships can be orchestrated to achieve supply chain integration capabilities.

Implications –The study provides insights for practitioners who have limited "hard" firm level resources. Managers should be aware of the significance and characteristics of interpersonal relationships, and decide when and how to deploy both interpersonal and interorganizational relationships as resources during the integration process. In the formative stage, managers should utilise boundary spanners with good personal credibility. More physical contact with counter-partners should be encouraged to foster personal affection, thus initiating the formation of inter-organizational relationships. In the operational stage, personal communication should be strengthened to facilitate the supply chain integration process. On the other hand, managers should mitigate the conflict between primary business interests and subordinate interpersonal friendships.

Author's Declaration

This thesis was produced according to Massey University's "PhD thesis by publication" requirements: it is based on research that has either been published, in revision following reviewers' comments, in review, or in preparation to be submitted. Each individual chapter is set out according to the stylistic requirements of the journal to which it has been submitted. Consequently, some of the submitted chapters are relatively succinct, there is some repetition (particularly in the literature review and methods sections) and there are small stylistic differences between chapters.

Acknowledgements

First and foremost, I want to thank my principal supervisor, Professor Paul Childerhouse. It has been an honour to be his PhD student as well as his colleague. He has shared with me the philosophy of life-learning, both consciously and unconsciously. I appreciate the time, ideas, and support he has contributed to make my PhD experience productive and stimulating. I also want to thank my co-supervisor, Dr. Yuanfei Kang. Because of our similar cultural backgrounds and convenient geographic proximity, I have kept a seamless discussion with Dr. Kang on all kinds of issues including the research topic, interview questions, data collection, analysis and manuscript writing and revisions. The joy and enthusiasm both supervisors have for their research was contagious and motivational for me, even during tough times in the PhD pursuit. I am also thankful for the excellent example both supervisors have provided as successful researchers. Because I am pursuing my PhD by publication (rather than PhD by monography), I have experienced dark moments in which my manuscript submissions were rejected or which required numerous major revisions. I am grateful to both supervisors for their guidance, encouragement, and support in the whole process.

Also, I want to express my appreciation to my team, IMI cluster members, especially the Director, Professor Nigel Grigg, for his strong support on my PhD confirmation and completion, Dr. Sanjay Mathrani for his advice in the very beginning of the project, Mr. Alan Win and Mr. Jersey Seipel for their support on the interview issues.

My thanks also go to Professor Baofeng Huo from Zhejiang University, Professor Dong Yang from Donghua University, and Dr. Jack Gong from the University of Southampton for giving me valuable suggestions and spiritual support.

My time undertaking a PhD was made enjoyable as a result of the philosophy that one is "*never too old to learn*". I had previously started my PhD studies during 2000-2003 but I suspended because I immigrated to Auckland. After five years physical, nightshift labouring work in the new country, I returned to academic area. Again, I restarted my PhD in my late 40s and felt a little embarrassed from the viewpoint of my culture. But recently a popular short verse (author unknown) in social media has comforted me (with minor adaptions by me):

"Harvard is three hours ahead of Stanford, but that doesn't make Stanford slow.
Someone became a leader at 25 while another being 50 became a CEO.
Obama retired at 55, but Trump became President when he was 70-year-old.
Yes, everyone in this world works based on his own time zone."

So, I am happy to accept my late coming "time zone".

Lastly, I would like to thank my family for all their love and encouragement. For my illiterate (even in Chinese) parents, Fuying Xia (mum), and Jianhuai Wang (dad) in China who always urged me to pursue further study (sadly my mum passed away in 2008). I am also grateful for the support from my parents-in-law, Jinju Lin and Quanyun Fang. And for the understanding of my elder son, George (in Harvard College), and younger son, Albert (in Takapuna Normal Intermediate School), during their formative years. And most of all for my loving, supportive, encouraging, and patient wife Maggie whose faithful support during the all stages of this PhD is so appreciated and valued. Yes, love from family is always the most in our life.

Bill Wang

Massey University

October 2018

Funding and Support

I gratefully acknowledge

- School of Engineering and Advanced Technology, Massey University to exempt me from all charges for my PhD study as a Massey University staff.
- Graduate Research School for its Massey University Conference Presentation Grant's for 2017.
- National Natural Science Foundation of China (No. 71372058; No. 71525005)

Table of Contents

List of Tables

List of Figures

Abbreviations and Terms

ABDC	Australian Business Dean Council
ABS	Association of Business Schools
C+F	Contract farmers
EI	External integration
GDP	Gross domestic product
II	Internal integration
INGOs	International non-governmental organizations
IORs	Inter-organizational relationships
IPRs	Inter-personal relationships
LNGOs	Local non-governmental organizations
RBV	Resource-based view
RDT	Resource dependence theory
ROT	Resource orchestration theory
SC	Supply chain
SCI	Supply chain integration
SCM	Supply chain management
SSCI	Service supply chain integration
SET	Social exchange theory
SME	Small and Medium Enterprises

Chapter 1. Introduction

1.1 Research gaps and research topics

A business needs to collaborate with its suppliers and customers in its supply chain (SC) because competition between companies has been replaced by competition between supply chains (Tan, 2001). Lambert and Cooper (2000) state that successful supply chain management (SCM) requires cross-functional supply chain integration (SCI). SCI refers to the development of strategic intrafirm and interfirm collaboration of suppliers and buyers along an extended supply network (Cao *et al*., 2015; Liu *et al*., 2016). SCI can significantly improve the efficiency and effectiveness of companies and their SCs. For example, SCI can improve interface management, evaluate trade-offs, and optimize a wide range of decisions, thereby aligning strategies between SC partners (Childerhouse *et al*., 2011). Also, it can improve and streamline the internal and external exchange of information and data, leading to the improvement of physical flows throughout the SC (Wiengarten *et al*., 2016). Meanwhile, SCI can save transaction costs (Yeung *et al*., 2009), and reduce waste and duplication between SC partners (Bowersox *et al*., 2007). Moreover, SCI can help companies to access external physical and soft resources (including knowledge) to enhance capabilities and innovativeness (Wiengarten *et al*., 2016). Consequently, SCI can improve the competitiveness and performance for both companies and their SCs (Flynn *et al*., 2010; Gimenez *et al*., 2012; Leuschner *et al*., 2013).

Implementation of SCI in practice is difficult and rare (Childerhouse *et al*., 2011). In addition, the results of SCI are far from ideal (Cao *et al*., 2015). There exists a necessity to explore SCI enablers. Since SCI is the collaboration between companies in SCs, it is not surprising that most of the extant SCI literature focuses on organizational level factors including trust, power, commitment, justice, culture, and communication (Braunscheidel *et al*.,

2010; Griffith *et al*., 2006; Hult *et al*., 2004; Kwon and Suh, 2005; Mentzer *et al*., 2001; Prajogo and Olhager, 2012; Zhao *et al*., 2008). For instance, Bachmann (2001) regarded trust between companies as a vital ingredient in facilitating SC activities. Zhang and Huo (2013) stated that trust is positively related to supplier integration and customer integration. Cheng (2011) and Wu *et al*. (2014) argued that organizational commitment positively influences SCI. With commitment, SC companies are more likely to assist the development of strategic alliances, to share key information, and jointly coordinate the SCI process (Zhao *et al*., 2008; 2011). Zhao *et al*. (2008) also argued that power can motivate parties to align with each other regarding their strategies, to share information resources to balance the influence of power, and to develop joint problem-solving routines to coordinate activities in the integration process.

The success of SCI is related not only to economic and technology factors, but also to social factors (Zhao *et al*., 2008). As SCI is planned, executed, controlled, and measured by individuals, people's roles cannot be overlooked (Cao *et al*., 2015). The attitude, willingness, trust, commitment, and behaviours, especially in regards to the relationships among boundary spanners, may subtly but significantly influence inter-organizational relationships (IORs). This inner mechanism under IORs may affect the efficiency and effectiveness of SCI. Some studies acknowledge the role of individuals in SCM, but mainly focus on the training, skills, and knowledge aspects (Fawcett *et al*., 2007), often overlooking interpersonal relationships (IPRs).

In practice, IPRs exist in many cultures and countries, including but not limited to "*guanxi*" in China, "*wasta*" in Brazil, "*pratik*" in Haiti, "*jeitinho*" in Lebanon, "*pulling strings*" in the United Kingdom (Smith *et al*., 2012), and "*blat*" in Russia (Michailova and Worm, 2003). From a resource-based viewpoint (RBV), IPRs can be regarded as a very special and important resource because they are more valuable, rare, inimitable and non-substitutable (Barney, 1991). In social exchange theory (SET), IPRs can encourage the interaction between boundary spanners for the expectation of a reward (Wu *et al*., 2014). This exchange of interpersonal

resources can facilitate the resource exchange between companies and further influence the firm level interaction and integration.

Decision-makers are influenced by their relationships with others as well as their cultural backgrounds (Cai *et al*., 2017; Schorsch *et al*., 2017; Sweeney, 2013). In fact, some basic characteristics of relationships such as mutual understanding, cooperative behaviour, and long-term orientation are apparent in many cultures (Wang, 2007). A failure to consider the role of IPRs in SCI would limit a deeper understanding of why boundary spanners involved in SCI behave in certain ways. On the other hand, IPRs must work through their companies to affect SCI, otherwise they will quickly lose their influence and power. Thus, it is crucial to understand the interconnections between IPRs, IORs and SCI. However, research in this important area is still at its infancy (Schorsch *et al*., 2017). Researchers have proposed taking individual behaviour and IPRs as central themes in some SC research (Gligor and Holcomb, 2013; Huo *et al*., 2015; Mandják *et al*., 2016; Pulles and Hartman, 2017). Therefore, the identified research gap regarding IPRs and interactions with IORs, in enabling SCI, present a research niche for this study.

1.2 Key concepts and research questions

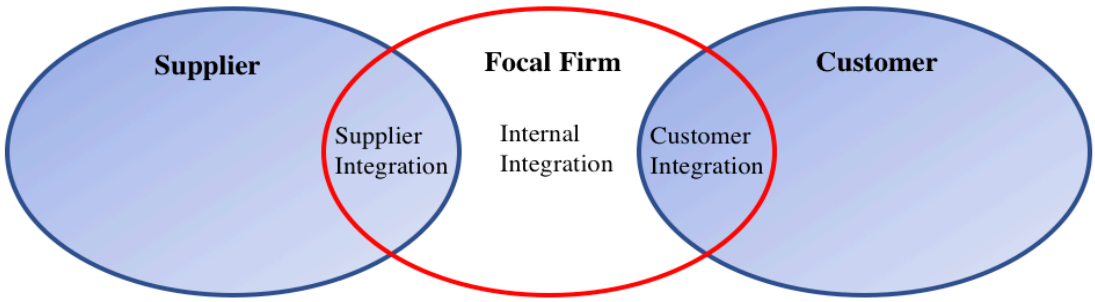
This research explores the role of IPRs in the context of SCI, but because SCI is the firm level integration and is related to IORs, literature on the three main concepts of SCI, IORs, and IPRs will be reviewed.

1.2.1 Supply chain integration (SCI)

SCI is to structure internal or inter-organizational strategies, practices, procedures, and behaviours into collaborative, synchronized, and manageable processes to fulfil its customers' requirements (Huo, 2012). There is no commonly accepted sub-dimensions of SCI (Huo, 2012), but traditionally, most researchers adopt scoped-base SCI: SCI can be

classified into internal integration and external integration (Flynn *et al*., 2010) while external integration can be further classified into supplier integration and customer integration (Cao *et al*., 2015; Huo, 2012; Yeung *et al*., 2009) (See ***Figure 1***).

Figure 1 *Supply chain integration (internal integration and external (supplier/customer) integration*



Internal integration refers to the integration among different functional areas within a firm's boundaries. External integration refers to the integration of a firm with its upstream suppliers (supplier integration) and/or downstream customers (customer integration) (Wiengarten *et al*., 2016). This classification clearly addresses the scope of SCI; thus researchers and practitioners can clarify the integration direction and concentrate on the right strategic partners. However, the scope-based classification emphasizes the internal and external relationships in SCs, which may weaken a comprehensive understanding of SCI.

In order to avoid the weakness of scope-based SCI dimensions, this research applies a content-based view of SCI in terms of strategic alliances, information integration, and process integration. As SCI highlights the strategic interconnection and alignment between SC partners (Wiengarten *et al*., 2016; Zhao et al., 2011), strategic alliances are of primary concern. Strategic alliance refers to joint decisions among SC partners in order to achieve agreed goals of aligned companies (Min, 2015; Zhao et al., 2011). Because the success of strategic alliance heavily relies on collaborative planning and execution efforts to create a seamless SCI, it must be considered in conjunction with accurate and timely information sharing/integration and

process integration/integration (Devaraj *et al*., 2007). To consistently use the terms throughout the thesis, this research applies information integration and process integration as the other two content-based SCI dimensions following some researchers' work. Leuschner *et al*. (2013; p. 38) defined that information integration as "*the coordination of information transfer, collaborative communication and supporting technology among firms in SC*". Information integration concerns visibility and timeliness (Tsanos and Zografos, 2016). Process integration refers to the collaborative working between SC partners, such as joint product development, and common systems (Haq and Boddu, 2017).

These three dimensions are closely related to each other. For example, information integration can only be fully leveraged through process integration (Christopher, 2000) while process integration cannot succeed without attending orientation of information integration (Haq and Boddu, 2017). The integration of the three dimensions can create sustained competitive advantages leading to higher SC performance (Tsanos *et al*., 2014; Tsanos and Zografos, 2016). Given that strategic alliance, information integration, and process integration are identified as central activities in SCM (Flynn *et al*., 2010; Liu *et al*., 2016; Zhao *et al*., 2011), this research frames these three concepts as key dimensions of SCI.

Since SCI is a long-term process, this research simply divides and classifies it into formative and operational stages. In the formative stage, supply chain partners that are to be integrated endeavour to interact with each other, to assess the possibility of SCI, and to prepare for the formation of SCI. In the operational stage, supply chain partners maintain and develop the integration by aligning their strategies, sharing information, and facilitating process integration by solving conflicts and operational problems.

1.2.2 Inter-organizational relationships (IORs)

Since SCI is the collaboration among companies at the organizational level, the long-term IORs can work as a driver of SCI and may influence the performance of SCI (Prajogo and Olhager, 2012). Prior studies have examined various IOR factors in SCI, including trust, leadership, power, commitment, justice, culture, and communication (Braunscheidel *et al*., 2010; Cao *et al*., 2015; Griffith *et al*., 2006; Huo *et al*., 2017; Kwon and Suh, 2005; Mentzer *et al*., 2001; Prajogo and Olhager, 2012; Zhao *et al*., 2008; Zhang and Huo, 2013). For example, because mutual trust can increase contract duration, encourage efficient conflict resolution (Flynn et al., 2010), and enhance information integration (Cai *et al*., 2010), trust between customers/suppliers significantly influences SCI performance (Zhang and Huo, 2013). Power between organizations (e.g. customer power) can impact on relationship commitments, then impact on SCI (Zhao *et al*., 2008) and improve performance (Huo *et al.,* 2017). Procedural and distributive justice can influence SC partners' attitudes and behaviours, decrease conflicts and increase satisfaction, consequently influencing integration performance (Griffith *et al*., 2006). Braunscheidel *et al.* (2010) and Cao *et al*. (2015) investigated the effects of organizational culture on SCI and delivery performance by examining the relationships between organizational cultures and SCI. Hult *et al*. (2004) devised a model linking knowledge development to cycle time in SCI.

All these factors contribute to the establishment of SCI across firm boundaries, and play distinctive roles in SCI. This study focuses on trust, commitment, and power only because these three factors are more fundamental, significant, and commonly investigated in SCM. Trust and commitment are vitally important for SCI because they provide a foundation for all cross boundary SCM activities (Chen and Paulraj, 2004). These two have become the most commonly examined factors in terms of their influence on relational contracting transactions (Tsanos and Zografos, 2016). Meanwhile, power, related to relative resources dependence (Wu

et al., 2014), has been regarded as the central crux among various organizational determinants of SC relationships (Cox, 2001). In addition, the three factors are related to each other. For example, levels of commitment are strongly related to levels of trust (Kwon and Suh, 2005).

1.2.3 Interpersonal relationships (IPRs)

Das (2016) defined that an organization is an entity which is comprised and structured by a social unit of people and linked to an extant environment in order to pursue collective goals. Following this definition, the study focuses more on the people along the organizational boundaries and regards the related relationships between organizations (such as suppliers and customers), relationships between the boundary spanners as the extant environment. From this perspective, SCI and organizational level relationships are closely related to boundary individuals and their relationships. For example, only after the trust during the business interaction between these individuals has been built, penetrated, and accumulated to the individual collection level over time (Rempel *et al*., 1985), then it may become a base and form the trust between organizations (McKnigh *et al*., 1998). More specially, based on empirical investigation of Hong Kong importers with Western exporters, Barnes *et al*. (2015) claimed that the higher level of interpersonal communication, credibility, and affection can enhance higher level of inter-organization trust.

Although cultures in different business environments are different, there exist some shared basic characteristics in relational exchanges such as mutual understanding, cooperative behaviour, and long-term orientation (Wang, 2007). This principle forms a basic foundation for this research. This research follows the justification and research of Barnes *et al*. (2015) in IPRs and regards personal affection, credibility and communication as three dimensions of IPRs. Inner personal affection pertains to the individual's feelings and sentiments; it is related to an enduring and emotional commitment to other individuals (Lee and Dawes, 2005). With

personal affection, individuals in a business interaction can have a mutually empathetic understanding of, and affection for, each other (Leung *et al*., 2008). It also provides the flexibility needed to handle changing circumstances as well as creating strong ties (Leung *et al*., 2005). Thus, Pulles and Hartman (2017) address the central role of personal affection and state that likeability influences interpersonal interaction outcomes. Consequently, it can significantly influence the willingness, at the firm level, to engage in strategic collaboration.

Barnes *et al.* (2015) state that personal credibility is based on strong performances, achievement records, responsibility, and loyalty. This study refines this concept into two further classifications: character-based and reliability-based personal credibility. Character-based personal credibility is related to a perception of responsibility and loyalty because of social similarity in the business (Gulati, 1995). Reliability-based personal credibility is related to one's actual behaviour and performance. Personal credibility can inspire individuals to gain trust to develop interaction over time, generate strong desires to continue IPRs then to IORs (Luo, 2007), so it can give boundary spanners confidence to make committed efforts within SCI. Compared with subjective personal affection, personal credibility is more objective as it is based more on facts and records.

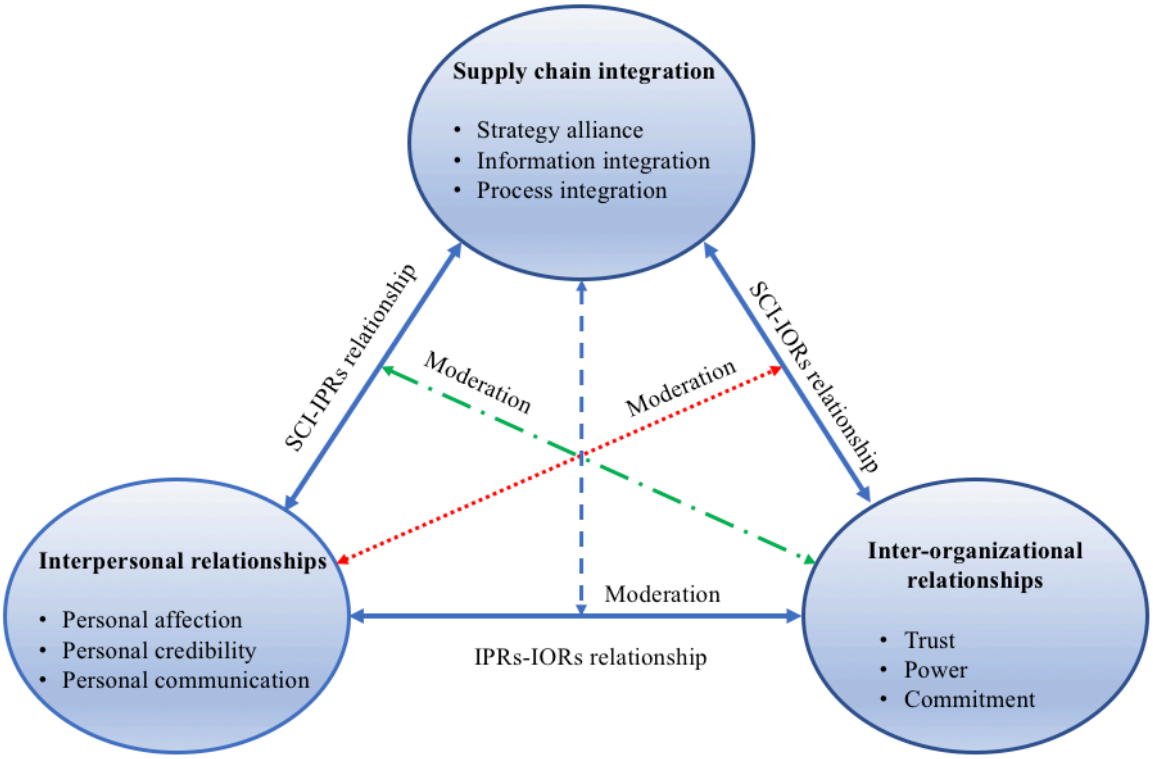
Personal communication can provide a means for individuals to exchange information formally and informally using a variety of ways. Personal communication enhances the feeling that promises and obligations can be delivered as agreed (Ring and Van de Ven, 1994), thus achieving harmony in IPRs and consolidating IORs. When communication is more open and personal, the richness of the communication increases (Cousins *et al*., 2006). As a result, a higher level of personal communication will lead to greater longevity of IPRs and IORs (Barnes *et al*., 2015).

1.2.4 Research objectives and goals

Most prior studies on SCI enablers mainly focus on IORs, overlooking the influence of IPRs. This research aims to fill the research gap by studying the role of IPRs in a SCI context. Although firm level integration activities are executed by individuals, and the relationships between these boundary spanners may be subtle, their interconnections warrant attention. This research therefore *explores the relationships between IPRs, IORs and SCI.*

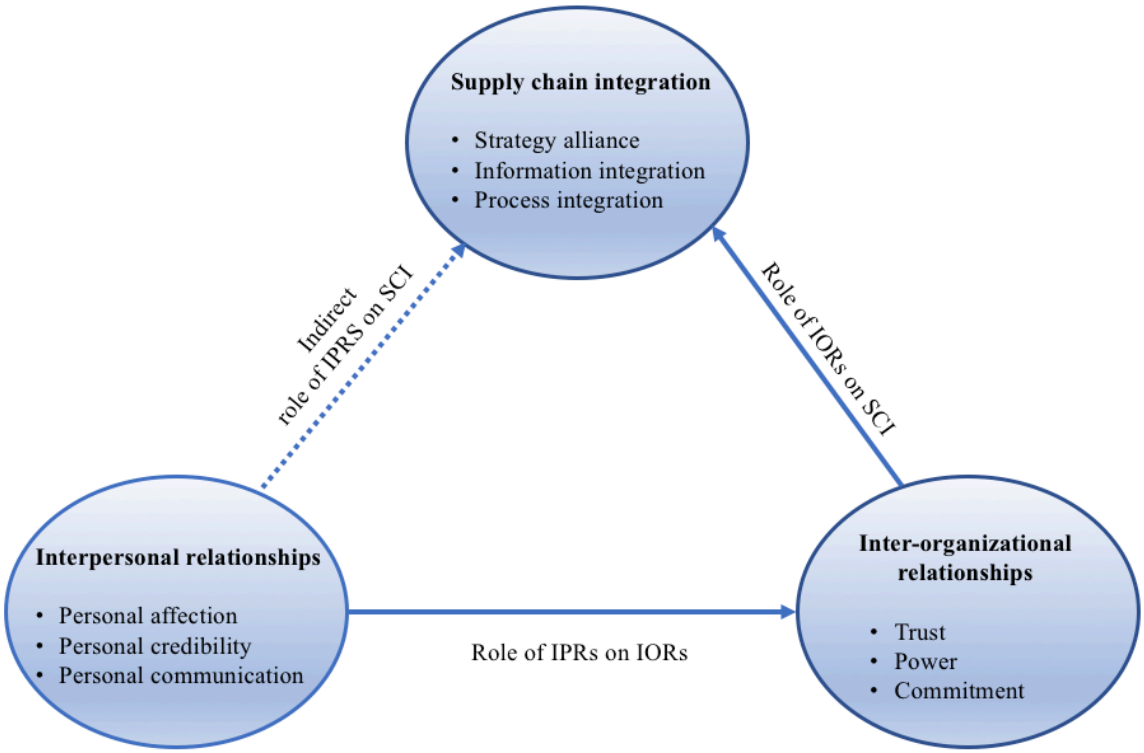
This research objective forms the basic research framework. Among the three constructs of IPRs, IORs, and SCI, any of the two (for example, IPRs and SCI) can have interactions with each other. Meanwhile, each interaction (for example, IPRs-SCI) may be integrated by the third element (for example, IORs). Moreover, each factor has different dimensions. This research identifies three dimensions within each factor and proposes that each dimension may interact with any of the other three dimensions within each factor. Thus, the IPRs-IORs-SCI system becomes very complex (see ***Figure 2***).

Figure 2 *IPRs-IORs-SCI system*



These relationships may become even more complicated when they are considered in relation to SC networks, given that SC networks consist of a variety of suppliers and customers at different tiers. Hence the relationships in the system are very intricate. This research offers a simplified conceptualisation of the system to establish the framework of IPRs-IORs-SCI (see ***Figure 3***).

Figure 3 *IPRs-IORs-SCI research framework*



The conceptual model is trying to build the inter-relationships between the individuals and their own organization and target integration organization. Although each construct has a variety of dimensions and factors, this research just chose three dimensions for each construct to simplify the framework based on literature review. For example, trust, power, and commitment are regarded as the most fundamental and significant factors of IORs (Chen and Paulraj, 2004). Meanwhile, strategy alliances, information integration, and process integration are commonly accepted as the main contents of SCI (Flynn *et al*., 2010; Liu *et al*., 2016; Zhao *et al*., 2011). Personal affection, personal credibility, and personal communication are concluded in IPRs (Barnes *et al*., 2015). As IPRs cannot influence SCI directly, each dimension of IPRs needs to play roles on the three dimensions of SCI, through IORs in terms of trust, commitment, and power. Consequently, even in this simplified IPRs-IORs-SCI system, 27

(=3×3×3) linkages exist between the individual (relationship builder), related organizations, and the organization that is target for SCI (Please refer to Figure 10 in Chapter 2 in page 50)

Because the role of IORs factors such as trust, power, and commitment on SCI has been investigated extensively (Bachmann, 2001; Cheng, 2011; Wu *et al*., 2014, and Zhao *et al*. 2008), this research focuses on (1) the role of IPRs on SCI, and (2) the role of IPRs on IORs in a SCI context. As SCI comes down to integration at the firm level, and the influence of IPRs on SCI is more likely to be indirect as it works through IORs, so Figure 3 uses a dotted line to show the indirect role of IPRs on SCI. The influence of IPRs on SCI, and how IPRs influence IORs, are central concerns of this research. Given that IPRs have three dimensions, the role of IPRs on SCI can be examined by answering the following research question:

RQ1. How do personal affection, personal credibility, and personal communication influence SCI in terms of strategic alliance, information integration, and process integration?

A second question that emerges in relation to the role of IPRs on IORs finds its basis in the identification of trust, commitment and power as the three main factors of IORs:

RQ2. How do IPRs (personal affection, personal credibility, and personal communication) influence IORs in terms of trust, commitment, and power during the SCI process?

1.3 Research methodology overview

As this thesis is based on publications, each paper is a self-contained piece, with its own introduction, literature review, research methodology, discussion, findings, and conclusion. The following is a brief overview of the research methodology employed in the three papers.

1.3.1 Research paradigm

Research approaches in social science are fundamentally from the philosophical paradigms of research. A research paradigm is regarded as the basic belief or worldview to

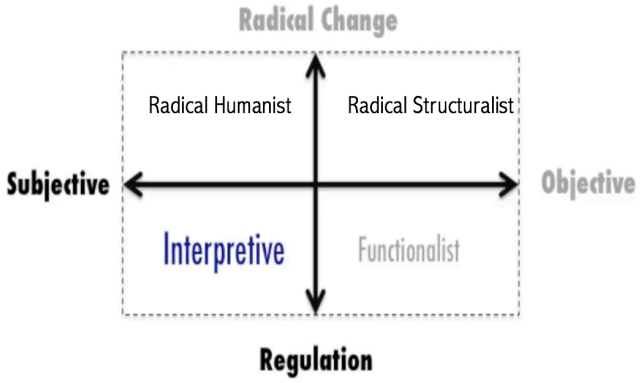
guide the researchers to apply research methodology in ontologically and epistemologically ways (Guba and Lincoln, 1994). According to Bryman and Bell (2011), ontology is concerned with the reality and nature of social entities while objectivism and constructionism take different positions in some ways. Objectivism implies that an organization is tangible, external to our research or influence, and sets rules, procedures, processes and structures. However, constructionism believes that the social construct arises from the interaction of individuals. Epistemology concerns how a research can know about the reality and acquire the knowledge with two main positions: interpretivism and positivism.

This research takes interpretivism for the following reasons. Ontologically, interpretivists emphasize the subjective meaning of the reality that is constructed through human social interaction process while positivists state that reality exists objectively and independently from human experiences (Burrell and Morgan, 1979). Epistemologically, interpretivists assume that scientific knowledge should be obtained through the understanding of human social interaction by which the subjective meaning of the reality is constructed (Walsham, 1995). Interpretivism focuses on the causal explanation and interpretive understanding of human behaviour. It is strong inductive leaning. Positivists, however, are concerned with the hypothetic-deductive testability of causal relationship just like in natural science research (Orlikowski and Baroudi, 1991). In this research, the role of IPRs in SCI can be subjectively regarded as working through human social interaction process; the research tries to understand and to interpretive these human interactions by focusing on the logic causal explanation of these interactions.

In terms of organizations research, Burrel and Morgan (1979) developed a well-known categorization of sociological paradigms: objective-subjective axis and regulation-radical change axis form four paradigms: functionalist, interpretive, radical humanist, and radical structuralist (***Figure 4***). Along the horizontal axis on the objective side, researchers believe the

world is a concrete objective reality while on the subjective side, researchers see reality as something that is primarily in a subjective experience. Along the vertical axis on the regulation side researchers state that the world is fairly stable and organized but on the radical change side the researchers see the world should be changed for reasons.

Figure 4 Sociological paradigm



Burrell and Morgan (1979)

This research was positioned into the interpretive paradigm for two reasons. First, the processes of the role of IPRs on IORs and SCI can be regarded as regulated, stable over time, and this process can be studied as a *status quo* as it is cohesive and orderly. Human activity and behaviour are needed to be understood as it is. Second, the research was out of the level of the subjective experience, consciousness of each individual person. Following the interpretivism, the research findings can suggest supply chain managers be aware that IPRs can influence IOR and SCI in a certain regulated, stable circumstance; practitioners can purposely cultivate the IPRs and make full use of the relationships, rather than simply focusing on the firm-level relationships. According to interpretive paradigm, the social reality can be viewed as a network of individuals assumptions and an inter-subjectively shared meanings, so, observation and/or interview approach should be applied into the research to draw out those individuals' thinking and people's perception (Burrel and Morgan, 1979).

1.3.2 Justification of qualitative multiple case study approach

Based on a comprehensive literature review, the research in Chapter 2 firstly proposes 27 propositions and establishes a conceptual framework to demonstrate the relationships between IPRs, IORs, and SCI. The research suggests that the trust, commitment, and power of IORs mediate the positive relationships between IPRs (personal affection, credibility, and communication) and SCI in terms of strategic alliance, information integration, and process integration. This is a purely theoretical work without applying empirical data to test the model.

In order to explore the role of IPRs in SCI (Chapter 3) and the role of IPRs on IORs in SCI (Chapter 4), the research has to justify the qualitative and quantitative research methods employed.

Table 1 *Comparison of quantitative and qualitative research*

	Quantitative method	**Qualitative method**
Theory and Research	Deductive (testing out theory)	Inductive (generating new theory)
Epistemology	Positivism (natural science)	Interpretivism (social science)
Ontology	Objectivism (tangible and measurable)	Constructionism (social interactions)
Approach	Test hypothesis	Discover meaning
Concepts	Distinct variables	Themes
Measurement	Standardized, predetermined data requirements	Flexible, ad hoc data requirements dependent on settings
Data	Precise and quantitative	Observations, words and images
Procedures	Standard and replicable	Tailored
Analysis	Statistical analysis, tables and charts to test hypotheses	Construction of a generalizable and coherent picture through rich descriptions

(Bryman et al, 2011; Neuman, 2006)

Although there are studies that examine the relationship between people in management, there is scant research on the influence of IPRs in SCM, especially in a SCI context (Schorsch *et al*., 2017). Research into the role of IPRs in SCI (Chapter 3) focuses on "*why*" and "*how*" IPRs influence SCI. This particular section is concerned with process, context, interpretation and understanding the roles of IPRs in SCI through inductive reasoning in order to generate new theory (Yilmaz, 2013). The role of IPRs on IORs in a SCI context (Chapter 4) develops Barnes *et al*. (2015)'s dimensions of IPRs in SCI to explore *how* IPRs influence IORs across formative and operational stages of SCI. Given that SCI enablers have been rarely examined at an interpersonal level, there is a need to lay the theoretical groundwork for the two research papers comprising Chapter 3 and Chapter 4. Qualitative research methods, such as multiple case studies, were found to be appropriate for the research to explore the under-investigated field.

These two research papers designed multiple case studies in accordance with relevant literature on case study methods. Yin (2014) suggests that under the replication methodological logic, multiple cases are selected either to predict similar case results in order to strengthen the

emerging theory (i.e., literal replication), or to generate contrasting results in order to extend theory (i.e., theoretical replication). Regarding the number of cases to be undertaken, Eisenhardt (1989, p. 545) recommended that "*a number between 4 and 10 cases usually works well. With fewer than 4 cases, it is often difficult to generate a theory with much complexity"; "With more than 10 cases, it quickly becomes difficult to cope with the complexity and volume of the data*". Therefore, this research applied four cases in investigating the role of IPRs on SCI (Chapter 3) and four cases in examining the role of IPRs on IORs (Chapter 4).

1.3.3 Case and data selection, validity, and analysis

The case selection in both Chapter 3 and Chapter 4 was purposive and directed by the theoretical concepts that were examined in the study (Patton, 2015; Strauss and Corbin, 1998). The cases were selected based on three criteria: (1) the industrial setting (Chapter 3 focused on the service industry while Chapter 4 concentrated on the manufacturing and service industries); (2) the business operations spanned more than five years, so as to ensure the case companies would have substantial involvement in SCI activities; (3) selected case companies should be different in their size, so that contextual effects in company size could be observed. The research stated that large size companies as those employing more than 50 full-time employees while the rest ones are SME (Small and Medium Enterprises) (Statistics New Zealand, 2013). The data were collected through semi-structured interviews of managerial executives in relation to SC activities, and triangulated with archival data (including websites, news coverage and company documents). Respondents from senior and middle level management were chosen for each of the case companies, so that the interview data could be triangulated from different perspectives.

Reliability and validity are central concerns in qualitative research measurement. Both help to establish the truthfulness and credibility of research findings. Reliability refers to consistency of a study's findings over time (Neuman, 2006). The research applies case study

interview protocol from which other researchers may apply to guide field research and analysis in order to achieve the consistent findings in similar settings (Tellis, 1997). Validity refers to how accurate an instrument is at measuring what it is trying to measure. This research mainly focuses on how to improve internal validity, external validity, and construct validity.

Internal validity refers to the degree to which confidence can be established regarding truthfulness of the findings and interpreting the findings (Lincoln and Guba, 1985). In order to enhance the truthfulness of the findings, the research adopted following tactics: (1) consistently applying comparison and theoretical sampling methods then an emerging theory can be credible (Glaser and Strauss, 2017); (2) triangulating different collection methods and data sources (including interviews, archival data from the Internet, and company document) so that the bias from a particular source of data can be negated (Lincoln and Guba, 1985); (3) employing multiple theoretical perspectives (i.e. theory triangulation) (Sinkovics et al., 2008); (4) discussing the findings with research peers; (4) exchanging and communicating with interviewees on the data and interpretations; and (5) refining the theoretical orientation of the research.

External validity refers to the extent to which a study's findings can be applied to other similar settings (Bitsch, 2005; Lincoln and Guba, 1985). A case study research aims to generalise the findings to the emerging theory rather than to statistically generalise its results to a larger population (Yin, 2014). The research used three tactics to improve external validity: (1) providing a detailed description of the cases and their settings as effective ways to facilitate external validity (Bitsch, 2005; Lincoln and Guba, 1985); (2) using a design of multiple case study involving four to ten cases and examining the commonalities and differences that emerged in order to achieve analytical generalisation (Eisenhardt, 1989); (3) employing diverse sampling which can enable the investigator to discover the widest possible information (Bitsch,

2005; Eisenhardt, 1989). In the research, interviewees were chosen from different levels from different sizes of the companies in different industries.

Construct validity is for measures with multiple indicators in a consistent manner (Neuman, 2006). In this research, multiple sources of evidence obtained (e.g., interview details, indication of data collection circumstances, and clarification of data analysis approach) and varying levels of interviewees' seniority complemented each other and served to ensure construct validity.

The data coding and analysis proceeded through two stages. The first stage was to process verbatim transcripts and secondary material and to identify the conceptual themes that emerged. The second stage was to analyse interview transcripts and code for conceptual content around the identified research themes. Data analysis became an iterative process between reviewing theoretical concepts and identifying empirical case material, each informing the other. The data results were then analysed and synthesised into case findings.

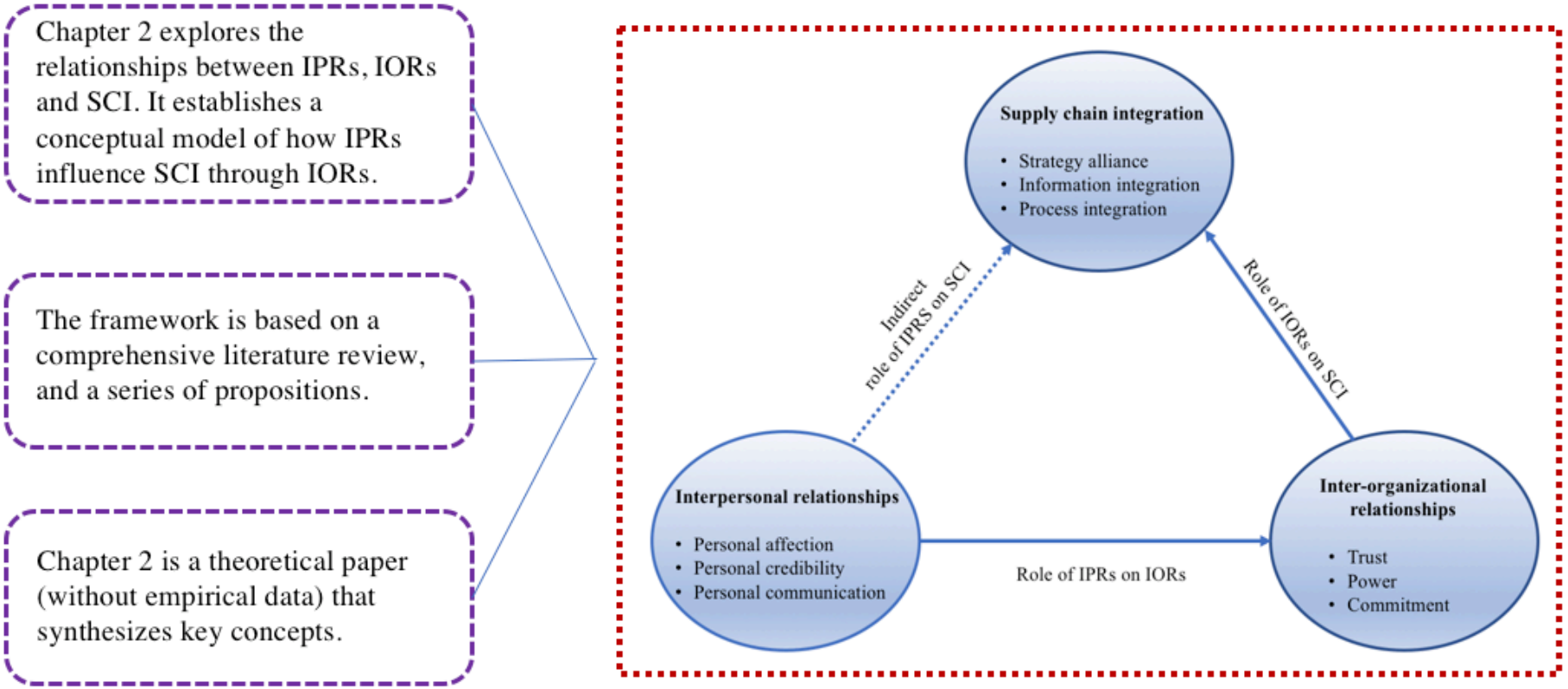
1.4 Structure of the thesis

Following the requirements of "PhD Thesis by publication*" at Massey University, this thesis has been written as papers for peer-reviewed publications. Chapter 2 explores the enablers of SCI from both the perspectives of IPRs and IORs. It clarifies the research objectives of the thesis by exploring the relationships between IPRs, IORs, and SCI. Based on a comprehensive literature review, this paper constructs a conceptual framework by postulating and synthesizing a series of propositions. The model addresses how IPRs maintain and enable SCI in terms of strategic alliance, information integration, and process integration. The paper

* (https://www.massey.ac.nz/massey/fms/Research/Graduate%20Research%20School/Z_New%20PhD%20Forms/PhD%20Thesis%20by%20Publication%20Dec%202015.pdf?8EBB07C2B2D729878262EEB8B01685CD) Massey University, December 2015

suggests that IPRs have positive influences on SCI, mediated by IORs. ***Figure 5*** illustrates the link between the research objectives and corresponding research methods employed.

Figure 5 *Links between Chapter 2 and IPRs-IORs-SCI relationships*



This chapter has been published in a journal and presented at an international conference (as follows).

Wang, B., Childerhouse, P., Kang, Y., Huo, B., and Mathrani, S. (2016). Enablers of supply chain integration: Interpersonal and inter-organizational relationship perspectives. *Industrial Management and Data Systems*. 116(4), 838-855 (Note: it has been cited for 9 times to 1st May 2018)

Wang, B., Mathrani, SK., and Childerhouse, P. (2015). A Framework to Study the Role of Interpersonal Relationships in Supply Chain Integration. *Proceedings of the 9th International Conference on Operations and Supply Chain Management.* Vol. 9, Series of Operations and Supply Chain Management in China (pp. 45 - 52). Ningbo, China on 23-25 July, 2015.

Chapter 3 explores the relationship between IPRs and SCI. This chapter addresses RQ1 by using an exploratory/investigational approach to four case studies in the service sector in New Zealand. Compared with physical supply chains, service supply chains show different characteristics because of specific natures of service. Service may be related to physical products, but service itself is intangible and cannot be stored like physical inventory. Service outcome (e.g. customer satisfaction) is related to customers' emotional experiences and customers' behaviour tendencies (e.g. customers' participation) (Price *et al*., 1995; Zhao *et al*., 2018), so service is hard to be evaluated like physical products. Also, service is designed to meet special customers' needs at a special time to pursuit special goals, so service must get customers' highly involvement although in some circumstances customers may have absence from remote service products (Paluch and Mlut, 2013). Even so, service which works for a customer at a certain time may not work for another customer at same time, or even not works for a same customer at another time. Therefore service has the characteristics of heterogeneity

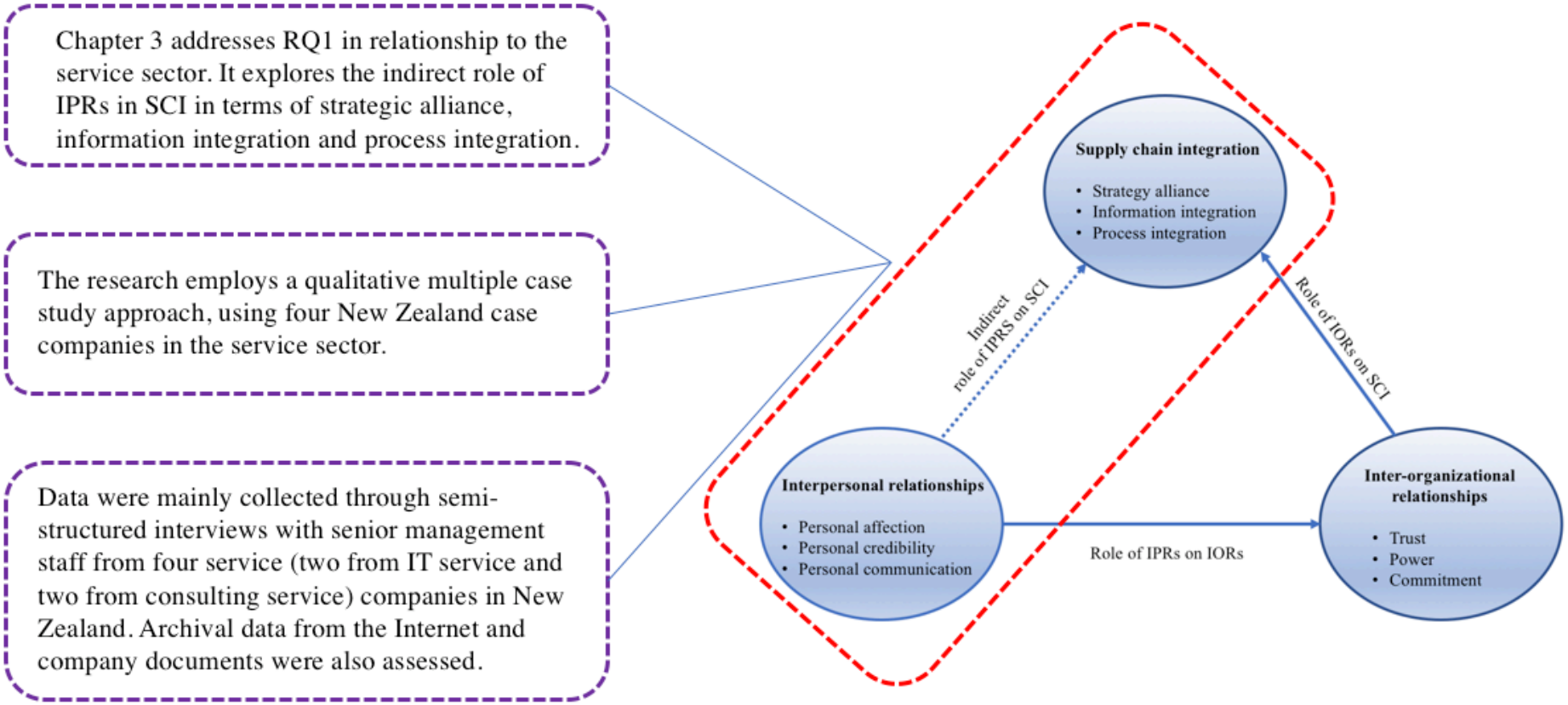
(uniqueness), inseparability, perishability, customer highly involvement, difficulty of evaluation (Aitken *et al*., 2016; Arlbjørn *et al*., 2011; Boon-itt *et al*., 2017; Hemilä and Vilko, 2015).

However, service SCI has similarities with traditional physical SCI. Regarding scope-based integration, service SCI still needs to consider internal integration and external integration with customers and suppliers. In terms of content-based integration, service SCI needs to align strategies among all suppliers and customers, share right information with right tires of supply chain partners, and coordinate processes.

The questions used in the interview protocol were designed based on the literatures review, mainly from Barnes et al. (2015) and proposed research framework. Also, the question setting approaches were referred to other researchers' especially Gligor and Autry (2012) were learnt for reference.

Chapter 3 studies service SCI and finds that the three IPR dimensions influence service SCI in different ways. The effects are indirect: personal affection acts as an initiator, personal credibility serves as a gatekeeper and strengthens the confidence of partners, and personal communication (a facilitator) plays a more important role in service SCI than personal affection and personal credibility. ***Figure 6*** illustrates the link between RQ1 and the corresponding research method and data collection.

Figure 6 *Links between Chapter 3, RQ1, research method, and data*



Chapter 3 has been published in an international peer reviewed journal and presented at two international conferences:

Wang, B., Kang, Y., Childerhouse, P., Huo, B. (2018). "Service Supply Chain Integration: The Role of Interpersonal Relationships". *Industrial Management and Data Systems*. 118(4), pp. 828-849.

Wang, B., Childerhouse, P., Kang, Y. (2016). Role of interpersonal relationships in supply chain integration: Evidence from New Zealand. Presented in *the 14th Australian New Zealand Academy of Management (ANZAM) Operations, Supply Chains and Services Management Symposium*, UTS, Sydney, on 13-15 June 2016

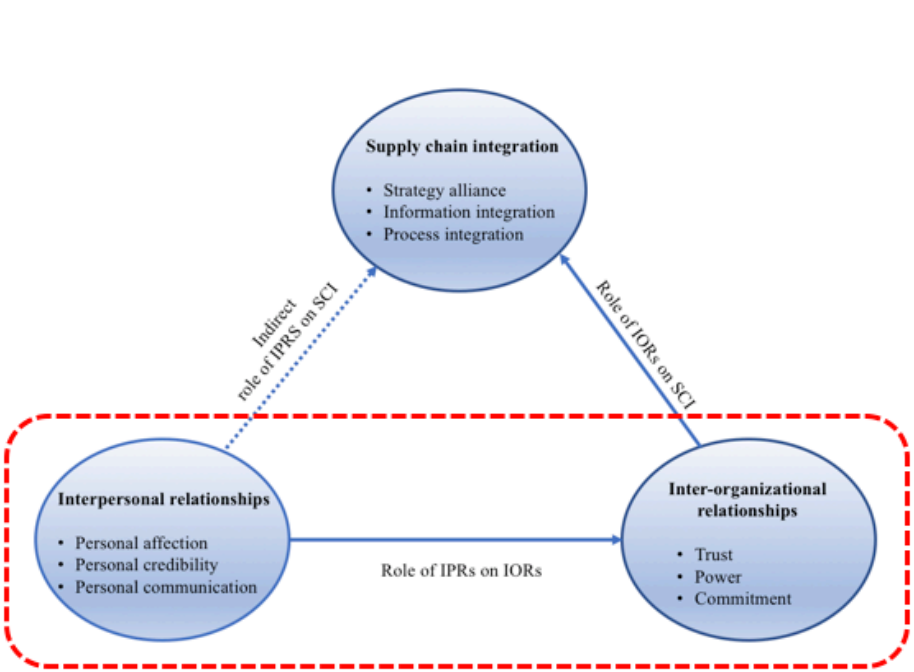
Wang, B., Childerhouse, P., Kang, Y. (2016). The role of interpersonal relationships in supply chain integration; an Internet environment cross-case investigation. Presented in *the 10th International Conference of Operations and Supply Chain Management*, Chongqing, China on 21-23 July 2016.

Chapter 4 addresses RQ2 by examining how IPRs and IORs interact with each other as driving forces of SCI. To clarify the interaction between IPRs level and IORs level, the term of "lower level" is used to refer to individuals level relationships while the term of "higher level" refers to organizational level relationships. IPR activities refer to those activities happened between individual boundary spanners. IPR activities involve searching and selecting the right individuals in the potential suppliers and/or customers. The boundary spanners need to making contact, communicating, interacting, and evaluating before making decisions. Since SCI is the integration between organizations rather than individuals, the only and final goal of IPR activities is to serve, prepare, initiate, and facilitate the IOR activities. On the other hand, IOR activities are related to firm-level collaboration, including understanding and aligning of collaboration strategies, negotiating, signing, and performing contract, sharing

necessary information in order to coordinate collaboration processes. All these IOR activities must be planned, implemented, evaluated and controlled through IPR activities. In short, IPR activities are setting for IOR activities while IOR activities should be underpinned by IPR activities. IPR activities can be regarded as a necessity for IOR activities. So, from the viewpoint of SCI, IOR activities work at higher level compared with IPR activities.

The research employs an exploratory multiple case study approach, selecting four case companies from New Zealand as the empirical basis. The research found that IPRs play a central role in the formative stage of SCI by initiating IORs. Influences from IPR dimensions on IORs tend to have different evolutional paths across the whole SCI process, and to have different magnitudes on IOR dimensions. Influences stemming from personal credibility and personal affection show a decline, while influence from personal communication becomes increasingly important. ***Figure 7*** illustrates the link between RQ2 and the corresponding research method and data collection.

Figure 7 *Links between Chapter 4, RQ2, research method, and data*



Chapter 4 answers RQ2 by exploring the influence of IPRs on IORs during formative and operational stages of SCI.

The research employs a qualitative multiple case study approach with four New Zealand case companies in manufacturing, software, and logistics consulting industry.

Data were mainly collected through semi-structured interviews with management executives from four companies in New Zealand. Archival data from the Internet and company documents were also assessed.

Chapter 4 has been accepted for publication in an international peer reviewed journal and presented at three international conferences:

Wang, B., Kang, Y., Childerhouse, P., Huo, B. "Inter-personal and inter-organizational relationship drivers of supply chain integration" (2018, Accepted). *Industrial Management and Data Systems*.

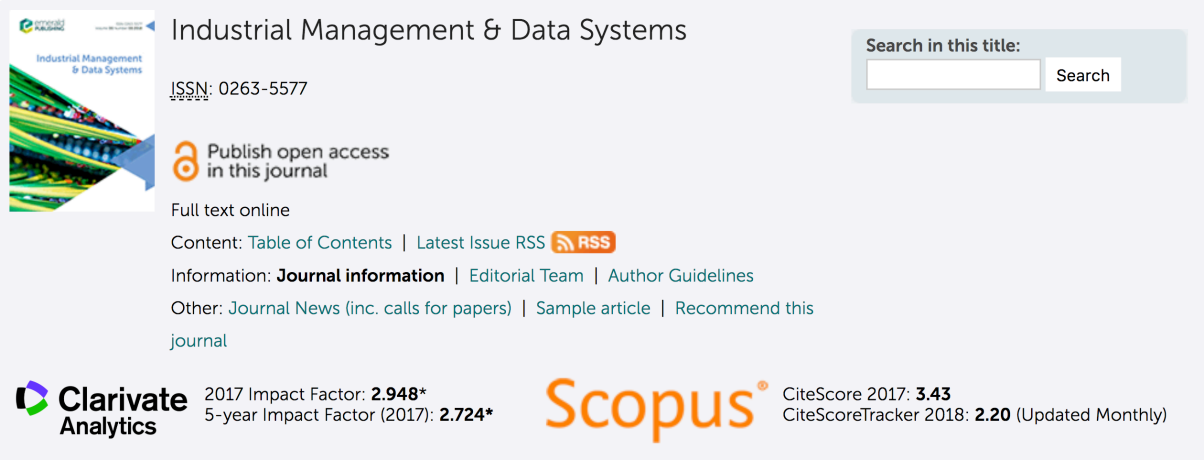
Wang, B., Childerhouse, P., Kang, Y. (2016). Inter-personal and inter-organizational relationships in supply chain integration: Evidence in New Zealand. *Proceedings of Asian Pacific Quality Organization (APQO) conference*. Rotorua, New Zealand. 20-23 November, 2016.

Wang, B. Childerhouse, P., and Kang, Y. (2017). Interaction of inter-personal and inter-organizational relationships in supply chain integration: case studies in New Zealand. *Proceedings of 15th ANZAM Operations, Supply Chain and services Management Symposium*. Queenstown, New Zealand, 12-13 June

Wang, B. Childerhouse, P., and Kang, Y. (2017). Influence of inter-personal and inter-organizational relationships on software supply chain integration: A resource orchestration perspective. *Proceedings of 9th International Conference on Logistics and Transport 2017*. Bangkok, Thailand, 1-4 November.

(Note: *Industrial Management and Data Systems* is an ABS (Association of Business Schools) 2-star ranked journal (a well-regarded journal) (2017 SJR of 0.904, impact factor of 2.948, 5-year impact factor (2017) of 2.724 (See ***Figure 8***))

Figure 8 *Screenshot of Industrial Management and Data Systems*



Chapter 5 synthesizes the purpose, content, and findings of the research and addresses the theoretical and managerial implications. In addition, Chapter 5 discusses the limitations of this research and offers suggestions for future research in this topic.

1.5 Additional associated journal publications

In addition to my PhD project on the role of interpersonal relationships in supply chain integration, my research interests also include supply chain collaboration in food industry and humanitarian sector, as well as supply chain uncertainties and optimisation.

1. Yang, D., Li, X., Jiao, R., **Wang, B**., (2018), "A stochastic programming approach for product configuration optimization problem under uncertainty" (2018), *Decision support systems*. 105: 108-118

This paper is to explore the uncertainties (such as component supplies) in product configuration setting by proposing a new stochastic decision model. It applies two-stage stochastic programming approach, and employs a pre-procuring strategy for component supply to reduce total configuration costs and shorten the delivery data of customized products. It shows the proposed stochastic decision model provides competitive solution results. This research is an output of my international collaboration with Chinese and

American researchers. *Decision support systems* is an ABDC (Australian Business Dean Council) A* ranked journal (2016/2017 SJR: 1.806, impact factor: 3.222.).

2. Adem, S., Childerhouse, P., Egbelakin, T., **Wang, B**. (2018), "International and local NGO supply chain collaboration: an investigation of the Syrian refugee crises in Jordan", *Journal of Humanitarian Logistics and Supply Chain Management*. (forthcoming) https://doi.org/10.1108/JHLSCM-05-2017-0020.

This paper is to identify the key drivers and challenges to supply chain collaboration in the humanitarian sector; to appraise the relationships between international non-governmental organizations (INGOs) and local non-governmental organizations (LNGOs) during disaster relief; and to explore the humanitarian context in regard to supply chain collaboration. It finds that contextual factors, including host governmental policies and the social-economic setting of a disaster directly affect the motivations for supply chain collaboration between LNGOs and INGOs. *Journal of Humanitarian Logistics and Supply Chain Management* is an ABDC (Australian Business Dean Council) C ranked journal (2016 SJR: 0.582).

3. Fu, S., Li, Z., **Wang, B**., Han, Z., Huo, B. (2018), "Collaborative behaviour between companies and contract farmers in Chinese food supply chains: Relational antecedent and consequence", *Industrial Management and Data Systems*. 118 (5) (forthcoming)

This study aims to explore relationships between relationship commitment, cooperative behaviours, and alliance performance in agricultural supply chains. By investigating dyadic relationships between companies and their contract farmers (C+F), this study investigated how relationship commitment influences cooperative behaviours, and

further influences alliance performance in C+F agricultural supply chain in China. *Industrial Management and Data Systems* is an ABS 2-star journal.

1.6 Appendix

Appendix includes (I) Interview protocol, (II-IV) Statements of contribution to doctoral thesis containing publications for three papers (Chapter 2 to 4).

Chapter 2. Enablers of supply chain integration: interpersonal and inter-organizational perspectives

Abstract

Purpose – Previous research on supply chain integration (SCI) enablers has primarily focussed on inter-organizational relationships (IORs), the purpose of this paper is to broaden the discussion to include interpersonal relationships (IPRs).

Design/methodology/approach – Based on a comprehensive literature review, a series of propositions are postulated and synthesized into a conceptual model of how IPRs maintain and enable SCI, which is decomposed into strategic alliance, information integration, and process integration.

Findings – The authors find that IPRs including personal affection, communication, and credibility, have a positive influence on SCI, and these links are mediated by IORs including trust, commitment, and power.

Originality/value – The framework developed in this study provides new insights into the role of interpersonal networks in IORs, which lead to SCI.

Keywords Supply chain integration, Inter-organizational relationship, Interpersonal relationship

Paper type Research paper

2. 1 Introduction

The central task of supply chain management (SCM) is to plan and control business processes from raw material suppliers to the end-customer in order to maximize consumer value (Harrison and van Koek, 2008). For achieving outstanding performance throughout the whole supply chain, SCM needs to manage activities of all supply chain members. Thus, supply chain integration (SCI) is deemed as an effective means (Bowersox *et al*., 2007; Lambert, 2001; Fawcett *et al*., 2007). Effective SCI can create supply chain efficiencies (Ralston *et al*., 2015), enhance the firms' competiveness (Frohlich and Westbrook, 2001), reduce transaction costs (Yeung et al., 2009), and improve both supply chain and firm performance (Cao *et al*., 2015; Danese and Bortolotti, 2014; Mackelprang *et al*., 2014). Traditionally, SCI has been classified into two dimensions including internal integration (II) and external integration (EI), while EI can be further classified into supplier integration (SI) and customer integration (CI) (Cao *et al*., 2015; Huo, 2012; Yeung *et al*., 2009). While this classification has its merits in emphasizing the focus of SCI on both internal and external relationships involved in a supply chain, it suffers from the shortcoming of weakening the systematic perspective of SCI as a whole. To address this shortcoming, this study identifies three dimensions including strategic alliance, information integration, and process integration, to categorize SCI based on supply chain contents. Maintaining relational stability in supply chain strategic alliance is a central task for SCI (Frohlich and Westbrook, 2001; Wu *et al*., 2014). A supply chain consists of information flow, material flow, and decision flow, which are covered by information management, process management, and strategy management, respectively. Therefore, we address SCI through the three dimensions of strategic alliance, information integration, and process integration. The central research question of this study is how SCI is achieved through a combination between its enablers at interpersonal and inter-organizational levels.

Current research on SCI relational enablers has notable weakness, as it is mainly at the macro firm-to-firm level, leaving relationships at a more micro individual level unattended (Gligor and Holcomb, 2013). In fact, SCI is achieved through interactive activities that are planned, implemented, and controlled by individuals especially of the key boundary spanning individuals including purchasing officers, sales representatives, customer service staff, invoice/receipt clerks, and decision makers. Thus, interpersonal relationships (IPRs) referring to the relationship among individuals who are involved in supply chain activities, play a significant role in achieving SCI by maintaining and developing supply chain relationships at the inter-organizational level. The study on IPRs can potentially develop "*a deeper understanding of the behavioural complexities that emerge through the interaction between the buyer and supplier*" (Gligor and Holcomb, 2013, p. 329; Sambasivan *et al*., 2013). Previous studies have explored the management of social networks or people, but are limited to general staff training or awareness of SCM (Fawcett *et al*., 2007). A recent study also highlighted roles and benefits of personal relationships in buyer-supplier interactions (Gligor and Holcomb, 2013). Therefore, our study aims to unpack how IPR influences three SCI dimensions through three core inter-organizational factors including trust, commitment, and power, in order to respond to a recent call for theory building in SCI at the individual level (Gligor and Holcomb, 2013).

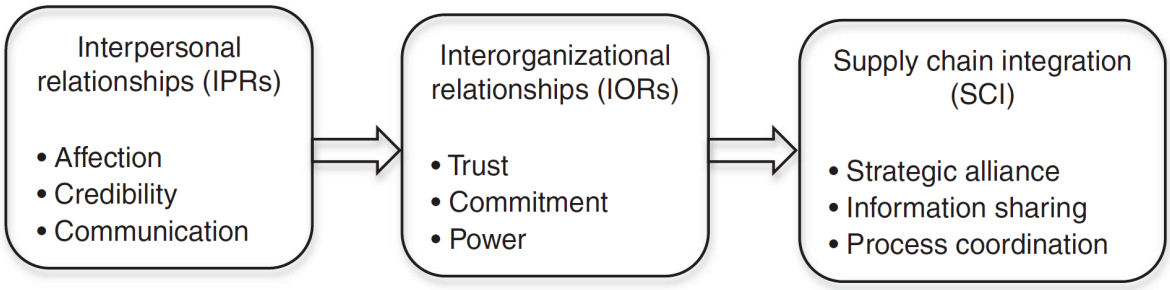
Overlooking relationships at the individual level presents a significant gap in the current research on SCI enablers, because SCI across company boundaries is implemented and achieved through individuals. Drawing from social exchange theory (SET) and resource-based view (RBV), this study intends to address this research gap by proposing a conceptual framework of SCI enablers. This framework extends the current IOR-SCI link through integrating SCI enablers at both IPR and IOR levels and providing new insights about the nature of firm-level IORs through the individual-level IPRs. SET suggests that individuals or

groups interact with others for expectations of a reward (Wu *et al*., 2014). Following SET, SCI is achieved from interactions of social exchange among supply chain players for mutual benefits. While rewards and costs involved in interactions are assessed at the IOR level, these social exchange interactions are performed through individuals at the IPR level. On the other hand, RBV suggests that firms can enjoy competitive advantages by acquiring and leveraging a bundle of valuable resources (Barney *et al*., 2011). Following RBV, SCI provides firms with competitive advantages, and boundary spanners and IPRs involved in supply chain activities represent an important resource possessed by firms. However, IPR resources need to be transformed into IOR capabilities before they can serve as SCI enablers, as capability represents a firm' s ability to deploy its resources for desired outcomes (Helfat and Peteraf, 2003).

This study makes several contributions to the literature and practices. First, extending SCI from the macro organizational level to the micro individual level, this study develops a new SCI conceptual framework by proposing influence of IPRs on SCI through mediators of IORs. Few studies in the literature have examined the role played by IPRs in SCI. This study explores mechanisms through which IPRs influence IORs and SCI, contributing to our understanding on relational enablers of SCI from both the firm and the individual-level relationship management. Second, this study adopts strategic alliance, information integration, and process integration as three new dimensions of SCI, contributing to our understanding of SCI dimensions. Third, this study examines SCI enablers at both organizational and individual levels by identifying three dimensions of IPRs and three dimensions of IORs. Our conceptual framework links IPR dimensions with different IOR dimensions and builds links between IOR dimensions and SCI dimensions (***Figure 9***), contributing to SCI relational enabler research and to the literature on the relationship between different levels of relationship management.

Finally, this study provides insights for managers to develop IORs through building IPRs, in order to achieve SCI.

Figure 9 *Links between IPRs, IORs, and SCI*



The paper is organized as follows. First, a literature review discusses the central concepts of SCI, IPRs, and IORs. Propositions are then postulated to explore the relationship between IPR, the three inter-organizational factors, and three SCI dimensions. Based on the literature review and propositions, a conceptual model is synthesized. Finally, managerial and research implications are presented along with future research imperatives.

2.2 Theoretical foundation and construct development

2.2.1 SCI

Raw material extraction, production, manufacturing and retail facilities are often globally dispersed, modern information and transportation technologies allow for these functions to be linked together in supply chains. SCM strategically manages processes from source to final consumption to create value for final customers (Mentzer *et al*., 2001; Hines, 2004; Harrison and van Koek, 2008). SCI enhances performance (Cao *et al*., 2015) via the reduction of wastes and duplication (Bowersox *et al*., 2007), and effective value chain management with better interface management, trade-offs, and wider-ranging decisions (Childerhouse *et al*., 2011). Firms that integrate their supply chains create value for services and products provided to end-customers as well as benefit the firms in the supply chain network (Wisner *et al*., 2016). SCI

refers to "*the degree to which an organization strategically collaborates with its supply chain partners and manages intra- and inter-organization processes to achieve effective and efficient flows of products, services, information, money and decisions, with the objective of providing maximum value to its customers*" (Zhao et al., 2008, p. 374).

SCI is a long-term strategy for supply chain members, but each member in the supply chain has different priorities because of their organizational goals, competitive policies, business processes, and contingencies within their business environments. From the strategic perspective, to maximize the efficiency of flows, strategic alliance is needed in SCI to share objectives (Cousins, 2005; Harrison and van Koek, 2008). Strategic alliance is defined as a "*purposive relationship*" between a supplier and a buyer that facilitates the exchange, sharing, or co-development of resources or capabilities to achieve mutually benefits (Kale and Singh, 2009). Strategic alliance allows suppliers and customers to focus on their core activities of providing quality products and services (Kannan and Tan, 2004). Supply chain alliance provides involved firms with competitive advantages and "*relational rents*" (Dyer and Singh, 1998), which are resulted from three immediate benefits: securing critical technologies and knowledge, expanding market entry and share, dispersing costs and risks (Auster, 1989). From the operational perspective, SCM mainly concerns the flow of physical goods and related information (Harrison and van Koek, 2008). Following RBV, information and materials can be treated as two main process resources that should be integrated (Wisner *et al*., 2016). Hence, information should be shared within and across supply chain members (Huo *et al*., 2014), and process should be coordinated along the whole supply chain (Zhao *et al*., 2011; Cao *et al*., 2015). Therefore, as indicated by Zhao *et al*. (2011), this study regards strategic alliance, information integration, and process integration as the three main dimensions of SCI.

The three classifications of SCI is different from the traditional popularly used dimensions of SCI including II, SI, and CI (e.g. Flynn *et al*., 2010; Huo, 2012). While the traditional

classification focusses on the scope of SCI, our new classification focusses on the content of SCI. The content-based SCI dimensions are also helpful for us to understand flow management in supply chains with strategic alliance emphasizing strategic decision flows, information integration and process integration emphasizing information and process flows, respectively. While many previous studies examined scope-based SCI dimensions, few studies investigated content-based SCI dimensions. In this study, we adopt this new classification of SCI to improve our understanding of this important concept and its enablers.

Cao *et al*.'s (2015) review of extant SCI literature identifies three main enablers of SCI: environmental factors (e.g. uncertainties of environment, technology, and demand); inter-organizational factors (e.g. trust, power, and commitment); and firm-level factors (e.g. strategy, information technology). Cao *et al*. (2015) further add cultural factors that directly address the influence of people on SCI. The inter-organizational factors, such as trust and commitment, are now explored in further detail as they are often considered as the "*salient features*" and determinant factors for supply chain excellence (Zhao *et al*., 2008; Zhang and Huo, 2013) and the basic foundation of SCM (Chen and Paulraj, 2004).

2.2.2 Theoretical approaches to SCI

SET and RBV have been applied into the SCM area as major theoretical lenses to SCI (Wu *et al*., 2014; Vanpoucke *et al*., 2014). SET provides an explanation on the motivating force for social interactions by suggesting that individuals or groups attempt to interact with others for the expectation of a reward (Wu *et al*., 2014; Yang *et al*., 2008). Attitudes and behaviours of social players toward the particular interaction are determined by the difference between expected rewards and costs associated with the interaction (Wu *et al*., 2014). For example, empirical research has found that SET-based organizational variables, such as trust, commitment, reciprocity, and power, positively influence information sharing and

collaboration, and supply chain performance (Wu *et al*., 2004). Previous research also suggested that SET-based procedural and distributive justice of a supplier' s policies enhance the long-term orientation and relational behaviours of its distributor (Griffith *et al*., 2006). We extend the application of SET to supply chain activities by including factors at the IPR level, based on the understanding that the exchange link between IORs and SCI is actually initiated, monitored, and controlled through interactive activities at the IPR level. Organizational attitudes and behaviours are assessed by boundary spanning individuals. As a result, perceived exchange rewards and costs in supply chain interactions for involved firms are influenced by attitudes and behaviours of IPR individuals. On the other hand, IPRs involved in supply chain interactions are unlikely to influence SCI without the involvement of IORs, as IPRs at the individual level must rely on an organization platform to play a role on SCI. Therefore, based on SET, we suggest that IPRs influence SCI through IORs and that factors drawn from the IOR level mediate the link between IPRs and SCI.

From the RBV perspective, IPRs represent important resources and capabilities possessed by different firms. RBV suggests that a firm can achieve sustainable competitive advantages through possessing and deploying its valuable, rare, inimitable and non-substitutable heterogeneous resources (Vanpoucke *et al*., 2014). According to RBV, key resources required in supply chain activities include tangible assets (e.g. facilities, equipment, human resources, IT systems) and intangible assets (e.g. process, procedures) (Xu *et al*., 2014). Effective SCI provides the firm with competitive advantages, because it leads to operational cost savings, shorter and more predictable lead-times, and increased flexibility through collaboration with supply chain partners. The personnel involved in supply chain activities, together with IPRs they develop, is an important resource for firms. Drawn from RBV, we propose that influence from IPR resources on SCI is more likely through the intermediary of IORs as the firm capability. Although there is a considerable overlap between resources and capabilities, RBV

makes clear distinctions: while a resource represents more tangible factors of a firm, capability represents a firm' s ability to deploy these resources for desired outcomes (Teece, 2007). Built on IPRs, a firm is able to develop its relational capabilities including trust, power, commitment that are developed in supply chain activities over long term. IPRs need to be transformed into IORs before they can help to achieve SCI. As a type of firm resource, IPRs affect SCI mainly through the intermediary of IORs, because IORs, as a firm capability, can deploy firm resources including associated IPRs, to achieve SCI.

2.2.3 IPRs

SCI is enabled through social interaction, mutual adaptation, and relation-specific investments (Wu *et al*., 2004). Therefore, it is important to investigate what factors drive managers and boundary spanners to integrate with supply chain partners (Cao *et al*., 2015). Behaviours of supply chain actors are not limited to economic factors alone, social factors including exchange, obligation, commitment, trust, and belief are also at play (Zhao *et al*., 2008). Personal ties between organizational trading partners can be developed among various involved individuals, such as senior management, sales and procurement managers, system engineers, and purchasing officers.

IPR is not a new term because it has been discussed across a range of industries and cultures. Related terms include: social networks, personal connections, and "*guanxi*" in China, "*wasta*" in Brazil, "*pratik*" in Haiti, "*jeitinho*" in Lebanon, "*pulling strings*" in UK (Smith *et al*., 2012), and "*blat*" in Russia (Michailova and Worm, 2003). According to SET, people are relational beings who depend on properly differentiated personal associations with others (Luo, 2007), although the influence and roles of IPRs play in business relationships may vary in different cultures (Lovett *et al*., 1999). IPRs have been studied extensively in various fields involving social exchange, such as education and learning (Chickering and Reisser, 1993) and

marketing (Gligor and Holcomb, 2013). Macintosh and Lockshin (1997) explore IPRs between retail salespeople and customers and highlight its importance for store loyalty and demonstrate the value of generating and maintaining IPRs as a retail strategy.

IPR has six characteristics: it is usually expressive (emotion based, intrinsic); it is based on voluntary interaction; it is informal; it is motivated by a communal orientation (giving without the expectation of repayment); it develops intimate connections; the parties involved in IPRs are not substitutable (Gligor and Holcomb, 2013). Based on SET, research has identified three IPR dimensions including affection, personal communication, and credibility, that influence interfirm relationships (Barnes *et al*., 2015). Personal affection refers to human feelings, sentiments, and emotion that are able to reflect closeness of the relation between individuals. Personal credibility refers to the degree to gain confidence, reliability, and trust from other individuals over time. Personal communication refers to the individuals' interaction involving information sharing that is able to generate greater familiarity, closeness, and understanding for involved individuals. Among three IPR dimensions, affection is the most basic feeling of individuals and is a more internal-facing attribute, because affection provides the basic motivation for further interaction between social exchange partners, we put it as the first IPR dimension. Credibility is a basic feeling of confidence degree to trust the social exchange partner in business interactions over time. Compared to affection, credibility is more external-facing. Communication is also external-facing and characterized as the interactive feeling and main direct means to interact with business partners. Thus, we put it as the third dimension.

IPR dimensions can influence relations involved in supply chain activities at the organizational level when integrating supply chains. For example, overlap between supply chains in terms of actors, resources, and activists has been highlighted as a major problem in SCM, as it can seriously delay, hinder, and increase costs to the process when changing the

degree of integration in one chain (Hertz, 2006). Efficient and effective personal communication, as a dimension of IPR, is able to play a significant role in solving the IOR problem of overlapping supply chains or at least mitigating incurred costs. Research has also identified shared resources between different firms as another major IOR-level barrier to SCI, because it leads to relationship handling costs and reduced technological flexibility (Childerhouse *et al*., 2011). At a tactical level, problems involved in SCM at the IOR level include opportunistic use of commercially sensitive information, missed opportunity from a superior power position, increased switching costs, and the costs of coordination, compromise, and inflexibility. The emotion- and voluntary-based IPR has the potential to overcome many of these obstacles, because the mutual orientation of IPR is able to minimize risks of opportunism when sharing resources.

2.3 Research propositions

2.3.1 IPRs and SCI

SCI is achieved at the organizational level, but all its three dimensions including strategic alliance, information integration, and process integration, are influenced by IPRs.

First, IPRs can affect strategic alliance significantly. Strategic alliance is divided into three stages of formation and partner selection, alliance governance and design, and post-formation alliance management (Kale and Singh, 2009). All these three stages are reinforced through "*conscious and subconscious behaviours*" between the supplier and the buyer (Kannan and Tan, 2004). IPRs developed in the interaction behaviour can affect strategic alliance at all three stages. Personal affection acts as a bonding agent across three stages. Frequent, accurate, open, and in-time personal communication can shorten the formation and partner selection stage, improve alliance governance efficiency and effectiveness, supplement and modify the post-

alliance management. Personal credibility can enhance partner' s willingness and strengthen confidence to collaborate.

Second, IPRs developed across boundary spanners play an important role in information sharing. Personal affection can lead to the frequent, accurate, in-time, and comprehensive information sharing. Personal credibility can provide the partner with confidence to share right information in the right time. Personal communication directly contributes to information sharing. Personal communication can even give your partner an extra prompt or hint by leaking some important information "*unconsciously*" if good IPRs have developed between transaction partners over time. On the other hand, some important information sharing may be delayed, blurred, or even hidden in massive information in the case that IPRs are not at presence.

Third, IPRs can influence process integration. SET suggests that the attitude and behavior can affect social interaction. Personal affection is formed from the preceding interaction between suppliers and buyers, thus it can demonstrate the potential attitude and following behavior during process integration including customer relationships/services, demand, order fulfilment, production development and commercialization, and manufacturing (Wisner *et al*., 2016). Personal credibility can reflect the attitude and behaviour accumulated from the historical interaction. With the confidence and trust related to good personal credibility, companies can save time and costs when coordinating processes, such as transaction, order, and delivery. Personal communication can exchange right quality, in-time information during process integration. Personal communication can also help to understand partners' working environment, business advantages and disadvantages, resources and capabilities in integrated processes, and to solve disputes and conflicts in the processes.

In summary, IPRs play a significant role in enabling SCI. IPRs, associated with the personnel involving in supply chain activities, are a type of important firm resource. However,

its influence on SCI is more likely to occur through the intermediary of IORs. RBV suggests that a resource can contribute to the firm' s competitive advantages more effectively by converting it into a firm capability so that it can align with the firm's business strategy (Zott, 2002). In the case of SCM, IPRs represent an important resource for the firm, but to act as a SCI enabler, it needs to be incorporated into IORs. Without IORs acting as a platform or intermediary, IPRs can only function at the individual level and are unlikely to influence SCI at the organizational level. Among various IORs, previous literature has identified trust, commitment and power as three major factors of IORs (Zhao *et al*., 2008; Yeung *et al*., 2009; Zhang and Huo, 2013), thus, we propose that these three factors serve as mediators for the link between IPRs and SCI.

2.3.2 The mediating role of trust

As discussed early, IPRs can positively influence SCI. We propose that this impact is mediated by trust between the supplier and the buyer. Trust refers to the extent to which a firm believes its exchange partner is honest and/or-benevolent (Yeung *et al*., 2009). Trust also means that interaction parties expect others not to act opportunistically or violate norms of the relationship (Lyles *et al*., 2008). Trust can be divided into reliability and character-based trust (Bowersox *et al*., 2007). With reliability-based trust, a supplier or a buyer is willing to perform and is capable of performing SCI. Character-based trust is based on the honest culture and philosophy of a supplier or a buyer.

Trust is regarded as a vital ingredient in facilitating supply chain activities (Bachmann, 2001), and is positively related to manufacturer – SI/CI (Zhang and Huo, 2013), because it facilitates all three SCI dimensions of strategic alliance, information integration, and process integration. Trust-building has become a key approach to upholding long-term cooperative relationships in strategic alliance (Zhang and Huo, 2013), because trust can maintain

cooperation and significantly contribute to the long-term stability of a supply chain (Chen and Paulraj, 2004). As strategic alliance is based on joined decisions to achieve agreed goals of aligned companies that share resources, information, profits, knowledge, and risks (Min, 2015), trust is regarded as a fundamental element of the successful "*marriage*" of strategic alliance (Sambasivan *et al*., 2011). Empirical evidence show that trust positively affects information sharing in the supply chain, because trust encourages necessary information sharing and improves information quality (Wu *et al*., 2014). Trust enables process integration between suppliers and buyers, because trust means a willingness to take risk (Mayer *et al*., 1995) and to rely on an exchange partner in whom one has confidence (Kwon and Suh, 2005). In addition, trust can drive coordination and cooperation among trading partners (Swink *et al*., 2007; Zhao *et al*., 2008), because it facilitates the investment of specific assets to achieve expected goals (Ireland and Webb, 2007; Yeung *et al*., 2009).

IPRs can facilitate the development of inter-organizational trust, because IPRs can have a positive influence on a trustee to pay effort to maintain commitment, honesty, and reduce opportunistic behaviours (Cummings and Bromiley, 1996). IPRs are motivated by a communal orientation (giving without the expectation of repayment) (Gligor and Holcomb, 2013), because the development of personal feelings, sentiments, emotion, or affection implies that interactive individuals can confront disasters or share fortunes (Barnes *et al*., 2015), so that personal affection can serve as a foundation for both reliability- and character-based trust. Personal credibility can strengthen the confidence and trust between buyers and suppliers directly. Effective personal contacts are helpful to strengthen inter-organizational communication, because personal communication can clarify shared business tasks, plans, goals, and risks (Krause and Ellram, 1997). Thus, we postulate:

P1a-c. Trust mediates the positive relationship between affection and (a) strategic alliance, (b) information, (c) process integration.

P2a-c. Trust mediates the positive relationship between credibility and (a) strategic alliance, (b) information, (c) process integration.

P3a-c. Trust mediates the positive relationship between communication and (a) strategic alliance, (b) information, (c) process integration.

2.3.3 The mediating role of commitment

We propose that the positive impact of IPRs on SCI is mediated by commitment. Commitment contributes to the continuity and growth of an interfirm relationship (Anderson *et al*., 1994; Hakansson and Snehota, 1995). Interfirm commitment refers to "*the willingness of a party to invest financial, physical or relationship-based resources in a relationship*" (Zhao *et al*., 2008, p. 370). It also means to maintain the relationship and the confidence in the stability of the relationship (Morgan and Hunt, 1994). Brown *et al*. (1995) classify commitment into normative and instrumental commitment. Normative commitment relates to the willingness to secure the supplier buyer relationship based on mutual commitment and sharing (Ellram, 1991), while instrumental commitment is associated with compliance (Brown *et al*., 1995). Instrumental commitment influences a party to favour the other party and hence be more accepting of the influence in a supplier-buyer relationship (Zhao *et al*., 2008). Commitment clearly underscores a dyadic relationship and thus enables SCI. With commitment, supply chain partners are more likely to assist the development of strategic alliance, to share tacit information, and jointly to solve process problems (Zhao *et al*., 2008, 2011). Empirical studies have also confirmed the positive influence of commitment on SCI (Cheng, 2011; Wu *et al*., 2014).

IPRs have a positive impact on commitment. IPRs are intrinsic and emotion based voluntary interactions, motivated by communal orientation, which develops intimate connections (Gligor and Holcomb, 2013). Thus, IPRs can induce, identify, and develop

normative commitment, and enhance instrumental commitment compliance to make joint plans, policies, and strategies with their partners. IPRs have a direct impact on both normative and instrumental commitment. With IPRs, supply chain parties are likely to identify and internalize values of their partners, and also likely to follow compliance requests.

Furthermore, commitment includes attitudinal and behaviour aspects. Attitudinal commitment is affective based, including sentiments of affection, emotional attachment, and social bonding with partners (Sharma *et al*., 2015). Based on inherent human feelings, personal affection concerns the mutual orientation and focusses on intimate connections, thus it can drive both parties to invest resources to align strategies, share information, and coordinate processes, in this way, it can be a base to initiate the formation of interfirm commitment (Wu *et al*., 2014). Personal credibility is related to a person's capability which others can have confidence to rely on. It can accumulate long-term commitment with both willingness and compliance. Personal communication between trading partners can directly express the willingness and design to interfirm commitment through understanding the partner 's strategies, policies, goals, operation processes, benefits, or loss. Therefore, we postulate:

P4a-c. Commitment mediates the positive relationship between affection and (a) strategic alliance, (b) information, (c) process integration.

P5a-c. Commitment mediates the positive relationship between credibility and (a) strategic alliance, (b) information, (c) process integration.

P6a-c. Commitment mediates the positive relationship between communication and (a) strategic alliance, (b) information, (c) process integration.

2.3.4 The mediating role of power

We also propose that the influence of IPRs on SCI is mediated by power between the supplier and the buyer. Power refers to the relative dependence between exchange members and is the capacity of one party to influence decisions and behaviours of partners (Wu *et al*., 2014). Power is based on the control of resources valued or desired by others (Turner, 2005). Overall, power is shifting from upstream to downstream in the supply chain, and a powerful firm plays more important roles than less-powerful firms in SCI (Bowersox *et al*., 2007). Power can be classified into mediated power and no-mediated power (Maloni and Benton, 2000). Mediated power including reward power and coercive power that are exercised through rewards and punishments, respectively. Non-mediated power includes expert, reference, and legitimate power. Expert power is related to knowledge, skills, and expertise through which a firm can use to influence others (Maloni and Benton, 2000). Reference power is related to the value identification between a supplier and a buyer. Legitimate power is related to the natural right a firm used to influence others.

Power is one significant factor to influence SCI (Zhao *et al*., 2008). Power can push both parties to understand each other' s goals and targets, facilitating the formation of strategic alliance. According to power-dependence theory, the power target is dependent on the power source, thus, the power target would share information resources to balance the influence of the power source' s influence. Similarly, power can also push both supply chain partners to develop joint problem-solving routines to coordinate their activities (Zhao *et al*., 2008).

IPRs have a positive influence on the use of inter-organizational power. The frequency, timeliness, accuracy, openness of personal communication can improve the perception of power. Personal credibility and affection can reconcile power to some extent. Emotion and voluntary interaction at the individual level assist the integration of value identification,

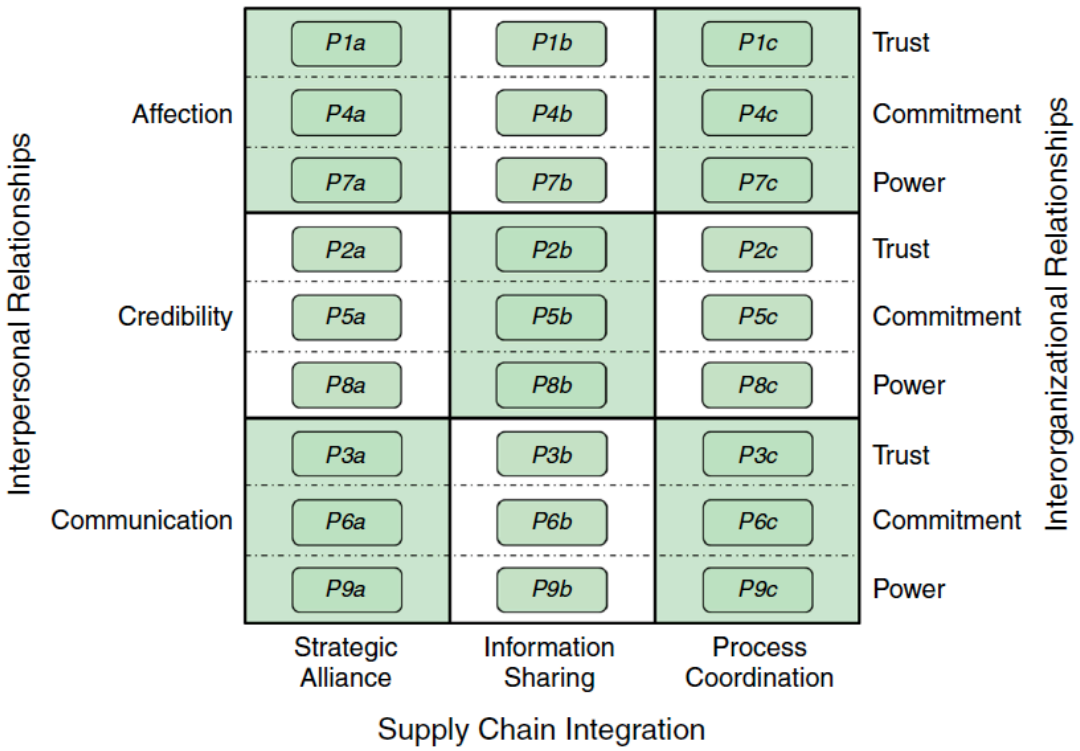
internalization, and understanding of the natural right to influence each other (Gligor and Holcomb, 2013). Because IPRs have a communal orientation motivation (giving without the expectation of the repayment) and intimate connections, IPRs can promote the transfer of knowledge, skills, and expertise between partners. The informal and non-substitutable characteristics of IPRs bring supply chain partners together. Based on links between power and SCI, between IPRs and SCI, and between IPRs and power, power mediates the impact of IPRs on SCI. Therefore, we postulate (Figure 9):

P7a-c. Power mediates the positive relationship between affection and (a) strategic alliance, (b) information, (c) process integration.

P8a-c. Power mediates the positive relationship between credibility and (a) strategic alliance, (b) information, (c) process integration.

P9a-c. Power mediates the positive relationship between communication and (a) strategic alliance, (b) information, (c) process integration.

Figure 10 *The Role of IPRs and IORs on SCI*



2.4 Proposed research methodology

2.4.1 Questionnaire design and measures

We can adopt a three-step approach used by Xu *et al*. (2014) to develop the questionnaire. First, a draft questionnaire based on literature review can be developed to identify valid measures for related constructs. The questionnaire can be revised based on case studies and interviews with managers in companies. Second, ten or more IPR individuals (including five or more from suppliers and five or more from buyers) and five or more academicians can be invited to review the questionnaire. Third, we can conduct pilot tests in selected ten or more companies, followed by in-depth interviews with these IPR individuals to verify the relevanceand clarify of the scales. Finally, the refined questionnaire can be modified and finalized based on their feedbacks. Multi-items of IPR, IOR, and SCI can be used to measure

key constructs in our conceptual model. All indicators can be measured using the seven-point Likert scale which provides more choices for respondents (Huo, 2012).

2.4.2 Sampling and data collection

Our propositions can be transferred to hypotheses before they are tested. We can collect data in representative areas. The questionnaire can be distributed to potential participants (mainly through electronic distribution) in appropriate industry sectors related to SCI. Non-response bias and common method bias can be checked after data are collected. Distributions of sample can be analysed. Items should be purified, and reliability and validity, as two main concerns of the measurement, should be tested. Characteristics of IPRs, IORs, and SCI can be reported based on descriptive statistics. Hypotheses can be tested statistically using regression or structural equation modelling methods.

2.5 Discussion and implications

Based on literature review and our theoretical and practical analyses, we develop a theoretical model to demonstrate the role of IPRs and IORs in facilitating SCI (Figure 2.1). Our model incorporates factors drawn from previous literature, namely, IPRs including personal affection, personal credibility, and personal communication, IORs including trust, commitment, and power, and SCI including strategic alliance, information integration, and process integration. SCI is a complex process and is affected by various factors at both organizational and individual levels. By emphasizing proposed relationships between SCI and its enablers of IPRs and IORs, this model aims to examine how SCI is achieved through interactions between IPRs and IORs. More specifically, our model demonstrates that IPR dimensions including personal affection, personal credibility, and personal communication, have positive impacts on SCI dimensions including strategic alliance, information integration,

and process integration, and that these impacts are activated through mediators of IORs dimensions including trust, commitment, and power.

IPR research within business is not rare, nonetheless, its applications in SCM remain relatively sparse (Gligor and Holcomb, 2013). SCI is typically explored at a macro inter-organizational level, our study focusses on the micro individual level, leading to a deeper understanding of behavioural complexities. Our study sheds new lights on the application of SET and RBV in the SCM area. Our model also extends the application of SET in SCM from the firm level to both firm and individual levels. Traditionally, SET explores attitudes and behaviours and its motions for two partners to exchange relationships in the business interaction. Our study explores the exchange between different-level relationships, i.e. how the IPR level, the IOR level, and the SCI level interact with each other and make exchange. This exchange between three levels gives a new envision and angle to explore SCM.

Our study also extends the application of RBV to SCI research by including IPRs as important SCI enablers and by proposing mediated effects of IOPs on relationships between IPRs and SCI. Following RBV, human resources, together with skills, and relationships associated with them, are regarded as important firm resources. However, the role played by IPRs in enabling SCI has been overlooked to a large extent in previous literature (Gligor and Holcomb, 2013). In addressing this research gap, our study contributes to the literature by identifying three dimensions of personal affection, personal credibility, and personal communication as SCI enablers at the individual level, by providing insights regarding relationships between IPRs at the individual level and IORs at the firm level, and by proposing the joint influence of both IPRs and IORs on SCI. More specifically, our study suggests that IPRs, as an important type of firm resource, are able to positively influence SCI. However, this influence would be more likely to occur through the mediating role of IOR factors, such as trust, commitment, and power, because IPRs, as a type of firm resource, need to embed in IORs

as a type of firm capability to affect the firm strategy like SCI (Zott, 2002). In addition, our study contributes to SCI research by providing new understanding on dimensions of SCI. Traditionally, SCI dimensions are classified mainly based on its scope, our study provides a new SCI classification based on its content (strategic alliance, information integration, and process integration).

A major managerial implication of this study is that companies need to have a better understanding regarding SCI enablers and take a good use of IPRs and IOPs to achieve SCI. By doing so, companies and their supply chain managers should not only invest in organizational-level IORs, but also make effort in the individual-level IPRs to purposely cultivate resources and capabilities for SCI.

2.6 Conclusion, limitations, and future research

This study examines mediating roles of IORs in the impact of IPRs on SCI. Specifically, IPRs (i.e. personal affection, communication, and credibility) have a positive influence on SCI (i.e. strategic alliance, information integration, and process integration), and inter-organizational relationships (i.e. trust, commitment, and power) play mediating roles in the relationships. This study contributes to SCI and relationship management literature and practices.

The main limitation of this study is lack of empirical test. Future research can test constructs and proposed propositions in our conceptual model. Further research can also investigate additional IOR factors that influence SCI, such as organizational and national norms and values (Cao *et al*., 2015). Further research is also required to clearly define IPRs that are difficult to describe because of their social and behavioural characteristics. Finally, impacts of IPRs in different industries, countries, and firm types/sizes are worthy of examination to help us to further understand its roles in SCI.

Chapter 3. Service Supply Chain Integration: The Role of Interpersonal Relationships

Abstract

Purpose – The purpose of this paper is to explore the role of interpersonal relationships (IPRs) in service supply chain integration (SSCI) in terms of strategic alliances, information integration, and process integration.

Methodology/approach – The research employs an exploratory/investigational approach to multiple case studies and empirically investigates effects of IPRs in SSCI. The data were mainly collected through semi-structured interviews with senior management staff from four service companies and their suppliers or customers in New Zealand. Archival data from the Internet and company documents were also applied.

Findings – The authors find that three IPR dimensions influence SSCI in different ways. The effect of IPRs on SSCI are indirect: personal affection acts as an initiator, and personal credibility serves as a "gatekeeper" and strengthens the confidence of interactive partners, while personal communication, a facilitator, plays a more important role in SSCI than personal affection and credibility.

Practical implications – The research provides managers in service supply chains the awareness of the importance of IPRs, as well as the characteristics of IPRs, in order to best utilize available resources. Managers should synergize all three dimensions of IPRs' resources: make efforts to cultivate personal affection to avoid the instinctive isolation modern technology brings;

attempt to accumulate positive personal credibility profiles; focus more on the role of personal communication and retain physical contact in SSCI processes.

Originality/value – This study contributes to SSCI literature by extending from the inter-organizational relationships (IORs) to interpersonal level relationships to explore the inner influence mechanism. Also, it explores the role of IPRs on all three dimensions of SSCI simultaneously rather than individual dimensions independently. Finally, it contributes to resource orchestration theory (ROT) by synthesizing three dimensions of IPRs resources, and IORs resources in order to achieve capabilities of SSCI. The study develops the individual-level research in supply chain integration (SCI) to a further depth.

Originality/value – We contribute to the SSCI literature by extending it from inter-organizational relationships (IORs) to IPRs to explore the inner influence mechanism. We also explore the effects of IPRs on all three dimensions of SSCI simultaneously, rather than independently exploring the individual dimensions. Finally, we contribute to resource orchestration theory (ROT) by synthesizing three dimensions of IPRs resources and IORs resources to achieve SSCI capabilities. Overall, we further develop the individual-level supply chain integration research.

Keywords Service supply chain, Interpersonal relationship, Supply chain integration, Resource orchestration theory, Case study

Paper type Research paper

3.1 Introduction

With the increasing importance of the service sector in the world economy (World Bank, 2015), service supply chain management (SSCM) research has gradually gained significance. However, the main body of the SCM literature still focuses on the manufacturing sector (Boon-itt *et al*., 2017; Uusipaavalniemi and Juga, 2008). Compared to physical products from the traditional manufacturing sector, service products exhibit unique characteristics that can be summarized as "IHIPCD": intangibility, heterogeneity, inseparability, and perishability (Hemilä and Vilko, 2015); customer participation (Aitken *et al*., 2016); and difficulty of quality dimension evaluation (Arlbjørn *et al*., 2011). These special attributes should be considered when applying product-centric SCM practices to customer-oriented SSCM.

Supply chain integration (SCI) is regarded as an efficient and effective approach to improving the performance of supply chains (Huo, 2012). However, there are some significant gaps in the research on SCI in the service sector. First, this stream of research is highly limited, with only some conceptual definitions and/or comparisons with SCI in the manufacturing sector available (Aitken *et al*., 2016; Boon-itt *et al*., 2017; Selviaridis and Norrman, 2014). Second, SCI research tends to overlook the influences of individual behavior and interpersonal relationships (IPRs). This is a noticeable weakness of the SCI research, especially in the service setting, as one of the main differences between services and manufacturing is that services require close person-to-person contact between service providers and customers. Moreover, a service supply chain (SSC) is a supply chain *for* service rather than a supply chain *of* service (Maull *et al*., 2012). Human behavior is not purely rational, as people care about and are influenced by their relationships with others (Cai *et al*., 2017; Gligor and Autry, 2012; Schorsch *et al*., 2017). Third, SCI research tends to focus on the individual SCI dimensions, rather than addressing all SCI dimensions as a whole. For example, Uusipaavalniemi and Juga

(2008) examined the information integration level in maintenance services in SSCM by answering questions regarding which information, which form of information, and how and when information should be shared between supply partners. Lillrank *et al*. (2011) explored SSCM processes and suggested decomposing processes into service events. Boon-itt *et al*. (2017) developed and validated measurement scales for SSCM process capability constructs. However, to achieve superior performance, firms must achieve SCI by synthesizing all three SCI dimensions: strategic alliances, information integration, and process integration (Liu *et al*., 2016; Wang *et al*., 2016; Zhao *et al*., 2011).

To address the research gaps identified above, we aim to examine the influence of IPRs in facilitating the achievement of SCI in all three SCI dimensions, with the service sector as the research setting. To do so, we address two research questions:

RQ1. What roles do the three IPR dimensions of personal affection, personal credibility, and personal communication play in the service supply chain integration (SSCI) process?

RQ2. How do the IPRs identified influence SSCI along its three dimensions (i.e., strategic alliances, information integration, and process integration)?

Research has conceptualized the three IPR dimensions in terms of their influences on inter-organizational relationships (IORs) (Barnes *et al*., 2015; Wang *et al*., 2016). We apply this IPR conceptualization to examine the mechanisms through which different IPR dimensions influence SCI in the service sector. We develop several research propositions based on the empirical findings generated from four case companies in New Zealand's service sector.

Using resource orchestration theory (ROT) as a theoretical lens, we seek to gain a better understanding of the roles of IPRs in achieving SSCI. ROT suggests that the firm can structure and bundle all of the available resources in its disposal to build competitive capabilities and to

leverage those capabilities to achieve superior performance (Sirmon *et al*., 2007; Sirmon *et al*., 2011), instead of focusing on individual resources or simply combining them (Liu *et al*., 2016). From an SCM perspective, individual IPR factors can be regarded as firm resources, as they are valuable, rare, inimitable, and non-substitutable (Barney, 1991). In the SSCM literature, only limited attention has been paid to the orchestration and synergy of these resources in SSCI (Liu *et al*., 2016). Thus, there is a need to empirically examine how firms can interrelate their IPR resources between suppliers and customers to achieve superior SSCI.

We contribute to the SSCI literature in several ways. First, we extend the SSCI research from the firm level to the individual level by examining the influence of IPRs between suppliers and customers on achieving SSCI. This has not yet received any research attention. Second, by combining ROT and the IPR conceptualization, we define IPRs (i.e., personal affection, personal credibility, and personal communication) as individual-level firm resources. We further highlight the role of these specific firm resources in building SCI as a firm capability for gaining competitive advantage. Third, following ROT, we address SSCI along three dimensions and reveal the different roles of individual IPR dimensions in facilitating SSCI. The propositions developed in our study of case-based empirical findings facilitate theory building in an important area concerning how people's behavior and relationships shape SCM.

This paper is organized as follows. Section 2 provides a theoretical foundation by reviewing the relevant literature. Section 3 outlines the research method. Section 4 presents and discusses the empirical results and develops the research propositions. Section 5 concludes with implications for theory and practice.

3.2 Theoretical background

3.2.1 Service supply chain integration (SSCI)

The primary task of SCM is to manage resource flows from the original suppliers to the end customers, making SCI important in SCM (Hitt *et al*., 2016). SCI refers to the development of strategic intrafirm and interfirm collaborations along the entire supply chain (Liu *et al*., 2016). Complete SCI must focus more on its contents and achieve strategic alliances, information integration, and process integration corresponding to strategic, information, and process flow, respectively (Zhao *et al*., 2011). Strategic alliances are characterized by conjoined thinking and decision making (Pagell, 2004) and by synchronized planning (Liu *et al*., 2016) focused on long-term symbiotic effects (Prajogo and Olhager, 2012). They offer fast and flexible means of achieving market access, scale economies, and competence development (Larsson *et al*., 1998) and capture cross-business synergies to secure competitive advantages via collaboration (Narasimhan and Nair, 2005). Information integration refers to the sharing of key information in the course of supply chain processes to achieve real-time transmission and processing of information vital for supply chain decision making (Prajogo and Olhager, 2012). Process integration refers to the extent to which supply chain partners streamline and facilitate supply chain processes (Liu *et al*., 2016).

The above research outputs for general SCI can be applied to the SSC, but their characteristics must be considered. SSCM is analogous to traditional physical products related to SCM, but focused more on services (Hemilä and Vilko, 2015). Baltacioglu *et al*. (2007, p. 112) defined SSCM as "*the management of information, processes, resources and service performance from the earliest supplier to the ultimate customer*." SSCM differs from product-centric SCM mainly due to the special nature of services. The most often quoted characteristics are summarized as IHIPCD:

- Intangibility. The service itself is intangible (Boon-itt *et al*., 2017; Hemilä and Vilko, 2015), although many service processes may be viewed as tangible in terms of their outputs (e.g., repairing a car).

- Heterogeneity. As services are tailored to unique customer requirements in a changing business environment, it is difficult to automate them (Boon-itt *et al*., 2017; Hemilä and Vilko, 2015).

- Inseparability/Simultaneity. Services are provided and consumed simultaneously (Boon-itt *et al*., 2017; Hemilä and Vilko, 2015).

- Perishability. Services are often perishable due to the difficulty of reselling, storing, and transporting them as a result of their time-sensitive nature (Boon-itt *et al*., 2017; Hemilä and Vilko, 2015).

- Customer participation. Due to customer duality, customers are both the service input providers and service output consumers (Aitken *et al*., 2016).

- Difficulty of quality dimension evaluation due to the above service natures (Arlbjørn *et al*., 2011).

As SCI explores firm-level integration, it involves the integration of all partners across the supply chain (Stevens and Johnson, 2016). In practice, integrating the entire supply chain is difficult and rare (Childerhouse *et al*., 2011). Thus, many studies have only focused on part of integration, such as supplier integration (Petersen *et al*., 2005; Zhang *et al*., 2016) or customer integration (Lai *et al*., 2014). However, SSCI has very special characteristics entailing bi-directional input flows (Selviaridis and Norrman, 2014) due to customer duality (Aitken *et al.*, 2016). Thus, the customer plays several roles, namely as the service co-designer, co-producer, co-deliverer, and quality monitor (Sampson and Spring, 2102). Furthermore, the trend of

reducing the number of tier-one suppliers and establishing longer-term contracts with a selected group of supply partners decreases SSC complexity (Bask *et al*., 2010). The IHIPCD nature of services also makes the SSCI process more dynamic and sophisticated (Boon-itt *et al*., 2017). As a result, dyadic service provider-customer relationships become more common and significant. As SSCI can be achieved through different types of relationships with customers and suppliers (Arlbjørn *et al*., 2011), we also focus on dyadic relationships. Given the central role of the customer side in SSCs, we focus on the individual level rather than the predominant organizational perspective (Maull *et al*., 2012).

3.2.2 Interpersonal relationships (IPRs)

SSCI has primarily been examined at the organizational level (Stevens and Johnson, 2016), with various studies empirically examining the influence of a range of organizational factors, such as trust, power, leadership, communication, reciprocity, and commitment (Cao *et al*., 2015; Huo, 2012). However, SSCI practices are planned, implemented, controlled, and evaluated by individuals, especially those with key boundary-spanning responsibilities, such as service managers, service provider officers, service consultants, project managers, invoice and receipt clerks, and relationship managers. The alignment, connection, and coordination of these individuals between service suppliers and customers are emphasized in SCI (Stevens and Johnson, 2016), highlighting the importance of IPRs in SCI. Thus, SCI is regarded as state of the art in this field (Pagell, 2004), such that it is vital to developing and maintaining superior IPRs in SSCI.

Research has conceptualized IPRs as a three-dimensional construct consisting of personal affection, personal credibility, and personal communication (Barnes *et al*., 2015). Personal affection, an internal and relational aspect of IPRs, is a reflection of an individual's feelings and sentiments and is related to enduring and emotional commitments to other individuals (Lee

and Dawes, 2005). With personal affection, individuals in a business interaction can have mutually empathetic understandings of and affection for each other, providing the flexibility needed to handle changing circumstances and to create strong bonds (Leung *et al*., 2005). Thus, personal affection can affect the attitude and behavior of boundary-spanning individuals, consequently being conducive to the progression of a more comprehensive strategic alliance, greater information integration, and profound process integration, especially during the formative stage of SCI. Pulles and Hartman (2017) addressed the central role of personal affection and argued that likeability influenced interpersonal interaction outcomes in SCI and significantly influenced willingness to engage in strategic collaboration.

Personal credibility is also an intrinsic element of IPRs, but contains further meaningful information. Personal credibility is the trust and confidence an individual can inspire in a business over time, based on strong performance and achievement records, responsibility, and loyalty to the business (Barnes *et al*., 2015; Wang *et al*., 2016). Building personal credibility is a long and gradual process. As trust can be based on character and reliability (Bowersox *et al*., 2010), so can personal credibility. Character-based personal credibility involves the perception that the boundary spanners are socially similar to themselves (Gulati, 1995). Reliability-based personal credibility is based on an individual's actual behaviour and performance. It stems from perceptions that an individual considers his/her action's impact on others. Therefore, it can give confidence to the counter-partner's representatives, who then become open to investing time and effort into preparing for the alignment of strategies in both firms, to sharing if not volunteering information, and to coordinating the formative process. Personal credibility can generate strong desire to continue a relationship (Luo, 2007). As personal credibility is based more on facts and data, it is more objective than personal affection, which is subjective, hard to pin down, and based on heuristics and instincts (Diener *et al*., 2003).

Personal communication is the main vehicle of exchanging information and ideas with business partners to achieve familiarity and mutual understanding (Pearce and Robinson, 2000). Compared to personal affection and personal credibility, personal communication has more of the external attribute of IPRs (Wang *et al*., 2016). Personal communication enhances the feeling that promises and obligations can be fulfilled as agreed, thus achieving harmony in IPRs and inter-organizational relationships (Ring and Van de Ven, 1994). The richness of communication increases when it is more open and personal, resulting in the enhancement of IORs (Cousins *et al*., 2006). A higher level of personal communication leads to the greater longevity of IORs (Barnes *et al*., 2015), as personal communication can encourage business partners to understand the intentions, plans, and strategies of other business partners, to share the right process information, and to facilitate the process by reducing risks and conflicts.

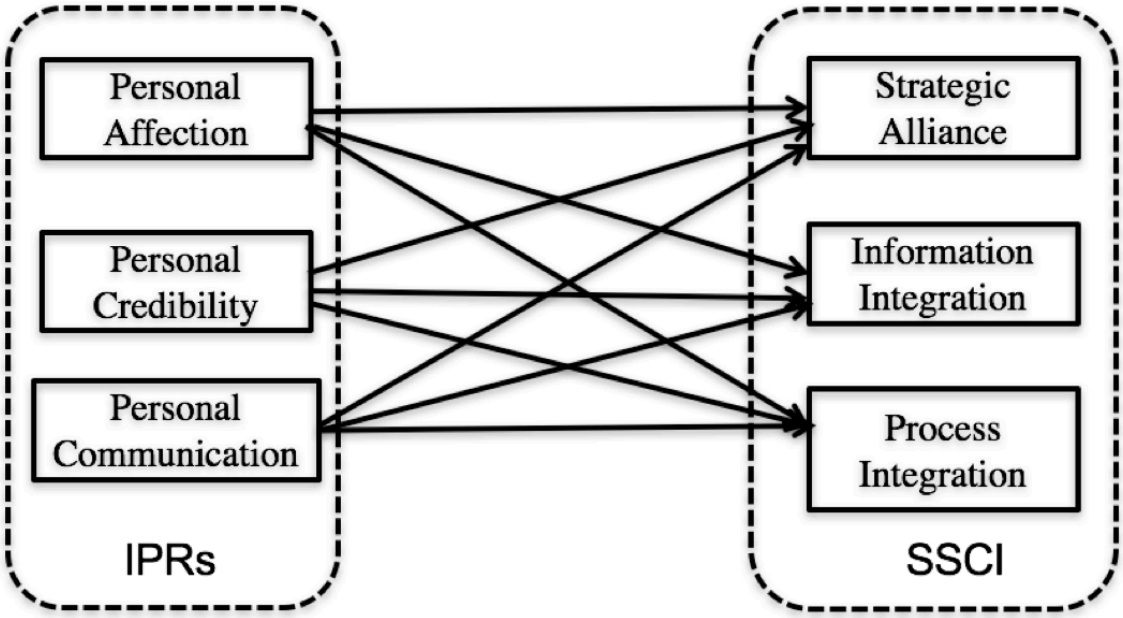
3.2.3 Resource orchestration theory (ROT)

We now draw upon ROT to provide a theoretical lens for our research. ROT is an extension of the resource-based view, according to which valuable, rare, inimitable, and non-substitutable assets and possessions can be regarded as strategic resources (Barney, 1991). Heterogeneously distributed "sticky" resources can "be stuck with" other resources and capabilities in companies, creating a competitive advantage (Teece *et al*., 1997). These resources can be tangible (e.g., equipment and employees) or intangible (e.g., services and knowledge; Liu *et al*., 2016). IPRs (i.e., intangible relationships between service suppliers and customers on a personal level) are more valuable than other types of resources, as they are more difficult to obtain and are more inimitable than other physically tangible resources. IPRs are also a dynamic type of resource, as they are assembled in different time horizons (Ketchen *et al*., 2014).

However, possession of abundant resources alone does not "*indicate how resources can be deployed to generate synergistic effects*" (Liu *et al*., 2016, p. 14). ROT states that a

company's resources must be structured and bundled to build capabilities and then leveraged to achieve superior performance (Sirmon *et al*., 2007; Sirmon *et al*., 2011), rather than merely combined (Liu *et al*., 2016). Determining how to manage resources to make full use of their potential is even more important than determining which resources a company possesses (Ketchen *et al*., 2014). More importantly, the fit or alignment of interdependent resources should be considered (Liu *et al*., 2016). ROT is particularly useful for understanding the fit and deployment of resources and capabilities, such as IPRs, IORs, and SSCI. Due to the supplier-customer boundary, individuals have dual identities at both the personal and firm levels and the relationships and resources between them are more complex. Thus, we focus on how to leverage and orchestrate all of these resources in the forms of IORs and IPRs to achieve SCI at the organizational level. We develop our research framework (Figure 10) based on the above literature review.

Figure 11 *Conceptual model of IPRs and SSCI*



3.3 Research method

The choice of research method should flow from the nature and content of the phenomenon to be examined (Gligor and Holcomb, 2013). We aim to examine the roles of different dimensions of IPRs in influencing SCI in the service industry. To explore how SCI at the organizational level is facilitated by IPRs at the individual level, we adopt a qualitative research method using multiple case studies.

We adopt this research approach for two reasons. First, the literature on supply chain relationships is rather rich for firm-to-firm relationships. However, only a few studies have focused on the individual-level relationships that interfirm relationships subsume (Gligor and Autry, 2012; Wieland *et al*., 2016). Thus, a qualitative approach is recommended to facilitate theory building by generating an in-depth understanding of the people dimension of SCM, which is the most underrepresented topic in the discipline of SCM research (Schorsch *et al*., 2017). Second, managerial decisions in supply chain relationships are made by individual managers and thus the human relationships and behavioral components of SCM play at least equally important roles in SCM as organizational processes, technologies, and measurement systems (Huo *et al*., 2015; Sweeney, 2013). Managers, as humans, do not always act purely rationally, as they tend to be influenced by their interpersonal relationships and cultural backgrounds (Loch and Wu, 2008). Thus, adopting a qualitative research method also responds to the call for increased use of grounded theory in the SCM discipline when studying phenomena with complex behavioral dimensions that exhibit a high degree of dynamism and complexity (Gligor and Holcomb, 2013).

3.3.1 Case selection

Our multiple case study design was developed according to the literature on the case study method. Replication logic underlies the use of the multiple case study method. Under this

methodological logic, multiple cases are selected either to predict similar case results and thereby strengthen the emerging theory (i.e., literal replication) or to generate contrasting results and thereby extend it (i.e., theoretical replication) (Yin, 2014). Four cases are considered to offer a good empirical base for replication and extension of the emergent theory (i.e. analytic replication) (Eisenhardt, 1989). With fewer than 4 cases, it is often difficult to produce convincing empirical findings, and generate robust theory; having too many cases makes it difficult to manage data complexity and volume and considerably challenges the detailed reporting of empirical findings (Eisenhardt, 1989), thereby weakening the case study method itself (Cavanagh and Freeman, 2012).

This study's case selection procedure was theory based and conceptually focused, making our case selection purposive and theoretically directed (Patton, 2015; Strauss and Corbin, 1998). The case companies were selected in a specific locale according to a perceived, but reasonable initial set of dimensions developed in advance, including industry, size, time span, and business experience in terms of supply chain activities. Three case selection criteria were identified: (1) industrial setting in the service sector, (2) a minimum 5-year period of business operations to ensure substantial involvement in supply chain activities, and (3) selected case companies should be different in size to control for the contextual effects on company size. Four companies were selected from the IT and consultancy service industries (two from each industry). Table 2 summarizes the major characteristics of the case companies.

Table 2 *Case company profiles*

	IT-A	**IT-B**	**CS-A**	**CS-B**
Year of inception	1995	2010	1998	1959
Number of employees	380	11	8	600
Industry	IT service	IT service	Consulting service in logistics	Consulting service in engineering and environmental industry
Industry position	Market leader	Niche	Niche	Market leader
Main business activities	Developing and distributing IT software solutions in financial and accounting services	Developing and providing IT software solutions in human resource management services	Providing consulting service in logistics and supply chain management	Providing consulting service in large development projects in Malaysia, the Philippines, and Australia

Profiles of each case company are provided below.

Since being established in Wellington in 1995, IT-A has relied heavily on its supplier, USM, and has closely integrated with it to develop and distribute Web-based IT solutions, software products, and associated consulting services. IT-A also works on USM projects. It is regarded as a gold member in USM's global partner network. IT-A is among the longest and largest dedicated providers of Microsoft-based solutions in the southern hemisphere, with its Microsoft-related activity accounting for approximately 90% of its sales revenue.

IT-B has developed a range of innovative workforce management systems since 2010. As a software developer, IT-B specializes in providing solutions for time and attendance, employee and team scheduling, and payroll needs in addition to mobile solutions. IT-B specializes in cloud-based time and attendance data management systems and operates in a business area with leading edge technological innovation. It has only 11 employees, but thanks to its successful integration with its customers and customer network, IT-B has attracted more than 100 organizational customers in Australia and New Zealand.

CS-A, formed in 1998, provides specialized consultancy services in logistics and supply chain management, especially in fourth-party logistics (4PL) services. It has built a good

reputation in business areas, such as developing and implementing value chain strategies, restructuring, reengineering, launching new ventures, improved planning, and measuring and monitoring supply chain performance. With eight employees, CS-A provides consulting services to a range of clients from the industrial sectors of logistics, manufacturing, retailing, and education and in public sectors in countries such as New Zealand, Australia, Singapore, India, and Brazil.

CS-B, formed in 1959, is an engineering and environmental consultancy firm. As a market leader in the consultancy industry in New Zealand, it provides consulting services on large developmental projects, such as dam construction, energy plants, and infrastructure developments, to clients from countries in the Asia-Pacific region such as Malaysia, the Philippines, and Australia.

3.3.2 Data collection

We collected data for this study mainly from interviews (including face-to-face and Skype interviews) and archival data from the Internet and company documents. We conducted in-depth interviews with managerial executives who were directly involved in the processes of buying and selling logistics services. The research context of this study was SSC relationships. In SSCs, due to the IHIPCD nature of services and customer duality (Aitken *et al*., 2016), the dyadic service provider-customer relationships are extremely significant. Following prior research (Fugate *et al*., 2006; Gligor and Holcomb, 2013), we used the dyadic relationship as the unit of analysis. The research aim was to facilitate theory building regarding the roles IPRs in the supply chain structure played to facilitate SCI at the organizational level. To gain a dyadic perspective on the relationship, it was important to include managers from the other end of the focal firms' supply chain activities either on the supplier or customer side. Thus, a modified snowball technique was used to elicit dyadic relationships. More specifically, at the end of the interviews with the managerial executives from the case companies, the respondents

were asked to facilitate contact with the managers in their supply chain partner firms with whom they described having personal relationships. The interviewees were then selected from these managers, thereby constructing the supply chain dyads. As shown in Table 3, this iterative process resulted in 20 interviewees from the four case companies.

Table 3 *Interview data sources*

Case company	Interviewee from the dyadic relation	Interviewee position
IT-A	Managerial executives from the case firm	Executive General Manager
		Solutions Manager
		R&D Manager
		CRM Manager
	Boundary spanners from supply chain partners	Global Partner Manager
		Technology Support Manager
IT-B	Managerial executives from the case firm	General Manager
		Cloud Manager
	Boundary spanners from supply chain partners	HR Manager
		HR Team Leader
CS-A	Managerial executives from the case firm	Director, Owner
		General Manager
		Senior Consultant
	Boundary spanners from supply chain partners	SCM Manager
		Warehouse Manager
CS-B	Managerial executives from the case firm	General Manager
		Project Manager
		Service Manager
	Boundary spanners from supply chain partners	Project Manager
		Associate Project Manager

We validated the results by performing validity and reliability tests. In terms of construct validity, we used multiple sources of evidence (i.e., interviews and archival data) and multiple levels of interviewees to complement each other. Internal validity was enhanced according to the following suggestions (Merriam, 1998): (1) triangulating to confirm the emerging findings; (2) discussing the findings with research peers; (3) exchanging and communicating with the interviewees about the data and interpretations; and (4) refining the theoretical orientation of

the study. Comparing across four case studies increases the external validity to examine commonalities and differences. Reliability is less applicable to qualitative research (Merriam, 1998) but still have ways to control such as using case study protocol to guide field research and analysis, and developing case study database. The measures that were used to ensure the validity and reliability of the research are summarized in Table 4 (Gibbert *et al.*, 2008; Yin, 2014).

Table 4 *Validity and reliability tests*

Validity and reliability criteria	Case study tactics
Construct validity	Multiple sources of evidence were applied to triangulate the data (e.g., face-to-face and/or Skype interviews, information from the Internet, and company documents) (Section 3.3.2) A chain of evidence was established (e.g., interview details, indication of data collection circumstances, and clarification of data analysis approach) (Sections 3.3.2 and 3.4.1) The draft report was reviewed by three researchers (Section 3.3.2)
Internal validity	The case study was guided by a clear research framework (Figure 3.1) Pattern matching logic was applied to compare the empirically identified patterns to the predicated patterns (Section 3.4.1)
External validity	Rationale for the case selection (Section 3.3.1) Details of the case study context (Section 3.3.1) The case study was guided by resource orchestration theory (Section 3.2.3)
Reliability	The interviews were guided by a semi-structured protocol We developed a case study database, including interview transcripts, summaries, data coding, and company documents (Sections 3.3.2 and 3.3.3)

3.3.4 Data analysis

Content analysis was adopted to analyze the case data, using the approach suggested by Miles and Huberman (2013). The case data were first reduced by writing a summary immediately after each interview to capture the researchers' observations and key information

related to the research subjects. The first two authors coded the data. First, they jointly developed the coding scheme and used it to analyze one case. Then, they divided up the coding work for the remaining three cases, with one author coding the data while the other acted as the auditor. Using an open coding approach, the interview transcripts were coded to establish thematic codes. Similar codes were then grouped into research themes that reflected the theoretical discussion and key factors of the conceptual framework. Where the codes were different, the two authors reviewed the specific sections to determine what caused the discrepancies and to reach a consensus. Afterwards, they reread each interview transcript several times, using axial and selective coding to categorize the incidents, events, and ideas of the four case companies and to discern the similarities and differences in the thematic codes assigned to them. Both authors then crosschecked the resulting categories by exchanging their respective work. Any disagreements were resolved through discussion.

Table 5 provides an example of the coding structure. Constantly and systematically moving the data and theory and using data displays in the form of tables allowed for the identification of causal links between the concepts examined in the study. Research propositions were developed that were then verified by going back to the transcripts and the literature. Figure 10 is the result of repeatedly iterating between data and theory and represents an empirically grounded framework for the role of IPRs in facilitating SCI in the service sector setting.

Table 5 *Three dimensions of IPRs*

Personal affection	"In the early days of (a market), no one wanted to touch it because it was all new and no one really understood what it was...but it's getting a bit more successful now since our people contacted them and gradually won their trust." (CS-B)
	"We typically collaborate better with parties we have some liking of." (IT-A) "Like and dislike can be changed as the business goes on. For example, the more you communicate, the more you know each other." (IT-B)
	"Of course, you like to discuss business more and are happier with those you like." (CS-A)
	"Only when one has a good impression of another, do both really get on well." (CS-A)
Personal credibility	"As a consultancy, our people and their experience are important. They are key to winning projects. Their important advantages are their track record, experience, and reputation for quality." "(Personal credibility) helps in building a team and working with various people, ranging from our customers to those from other cultures." "Very close relationship, yep, yep. We don't have signed agreements with them, we wouldn't expect them to, and they, you know, they wouldn't expect us to go anywhere else and we wouldn't expect them to go anywhere else...It's all based on a long-term relationship, trust between our people and their people." (CS-B)
	"Good personal credibility means the quality of trustworthiness. For example, if you always keep your promise, I will trust you. Then, I would like to discuss business." (IT-B) "More information will be forthcoming if a partner is seen as credible and capable of a long-term relationship." (IT-A)
	"As we are so busy, we need to study personal credibility to see if we should do business." (CS-A) "We will work more readily with people we find personally credible to find solutions. Supplier-customer process integration is an example of needing to work together to find solutions." (CS-A)
Personal communication	"Our regional director would spend a week there every 2 months…We also just set up the office… (to establish) a physical presence there as opposed to having a fly-in-fly-out presence…It was a defensive move to the competitors and we figured it was about time we showed a bit more commitment." (IT-A)
	"We tend to treat information through e-mail as supplementary to our contracts. Compared to frosty e-mails, hearing voices during telephone calls makes us feel the friendship and a kind of obligation to make commitments. Thus, you react faster to solve problems." (IT-B)

3.4 Analysis and discussion

3.4.1 Case findings

The logic of analytic induction was followed and the cases were analyzed individually in an incremental manner. Due to the space limitation, we report only the final version of the analysis. The research findings regarding the relationships between the core factors are presented following a cross-case analysis.

3.4.1.1 Supply chain integration in the service sector

In all four cases, the companies focused on the three content components for SCI achievement. All of the case companies had achieved SCI to different extents as measured along the three component dimensions, as shown in Table 6.

Strategic alliances

Evidence of the importance of strategic alliances was present in all four cases. IT-A has built a long-term strategic alliance with USM as its key supplier and important customer. As a local New Zealand high-tech company, its business operations have almost exclusively focused on providing IT solutions and associated consulting services built on technological platforms provided by USM. IT-A's direct link with USM's headquarters in the U.S. along with the IT platforms and associated technologies provided by USM are its most valuable advantages over its market competitors in the Australasian region. Benefitting from this advantage, IT-A had managed to maintain an annual growth of approximately 25% over the 5 years preceding the interview, with USM-related business sales accounting for approximately 90% of its overall revenue. One respondent made the following comment:

> *Our alliance with USM has been highly important in helping our company keep its edge over competitors and keep it at the forefront of developments in USM's thinking. This is highly important in the context of technology affected by ongoing innovations.*

Alliance partnerships played a similar role for the two consultancy companies, CS-A and CS-B, but the nature of their supply chain alliances demonstrated different features. First, with alliances built on the customer side of the supply chain, rather than mainly on the supply side, these two case companies did not demonstrate much supply input from external supply chain partners. Second, by providing long-term consultancy services to clients, the two consultancy

cases formed strategic alliances with a number of clients in relatively fixed business relationships.

Information and process integration

The case study data support the notion that both information and process integration are important content components of SCI and that both are actually the result of strategic alliances between supply chain partners. In each of the four cases, we found the degree of information integration and process integration between supply chain partners to be highly related to the strength of their strategic alliances. Close alliances require and enable firms to maintain a high degree of information and process integration with their supply chain partners.

Both IT cases had managed to achieve a high degree of information and process integration with their supply chain partners in the IT industry, and their IT capabilities facilitated this integration. USM is IT-A's key supply chain partner on both the supply and customer sides of its supply chain activities. Armed with a rather strong ability to modify and develop high-tech IT software solutions, IT-A also engages in business activities providing IT services to its key supplier, USM, making its U.S. headquarters IT-A's customer. This reverse supply chain relationship has not only expanded IT-A's businesses, but more importantly has helped streamline its supply chain processes at the functional level and has thus strengthened its supply chain relationship with its key supply partner, USM. This is illustrated by the following quote:

> *Now we do the majority of their keynote demonstrations at their large conferences. For example, we have prepared the keynote and 47 other demonstrations at a 1-week long conference last year. Thus, we worked with people from multiple business units within the American division, those we've done work for over the years.*

IT-B also demonstrated a high level of information and process integration with its client

companies. Web-based IT media have greatly facilitated seamless information flow between IT-B as an online service provider and its customers. This has made information generation and analysis the core of IT-B's service products. Information from customers regarding specific requirements on HRM services flow from customers to IT-B. A respondent from IT-B made the following comment:

> *Information generation and information sharing with our customers are at the core of our business services. The latest IT platforms, such as cloud-based databases and Chrome-based systems, not only enable us to share information with customers, but, more importantly, they are the business formula we rely on to start business in the first place and also to compete in the industry.*

Table 6 *Service supply chain integration between supply chain partners*

SCI Component	**IT-A**		**IT-B**		**CS-A**		**CS-B**	
	Level	Feature	Level	Feature	Level	Feature	level	feature
Strategic alliance	High	With a single core supply chain partner	High	With a big number of clients	Moderate	With a few key clients	Moderate	With several key clients
Information integration	High	High frequent information flow achieved by posting two staff members in the core supply chain partner.	High	Seamless information flow achieved through automatic web-based IT media, but limited in the area of HRM functions.	High	In time information exchange via telephone, e-mail, online chatting apps, and face-to-face discussion, mainly in the 4PL area.	Moderate	Scheduled information exchange through meetings, supplemented by e-mails, mail, and calls, in large development projects (e.g., dam construction and wind farms).
Process integration	High	Business integration with the core supply chain partner not only at the headquarters, but also with its relevant functional departments.	High	Customized online software solutions to coordinate the HRM functions of client organizations.	Moderate	Coordinate whole customized service solution processes from design and testing to implementation, on a weekly basis throughout the project.	Moderate	Coordinate through subsidiary companies partly owned by local people to secure contracts with local governments.

3.4.1.2 Influence of interpersonal relationships on service supply chain integration

Research on IPRs has suggested that they positively affect SCIs (Barnes *et al*., 2015; Gligor and Holcomb, 2013). The data from the four cases provide empirical evidence supporting this suggestion. As reported earlier, all of the case companies have achieved SCI, although to different extents. As shown in Table 7, 8, 9, the case findings clearly demonstrate the significant effect of IPRs between key personnel and relevant individuals from their partner companies on SCI.

Table 7 *Levels of IPR influence on SCI*

Company	SCI	IPRs		
		Personal affection	Personal credibility	Personal communication
IT-A	Strategic alliance	M	H	M
	Information integration	L	M	H
	Process integration	M	M	M
IT-B	Strategic alliance	M	L	H
	Information integration	N	L	H
	Process integration	L	L	H
CS-A	Strategic alliance	M	M	H
	Information integration	L	M	M
	Process integration	L	M	M
ICS-B	Strategic alliance	L	H	H
	Information integration	L	M	M
	Process integration	L	M	M

(Note: N=No influence, L=Low level, M=Moderate level, H=High level)

Table 8 *Summary of the influence of IPRs on SCI*

SCI	IPRs		
	Personal affection	Personal credibility	Personal communication
Strategic alliance	3M+L	2H+L+M	3H+M
Information Integration	3L+N	3M+L	2H+2M
Process Integration	3L+M	3M+L	2H+2M

Table 9 *Numeral summary of the influence of IPRs on SCI*

SCI	IPRs		
	Personal affection	Personal credibility	Personal communication
Strategic alliance	14	18	22
Information Integration	6	14	20
Process Integration	10	14	20

(Note: N=0, L=2, M=4, H=6)

The role of interpersonal relationships in facilitating supply chain integration

The personal connections developed between one of IT-A's board directors and key personnel from USM played a central role in its establishment as a company. One of the respondents made the following comment:

> *The personal connections of our directors with USM have been the main basis of the business.*
>
> *We started off as a small business through personal associations between our Director of Strategy and Innovation with some key figures from USM. Over time, it has expanded into a leading software business in the Australasian region.*

The data also demonstrate that interpersonal relationships are highly useful for developing client bases in the consultancy case companies. As a small consultancy firm, CS-A has neither the time nor budget to invest in marketing. As such, it has relied heavily on its personal connections to build and maintain its clientele. New Zealand's small economy provides a unique business background for such high reliance on personal connections for business development. In such an environment, it is easier to get to know someone through personal connections. The managing director and marketing manager of SC-A made the following statements, respectively:

> *All we have is the managerial expertise of our people and the personal connections developed by our people with potential clients. All of our current customers are introduced by our friends or friends' friends. It is very common and important for us to develop in New Zealand's market. It is a very small world and its culture is a little special compared to big markets, such as those in Europe and the U.S. (Managing Director)*

> *Through previously established personal relationships, we approach our potential customers and they come to know our products and services. Then, we can learn the customers' needs in terms of their logistics services and provide our customized consultancy services. (Marketing and Customer Manager)*

A cross-case analysis generated an interesting finding regarding the differences in the influence of IPRs on SCI between the IT and consultancy industries. The IT case companies tended to commit their personnel to the development of IPRs throughout the process of supply chain activities with key people from their supply chain partners. However, for the consultancy case companies, IPRs played a more important role in the initial stage of SCI. This role gradually faded during the business process. A respondent from CS-B made the following comment:

Personal connections can only go so far. Afterwards, the quality of our services and advice do the job.

Of course, we will regularly and personally keep in touch with them to understand customers' new requirements, but the more important thing is our managerial expertise and the quality of our services.

Different roles of individual interpersonal relationship dimensions

The findings reported above are based on the role played by IPRs as a whole in facilitating SCI. We also determined the different roles of individual IPR dimensions in influencing SCI, as demonstrated in Table 6a.

The personal affection developed between key figures seems to play an important role in initiating a strategic alliance between two supply chain partner firms. A marketing and consumer manager from IT-B stated, *"Many of our long-term customers started from personal talking and good feelings. This is especially true for our small companies*." For information sharing, personal affection fell short, "*Personal affection is not significant, but it facilitates the discussion about what information will be shared*" (CS-A respondent). Another CS-A respondent disagreed that personal affection played a significant role in information sharing and simply said, "*Not really*." The empirical evidence from the case companies indicates that personal affection is "*just a kind of dialogue initiator*" in terms of information exchange between supply chain partners. Personal affection fared a little better in terms of process integration: "*Process integration implies more ongoing personal interactions*" (IT-B respondent).

Personal credibility was perceived as more important than personal affection in terms of information sharing. The findings from the case companies also demonstrate the importance of

personal communication. Compared to personal affection and personal credibility, personal communication is the more external attribute. Personal communication is the main approach to exchanging opinions and sharing information in direct interactions with business partners. In this way, personal communication can help in understanding business partners' intentions, plans, and strategies, in obtaining the right process information, and in facilitating the SCI process by reducing risks and solving conflicts.

The evidence from the case interviews indicates that personal communication is the most powerful of the three IPR dimensions studied in influencing SCI, as all of the supply chain activities across firm boundaries are eventually communicated between involved individuals. As shown by the IT case companies, communication is more efficient and convenient with the help of web-based communication tools, such as Skype and e-mail. However, our informants emphasized that traditional face-to-face contact was still more effective and preferred in many situations.

3.4.2 Discussion and research propositions

Our data analysis clearly demonstrates that IPRs can influence SSCI, although the influence is more likely to be indirect, as IPRs must work through IORs (Wang *et al*., 2016). From the perspective of resource orchestration, the boundary spanners between service providers and customers inherently possess both IOR resources and IPR resources due to their dual identification as both individuals and companies. Furthermore, the three sub-resources of IPRs (i.e., personal affection, personal credibility, and personal communication) are inherently related and cannot be separated (Barnes *et al*., 2015). To achieve superior performance, IOR and IPR resources and inner IPR resources must be structured, bundled, and leveraged (Sirmon *et al*., 2007; Sirmon *et al*., 2011), rather than merely combined (Liu *et al*., 2016) or even separated or ignored.

SSCI starts with strategic alliances characterized by conjoined thinking and decision making and by synchronized planning between a supplier and its customer (Liu *et al*., 2016; Pagell, 2004). However, strategic alliances start from the interactions of relevant boundary individuals (Prajogo and Olhager, 2012). At the very beginning of SSCI, personal affection is the only direct available resource, although it is intangible. It can subtly affect one's willingness and attitude (Leung *et al*., 2005) related to starting or furthering develop interactions with a counterpart's representative, especially in the service sector due to high costumer involvement (Aitken *et al*., 2016). This subjective feeling may be related to one's background, culture, and even hobbies. For example, a CS-B respondent addressed the significance of the Malaysian dam project to local employees. Meanwhile, SSCI processes are highly unpredictable and risky (Selviaridis and Norrman, 2014) and are more dynamic and sophisticated (Boon-itt *et al*., 2017). Personal affection can provide the flexibility to manage SSCI by creating strong ties between the personnel of a supply chain partner (Leung *et al*., 2005). Thus, the SSC can respond quickly to adapt to changing situations. In terms of information integration, personal affection, with its implication of inner, enduring, and emotional commitment to others (Lee and Dawes, 2005), can further influence the content, frequency, and accuracy of information sharing, and knowledge transfer and exchange, service co-design, production, delivery, and evaluation during the integration process. However, the influence of personal affection on SCI dimensions is limited and a little different. Personal affection can significantly influence one's willingness to collaborate and engage in strategic alliances (Pulles and Hartman, 2017), but there is a long way from willingness to practice, as both service providers and customers essentially align their strategies based on organizational benefit. Its influences on information and process integration are more limited, as information integration and process integration are overall organizational IOR interactions. Personal affection can thus have more of an influence on

strategic alliances than on information integration and process integration in coordination with IOR resources. Based on the above discussion, we make the following proposition.

P1. Personal affection influences SSCI as an initiator.

Personal credibility, a sub-resource of IPRs, can also be orchestrated with IOR resources in SSCI. Personal credibility refers to a person's trustworthiness in a business (Barnes *et al*., 2015). It can be intrinsically character based (i.e., related to willingness and capability) and reliability based (i.e., related to actual behavior and performance). In SSCM, service standardization is not easy and service providers cannot easily predict the pattern of demand for a particular period or specific item (Boon-itt *et al*., 2017). Thus, only individuals from service suppliers with strong willingness, professional skills, and knowledge like to develop the requisite service systems. As a result, character-based personal credibility is the fundamental requirement of SSCI. Meanwhile, it is highly unpredictable and risky to develop service products or systems in a highly uncertain service sector (Aitken *et al*., 2016; Selviaridis and Norrman, 2014), so only reliability-based personal credibility can instill strong confidence in customers that service providers can deliver the services they need. Therefore, without higher levels of personal credibility, the representatives of business partners would have difficulty developing trust with confidence (Luo, 2007) during the SCI process. Thus, personal credibility influences SCIs in two ways: good historical credibility resources in the service industry can open the door to further interactions, whereas inferior credibility resources can hinder SSCI. Compared to personal affection, personal credibility can have a greater influence on SCI. In terms of strategic alliances, personal credibility not only includes willingness for and belief in integration, but also more important capability from historical records to convince the counterparty to align their strategies. However, the influence on information and process integration is still limited, as information and process integration are dynamic and must be instantly implemented and controlled. Therefore, we make the following proposition.

P2. Personal credibility influences SSCI as a gatekeeper.

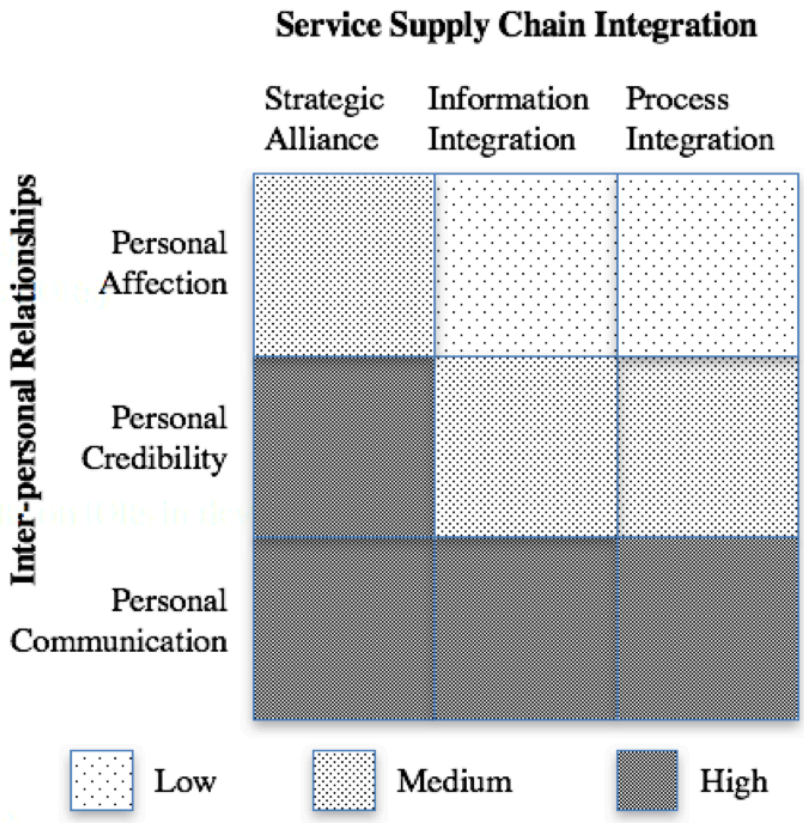
SSCM is based on customer duality (Aitken *et al*., 2016). The customer works as the service co-designer and co-producer and as the consumer of service outputs (Boon-itt *et al*., 2017). Thus, communication between service providers and customers in SSCM is more important than in product SCM. Inter-organizational communication can promote strategic collaboration between firms (Paulraj *et al*., 2008). As supplier-customer boundary individuals have dual identities at both the personal and firm levels, open and frequent personal communication can lead to familiarity, mutual understanding (Pearce and Robinson, 2000), and harmony (Ring and Van de Ven, 1994) between individuals and firms. Thus, personal communication, as a tool resource, can exchange IOR resources between service providers and customers during the integration process (Pearce and Robinson, 2000). In an unpredictable, highly risky, competitive, and costly environment (Aitken *et al*., 2016; Selviaridis and Norrman, 2014), personal communication can align strategies between service suppliers and customers in marketing, product and service development, and delivery. In terms of information integration, personal communication can exchange suppliers' capability, customers' requirements, and service solutions' proceedings. Regarding process integration, personal communication allows for tracking the process, discussing questions, adjusting development schedules, and solving problems. Compared to formal, bureaucratic, complex, time consuming, and working-time-constrained organizational communication (Ashcraft, 2006; Diesner *et al*., 2005), personal communication can more efficiently and effectively facilitate SSCI, as it is more flexible, direct, and simple without strict time constraints. Personal communication plays a more significant role in facilitating SSCI than personal affection and personal credibility.

In the SSCI context, the three IPR dimensions are inherently integrated. Personal affection provides a base for one to develop an interest in assessing personal credibility and to encourage personal communication. Personal credibility may modify personal affection with more

historical information and provide a substantial foundation for encouraging or hindering further personal communication. The personal affection resource is more internal and subjective. The personal credibility resource is more static and historic. Personal communication, a dynamic resource, is more active and can affect the extents of the roles that personal affection and personal credibility play in the SSCI process. Specifically, personal communication can modify, supplement, and even change the influence of personal affection and personal credibility. Thus, we make the following proposition.

P3. Personal communication influences SSCI as a facilitator; it plays a more significant role in facilitating SSCI than personal affection and personal credibility (Figure 11).

Figure 12 *Influence of IPRs on SSCI*



3.5 Conclusions and implications

We set out to investigate the role of IPRs in SSCI by examining four cases in the service sector in New Zealand. We highlight how the IPRs of boundary spanners between service provider companies and customers, in the service sector, influence SCI, although through IORs. IPRs can facilitate the formation of strategic alliances between service providers and customers, information integration, and process integration during SSCI. Furthermore, three dimensions of IPRs influence SCI differently: personal affection acts as an initiator in SSCI, personal credibility serves as a gatekeeper and strengthens the confidence of interactive partners, and personal communication (i.e., a facilitator in SCI) plays a more important role in SCI than personal affection and personal credibility.

3.5.1 Theoretical and practical implications

We contribute to the literature in two ways. First, research on SCI in the service sector is highly limited, as most research has focused on the SCM context to study conceptual definitions and to compare and contrast the service and manufacturing supply chains to transfer SCM from the manufacturing to service sector (Aitken *et al*., 2016; Boon-itt *et al*., 2017; Selviaridis and Norrman, 2014). Meanwhile, most of the SSCI literature has explored certain separate SCI contents only. Some studies have focused on information integration level in maintenance services in SSCM (Uusipaavalniemi and Juga, 2008), whereas others have explored SSCM processes (Boon-itt *et al*., 2017; Lillrank *et al*., 2011). To achieve superior performance, firms must achieve SCI by synthesizing all three main SCI dimensions, namely strategic alliances, information integration, and process integration (Liu *et al*., 2016; Wang *et al*., 2016; Zhao *et al*., 2011). In addition, most research has overlooked the role of IPRs, noticeably weakening the research on SCI (Gligor and Holcomb, 2013), especially in the service sector, which is highly related to people. We regard SSCI as a system for

simultaneously studying strategic alliances, information integration, and process integration. We extend the study of SCI from physical supply chains to service supply chains, from the firm level to the individual level, to explore the inner motivation and driver. Due to the IHIPCD characteristics of services (Hemila and Vilko, 2015), customer duality (Aitken *et al*., 2016), and dynamic and sophisticated service sectors (Boon-itt *et al*., 2017), service chains focus more on direct dyadic suppliers and customer connections. Furthermore, IPRs play more significant roles in facilitating strategic alliances, information integration, and process integration. We also compare the different influences of the three IPR dimensions on SSCI, which complements the SCI literature.

Second, we apply ROT to the SCI literature on a deep individual level. Most researchers have applied the resource-based view to study the resources a firm can use rather than how to deploy available resources to generate synergistic effects (Liu *et al*., 2016). We explore the characteristics of the IPR and IOR resources embedded in SSCs. We find that the sub-resources of personal affection, personal credibility, and personal communication are inherently related, but can be orchestrated purposely. Therefore, all of these resources can be structured, bundled, and leveraged (Sirmon *et al*., 2007; Sirmon *et al*., 2011) to achieve superior performance in SSCI.

We also provide guidelines for SSC managers to devise and apply IPR practices to improve SCI with their customers and/or service providers. As it is the supply chain for service, not of service (Maull *et al*., 2012), we suggest that managers recognize the significance and characteristics of IPRs in SSCs rather than rely on service contents only. Due to customer duality in SSCs (Aitken *et al*., 2016), service provider managers pay more attention to direct dyadic relationships with customers. Moreover, managers should understand the interactions and orchestration of all available resources to make full use of resources. For example, managers must provide regular training to their staff in both necessary expertise and customer

service knowledge and skills. More effort and time should be invested into developing and nurturing customer relationships. Boundary spanners should be encouraged to develop and maintain healthy IPRs with customers, rather than simply focusing on aggregate organizational-level relationships. Also, managers should encourage more physical contact rather than only online contact with suppliers or customers. This should cultivate personal affection and avoid the isolation effect of modern information and communication technologies and applications. Due to the gatekeeper role of personal credibility, managers should purposely select staff with good character-based personal credibility, train staff to improve their reliability-based personal credibility through successful work experiences, and carefully prepare and cumulate positive personal credibility profiles online. Considering the critical role of personal communication in SCI, personal communication skills should be cultivated through training to maintain frequent, direct, close personal communication during the SCI management process.

3.5.2 Limitations and future research

Although this study makes significant theoretical and practical contributions, it has limitations that must be addressed in future studies. First, we used the exploratory case study approach and collected data from four SSCs in New Zealand. This does not comprehensively reflect the role of IPRs in SSCI in New Zealand or even other parts of the world. Furthermore, the service sector has its special characteristics and background and cannot reflect the overall SCI situation. In addition, the analysis was mainly based on qualitative data. The complex relationship between IPRs and SSCI requires large-scale surveys to quantify the research results.

Second, IPRs indirectly influence IOR-mediated SSCI (Wang *et al*., 2016). Therefore, the interaction between IPRs and IORs in SSCI requires investigation. ROT studies breadth (across

firm scope), depth (across firm levels), and life cycle (at various stages of firm maturity; Sirmon *et al*., 2011). Thus, it is necessary to explore the interactions between the two-level relationships across the scope and levels of the supply chain during both the formative and operational stages of SCI. Future studies may apply ROT to quantitatively examine the model in more general companies in a variety of industries.

Chapter 4. Inter-personal and inter-organizational relationship drivers of supply chain integration

Abstract

Purpose – This study aims to examine how interpersonal relationships (IPRs) and inter-organizational relationships (IORs) interact with each other as driving forces of supply chain integration (SCI). More specifically, (the) three dimensions of IPR – personal affection, personal credibility, and personal communication – are examined in regards to how they affect inter-organizational relationships during supply chain integration.

Methodology/approach – The research employed an exploratory multiple case study approach with four New Zealand case companies selected as the empirical basis. Data were collected through semi-structured interviews of managerial executives in relation to supply chain activities, which were triangulated with company archival data.

Findings – We found that IPRs are able to interact with IORs to influence the integration of supply chains. More specifically, IPRs influence IORs by initiating organizational relationships in the SCI context; and influences from IPR dimensions on IORs tend to be of differing magnitudes and have different evolutional paths across the whole SCI process.

Originality/value – This research contributes to knowledge about the roles and mechanisms through which IPRs shape and enable inter-organizational level relationships within SCI context.

Paper type – Research paper

Keywords – Interpersonal relationships, inter-organizational relationships, supply chain integration, case study

4.1 Introduction

Market competition has long since evolved from competition between individual companies to competition between supply chains (Tan, 2001). Integration of these supply chains (SCs) is a means of enhancing efficiency and effectiveness, resulting in improvements in competitiveness and performance (Flynn *et al*., 2010; Gimenez *et al*., 2012; Leuschner *et al*., 2013). Supply chain integration (SCI) refers to the collaboration and coordination between suppliers and buyers along an extended supply network (Cao *et al*., 2015; Liu *et al*., 2016). While most extant research on SCI has extensively examined various factors of inter-organizational relationships (IORs) from an *organizational* level, influences from *individual* behaviour and interpersonal relationships (IPRs) (Huo *et al*., 2015) have been overlooked, resulting in a research gap in the SC literature involving the role of IPRs (Gligor and Holcomb, 2013).

Since SCI is integration between companies in terms of strategic alliances, information integration, and process integration (Flynn *et al*., 2010; Liu *et al*., 2016; Zhao *et al*., 2011), it is logical to study how SCI is influenced by IOR factors including trust, leadership, power, commitment, justice, culture, and communication (Braunscheidel *et al*., 2010; Cao *et al*., 2015; Griffith *et al*., 2006; Huo *et al*., 2017; Kwon and Suh, 2005; Mentzer *et al*., 2001; Prajogo and Olhager, 2012; Zhang and Huo, 2013; Zhao *et al*., 2008). However, SCI is planned, executed, and controlled by people (Cao *et al*., 2015). Individuals do not act purely rationally, since they care about other people, and are influenced by their relationships with others and their cultural background (Cai *et al*., 2017; Schorsch *et al*., 2017; Sweeney, 2013). Therefore, it is necessary to study the link between IORs and IPRs in order to achieve a comprehensive understanding of SCI for three reasons:

- Firstly, it is the inner, radical, and inherent IPRs that underpin and motivate the outer IORs, and it is the IPRs that may be converted into IORs in order to enable SCI.
- Secondly, IPRs may initiate the formation of IORs. For example, likeability based on personal affection may influence the outcomes of interpersonal interaction and significantly influence willingness to engage in strategic SCI (Pulles and Hartman, 2017). It has even been suggested that a company can never build an IOR with another, unless it has first built an IPR (Gligor and Holcomb, 2013).
- Thirdly, IPRs may affect the level of IORs. For example, personal credibility can influence interpersonal trust, which is in turn related to inter-organizational trust (Zaheer et al., 1998). Conversely, IPRs may be built, strengthened, and developed during IOR processes, and thus the trade-off between IPRs and IORs in SCI should be considered.

Overall, a failure to account for the role of IPRs in SCI research would limit our understanding to a superficial level, which would not be able to seek the root mechanism of SCI. Researchers have called for the taking of individual behaviour and IPRs as an important theme in SC research (Huo *et al*., 2015, Gligor and Holcomb, 2013; Mandják *et al*., 2016; Pulles and Hartman, 2017). However, research on this highly important area has been still at its infancy so far (Schorsch *et al*., 2017). To address the research gap, our study addresses the following research questions:

RQ1: What is the role of IPRs on IORs during the formative stage of SCI?

RQ2: How do personal credibility, affection, communication among boundary spanners influence the occurrence of IORs?

RQ3: How do influences from personal credibility, affection, communication among boundary spanners on IORs change during the operational stage of SCI?

While previous SCI studies focused on organizational antecedents mainly at the inter-organizational level, our study focuses on identifying influencing factors on both organizational and interpersonal levels and on examining mechanisms through which different dimensions of IPRs influence different factors of IORs, jointly enabling SCI. Based on four case companies operating in the manufacturing and service sectors in New Zealand, this study develops several research propositions to reveal the role played by IPRs in influencing IORs to enable SCI.

Our study contributes to the SCM literature in several ways. Firstly, it integrates factors from both IORs and IPRs to examine their interactive roles in enabling SCI, and thus overcomes the shortcomings of prior research: overlooking the role IPRs play. Although IPRs have long been examined for their influence on organizational behaviour, the role of IPRs in SCM has only recently received attention in areas such as inventory management (Bruccoleri *et al*., 2014), SC negotiation and communication (Gligor and Autry, 2012; Reimann *et al*., 2016), SC conflict resolution (Cai *et al*., 2017), and logistical services (Mocke and Kotze, 2016). Our study examines the linkage between IPRs and SCI, which has not been given any research attention. Secondly, our study identifies personal affection, personal credibility, and personal communication as the three main IPR dimensions that interact with IOR factors to influence SCI, and further highlights different roles played by these three IPR dimensions in interacting with IOR factors to enable SCI. Thirdly, our study reveals that IPR dimensions follow different evolutionary directions in their influence on IORs during SCI development: influence from personal credibility and personal affection tends to decline over time whereas influence from personal communication tends to increase. Moreover, our empirical findings also demonstrate that the influences of individual IPR dimensions on different IOR factors tend to have different magnitudes.

4.2 Literature review

4.2.1 Theoretical foundation

We adopt resource dependence theory (RDT) as the theoretical lens for our study. RDT views the firm as an "open system structure" seeking to manage the level of its dependence on the external environment for resources which ensure its survival (Cho *et al*., 2017; Huo *et al*, 2017; Pfeffer and Salancik, 1978). Firms form IORs to manage interdependence for resources, and thus, IORs are arranged where resource dependence occurs (Drees and Heugens, 2013). SCI can be regarded as the inter-organizational arrangements of aligning and coordinating SC activities and processes across the SC network to achieve a smooth flow of resources between firms. Since no single firm can control all required resources by itself, RDT addresses the motivation for cooperation and collaboration between SC partners which control complementary resources (Parmigiani and Rivera-Santos, 2011). Resource dependence may affect trust, power, and commitment between SC partners in SCI process. For example, dependence on suppliers can improve trust, leading to supplier integration (Zhang and Huo, 2013). Yet a supplier or customer possesses more power if it controls more important resources, which brings about power asymmetry (Casciaro and Piskorski, 2005). Resource dependence can push SC partners into forming IOR networks in order to develop reciprocity.

IPRs are considered a "soft" aspect of a SC as it involves people rather than technical matters (Borgatti and Li, 2009), and formation of personal relationships with members of SC partners leads to a creation of social capital, manifested as relational embeddedness (Gelderman *et al*., 2016). IPRs can underpin IORs by developing company's willingness to rely on SC partners, leading to perceptions of trust, power asymmetry, and relationship commitment, and evaluating collaboration over resource dependence and domination (Reimann and Ketchen, 2017). Therefore, RDT provides a sensible overall conceptual

framework which guides the empirical study in explaining SCI from the two perspectives of IPR and IOR.

4.2.2 Supply chain integration and inter-organizational relationships

SCI is widely regarded as a significant strategy for achieving effectiveness and efficiency in SCM (Croxton *et al*., 2001; Cao *et al*., 2015) by avoiding redundancy and overlap while seeking cooperation at lower costs (Mentzer et al., 2001). As a type of collaborative arrangements (Liu *et al*. 2016), SCI refers to the development of strategic intrafirm and interfirm collaboration along the SC (Cao *et al*., 2015). SCI activities are required to achieve the ultimate goal of SCM, that is, to create value through services and products provided to end-customers in a SC network (Wisner *et al*., 2014).

A scope-based perspective classifies SCI into internal and external integration while the external integration is further subdivided into supplier and customer integration (Flynn *et al*., 2010; Huo, 2012). This taxonomy emphasizes the "*importance of conceptualizing SCI as a multidimensional construct to examine its effects on firm performance*" (Liu *et al.*, 2016, p15). Our study focuses on external integration, which requires more resources, emphasising the inter-organizational process of integration with business partners. External SCI enables individual firms to form strategic alliances, share supply information, and coordinate operational processes, transcending firm boundaries (Flynn *et al*., 2010; Min, 2015; Zhao *et al*., 2011). Therefore, strategic alliances, information integration, and process integration are identified as central activities in SCM, and the three key dimensions of SCI (Flynn *et al*., 2010; Liu *et al*., 2016; Zhao *et al*., 2011).

Strategic alliance refers to joint decisions among SC partners in order to achieve mutually agreed goals (Min, 2015). Information integration concerns visibility and timeliness (Tsanos and Zografos, 2016) and refers to "the coordination of information transfer, collaborative communication and supporting technology among firms in SC" (Leuschner *et al*., 2013; p. 38).

Process integration refers to the collaborative working between SC partners, such as joint product development, and common systems (Haq and Boddu, 2017). These three dimensions are closely related to each other. For example, information integration is achieved through process integration, while process integration cannot occur without information integration (Haq and Boddu, 2017). The integration of the three dimensions can create sustained competitive advantages, leading to higher SC performance (Tsanos and Zografos, 2016; Tsanos *et al*., 2014).

Prior studies have examined a number of organizational factors in SCI, including trust, leadership, power, commitment, justice, culture, knowledge, and communication (Braunscheidel *et al*., 2010; Cao *et al*., 2015; Griffith *et al*., 2006; Hult *et al*., 2004; Huo *et al*., 2017; Kwon and Suh, 2005; Mentzer *et al*., 2001; Prajogo and Olhager, 2012; Zhang and Huo, 2013; Zhao *et al*., 2008). However, although all these factors contribute to the establishing of SCI across firm boundaries, they play distinct roles in influencing SCI. Among these factors, the literature has identified trust, commitment, and power as the three most influential organizational factors in enabling SCI. Trust and commitment are vitally important for SCI, because they provide a foundation for all cross-boundary SCM activities (Chen and Paulraj, 2004). Naturally, these two factors have become the most commonly examined at an organizational level in terms of their influence on relational contracting transactions (Tsanos and Zografos, 2016). Meanwhile, power, reflecting relative dependence in terms of resources among members in SC networks (Wu et al., 2014), has been regarded as the central crux among various organizational determinants of SC relationships (Cox, 2001). Therefore, our study focuses on the three factors of trust, commitment, and power, as organizational enablers of SCI. Based on a review of relevant literature, the role of these three factors on SCI is synthesized in Table 10.

Table 10 *Role of trust, commitment, and power on SCI*

Trust	Definition	Extent to which a firm believes its exchange part is honest/benevolent (Yeung et al., 2009); interactions parties expect others not to act opportunistically or violate norms of the relationship (Lyles et al., 2008). Trust can be divided into reliability-based and character-based trust (Bowersox et al., 2010)
	Role on strategic alliance	Trust can contribute significantly to the long-term stability of an organization (Handfield and Bechtel, 2002); fundamental element of the successful "marriage" of strategic alliance (Sambasivan et al., 2011)
	Role on information integration	Positively affect information sharing by encouraging necessary information sharing and improving information quality (Wu et al., 2014);
	Role on process integration	Enable process integration between suppliers and buyer based on the willingness to take risks (Mayer et al., 1995); drive coordination and cooperation among partners (Swink et al., 2007; Zhao et al., 2008)
Commitment	Definition	The willingness of a party to maintain a relationship through investments of financial, physical or relationship-based resources (Morgn and Hunt, 1994). Brown et al (1996) classify it into normative commitment (related to willingness to secure a relationship) and instrumental commitment (related to compliance).
	Role on strategic alliance	With commitment, partners are more likely to assist the development of strategic alliance, to share tacit information, and jointly to solve process problems (Zhao et al., 2008; 2011). Commitment positively influence SCI based on empirical studies (Cheng, 2011; Wu et al., 2014)
	Role on information integration	
	Role on process integration	
Power	Definition	Refer to capacity of one party to influence decisions and behaviours of partners; relative dependence between exchange members (Wu et al., 2014); based on the control of resources valued or desired by others (Turner, 2005). Power can be classified into mediated power (related to rewards and punishments) and no-mediated power (related to knowledge, skills, expertise, value-identification, and natural right (Maloni and Benton, 2000).
	Role on strategic alliance	Power can push parties to understand each other's goals and targets, faciliating the formation of strategic alliance (Zhao et al., 2008)
	Role on information integration	Power target would share information resources to balance the influence of the power source's influence (Zhao et al., 2008).
	Role on process integration	Power can push parties to develop joint problem solving routines to coordinate their activities (Zhao et al., 2008)

4.2.3 Inter-personal relationships

Business research, especially marketing research, has examined the role of personal factors in inter-organizational business relationships (Barnes *et al*., 2015; Gligor and Holcomb, 2013). For example, it is suggested that boundary spanners tend to develop social bonds through their personal social networks (Ramström, 2008), and that frequently, IORs are initiated by boundary spanners (Brass *et al*., 2004). Moreover, social bonds take their origin from relationships between individuals, which then emerge into inter-organizational bonds, given the fact that these boundary spanners' day-to-day experience involves working closely with individuals from other firms (Barnes *et al*., 2015; Haytko, 2004; Lian and Laing, 2007). However, it has been rather rare to apply IPRs research in settings of SCM until relatively recently (Ekanayake *et al*., 2017; Gligor and Holcomb, 2013). Recent studies have identified personal affection, personal credibility**,** and personal communication (Barnes *et al*., 2015; Wang *et al*., 2016) as the three main dimensions in IPRs that tend to influence IORs in a SC setting.

Following this conceptualisation, we review these dimensions to examine how they influence SCI. Personal affection refers to individual's sentiments and likeability that affect the closeness between people (Barnes *et al*., 2015). Personal credibility is the ability of others to rely on a person who is regarded as being credible or competent (Barnes *et al*., 2015). It is particularly important when initiating business interactions between individuals, whose trustworthiness and ability to build a successful relationship is uncertain (Luo, 2007). Frequent social interaction is an effective way of building up personal credibility, as they are able to cultivate trust on the personal level (Adobor, 2006). The establishment of personal credibility would pave the way for building inter-organizational trust, as there would be a strong desire to extend and upgrade interpersonal trust to inter-organizational trust (Ramström 2008). Personal communication has more external attribute of IPRs than personal credibility (Wang *et al*.,

2016). Personal communication is the vehicle of information resource exchange achieving familiarity and mutual understanding (Gligor and Autry, 2012). Personal communication is also an effective way to achieving harmony, as it enhances the feeling that promises and obligations can be delivered as expected (Barnes *et al.*, 2015).

Table 11 provides a summary of IPRs based on literature.

Table 11 *Literature review on interpersonal relationships (IPRs)*

Definition	IPRs refer to the individual-level relationships that develop between persons who happen to do business (Grayson, 2007).	
Key characteristics (Gligor and Autry, 2012)	Expressive	emotion based, intrinsic (Grayson, 2007)
	Based on voluntary interactions	individuals are expected to seek each other's company voluntarily (Fischer, 1982)
	Informal not like the formal roles expected in IORs (Price and Arnould, 1999)	
	Motivated by a communal orientation (Silver, 1990)	
	Lead to development of increasingly intimate social connections; share personal knowledge and open to each other (Fischer, 1982)	
	Personal in nature which cannot be substituted while business relationships are impersonal which can be substituted (Silver, 1990).	
Dimensions (Barnes *et al*, 2015)	Personal affection	Human affective likes/dislikes, sentiments and emotion that affects the closeness between individuals.
	Personal credibility	The degree of a person to gain confidence, reliability, and trust from the interactive people.
	Personal communication	Individuals interaction using language, words, signals to pass, share information to facilitate relational interaction, coordinate activities.

4.3 Methodology

4.3.1 Case study approach and sampling

Our study is exploratory and explanatory, focusing on the process and mechanisms (a "how" research question) through which IPRs interact with IORs and jointly enable SCI. Given

that SCI enablers have been widely examined at an organizational level, but rarely at an interpersonal level, initial theory building is needed, and thus, a multiple case study method was selected. Although we employed Barnes *et al* (2015) dimensions of IPRs, our research deployed it within a context where the previously-studied relationships may not be found. While Barnes *et al* (2015) focused on IPRs as drivers of quality and performance in IORs, for IPRs affect interfirm trust which influences interfirm relationship quality and consequently financial performances, our research also extended to other IOR factors, such as commitment and power in the SCI context. Furthermore, we explored the influences of each dimension of IPRs on IORs and compared the different evolutional paths across the entire SCI process (from formative to operational stages), each dimension having different magnitudes on IOR dimensions. The research question for this study deals with dynamic organizational and human behaviour, and addresses a research subject, namely, how IPRs and IORs influence SCI. A qualitative case study method is highly useful and apt for such relationship-based research (Bryman, 2012), which is becoming increasingly important in the SCM discipline (Halldórsson *et al*., 2015; Gligor and Autry, 2012).

A four-case study design was developed by considering literature on the case study. Replication logic underlies the use of multiple case studies. Under this logic, multiple cases are selected, with similar case results strengthening the emerging theory (i.e. literal replication), and with contrasting results extending it (i.e. theoretical replication) (Yin, 2014). Our case sampling was theoretical, and the sampling procedure was conceptually focused and directed by the theoretical concepts that were examined in the study (Eisenhardt and Graebner, 2007). Our case sampling is also purposeful and involved sampling in a specific locale according to a preconceived reasonable initial set of dimensions, including size, time span, and industry in terms of supply chain activities.

Three criteria were established for case selection. Firstly, the time span of the sample company's operations must be at least five years, so that the case company has substantially engaged in SC activities. Secondly, the extent of experience in SCI must be appropriate, such that their experiences can aid in offering a greater understanding of how SCI might be influenced by the enabling factors. Thirdly, the case companies must be different in terms of industry and company size, so that contextual effects of size and industry can be controlled.

SCI is a multi-level longitudinal phenomenon, since SCI evolves over an extended period of time as the integrated relationships within a supply chain and thus is time- and context-bounded. In this evolving process, supply chain partners interact with each other both in the internal and external business environments, which are also dynamic in nature. Therefore, this study needs to take temporal duration of these supply relationships into consideration. Our multiple case study design is helpful to serve this requirement. The ultimate goals of a case study method are to offer a rich description of the phenomenon being studied and to describe the context in which it occurs (Dyer and Wilkins, 1991; Halinen and Törnroos, 2005). By adopting the approach of triangulating multiple data sources, our data collection and analysis is able to capture the longitudinal nature of the SCI process. In data collection, multiple participants in each of the case companies were interviewed, and interview data from one interviewee were triangulated with those from other interviewees. While collecting historical information at one particular time point may result in a risk of retrospective bias and memory decay, triangulation of the data sources is able to negate potential subjective bias from a particular data source and retrospective bias (Piekkari et al., 2009). By means of simultaneously gathering and triangulating multiple sources of information (Guest et al., 2012), our case study design is able to describe a considerably long temporal horizon of SCI process.

4.3.2. Data collection

Following prior studies (Piekkari *et al*., 2009; Yin, 2014), we carefully selected interview respondents to gain greater depth and multiple perspectives regarding the case companies' SCM activities. Interview respondents are selected only if they have had direct involvement in decision-making or operations relevant to SC activities. As a result of this preparation, most of the respondents can be regarded as the boundary spanners of the case companies. Senior and mid-level management were targeted for the case interviews, to gain insights from multiple levels: while senior management can provide a strategic overview of their SC activities with partner companies, mid-level managers are able to provide more operational information such as information integration and SC process integration with trading partners. Each interview lasted between 60 and 90 minutes, was recorded and then transcribed verbatim. In addition, notes were taken during the interviews to draft interview reports. Unclear answers were clarified via follow-up phone calls and emails. In a few cases, following-up interviews were conducted with key informants.

We made iterative efforts to collect archival data from websites, news coverage and requested company documents, including the profile of the case companies, so that the interview data can be triangulated. The profiles for the four case companies, all named by pseudonyms, are as follows:

- SIB, a market leading wine bottling company, which was founded in 1995, proclaims itself to be "Brand New Zealand" on the world stage. It owns three sites in New Zealand, in Auckland, Hawkes Bay, and Marlborough. Eight thousand bottles can be produced per hour, and it has won many Australasian awards. SIB was selected as an exemplary large agricultural business in the New Zealand manufacturing industry.
- NIS, established in 2001, provides IT solutions based on Microsoft tools and technologies and provides consulting services to business and government clients. NIS

is principally a distributor and developer of web-based technologies, using the Microsoft platforms. Today NIS is among the longest and largest dedicated providers of Microsoft-based solutions in the southern hemisphere. NIS was selected as a representative of large software service providers in this study.

- AKS and NZF were selected to represent small and medium enterprises (SME) that make up 97% of businesses in New Zealand and employ 29% of the workforce (Joyce, 2014). Auckland is the major economic and financial centre, accounting for 36.6% of national GDP (Statistics New Zealand, 2015), both AKS and NZF are Auckland based. As a software developer, AKS specializes in providing customers with online solutions for a range of human resource management functions, such time and attendance, employee and team scheduling, and payroll needs, as well as mobile solutions. Although AKS only employs eight people, they have grown to serve more than 100 industrial customers serving the New Zealand and Australian market due to integration with their customers and customer's network.
- NZF, formed in 1998, provides specialized consultancy services in logistics and supply chain management, especially in the fourth party logistics (4PL) services. It specialises in developing and implementing value chain strategies, restructuring, reengineering, and the measuring and monitoring of SC performance. With eight staff, NZF provides consulting services to a range of clients from the industrial sectors of logistics, manufacturing, retailing, education, and public sectors in countries including New Zealand, Australia, Singapore, India, and Brazil.

Profiles of case companies can be seen in ***Table 12***.

Table 12 *Profiles of case companies*

Firm code	Industry	Industry position	Location	Interviewee's position	Firm size	Supply chain position	Supplier-customer relationship (years)
SIB	Wine Bottling	Market leader	South Island; North Island	Managing Director; Product manager; Purchasing Manager; Sales manager	Large	Manufacturer 3PL/4PL supplier	20
NIS	Software	No. 1	North Island	General Manager; Sales manager	Large	Upstream software service provider	16
AKS	Software	Niche	North Island	General manager; Product manager	SME	Downstream software service provider	5
NZF	4PL	Niche	North Island	General manager; Service manager	SME	4PL Supplier	10

(Note: The firms' names are replaced by descriptivemonikers)

4.3.3 Data coding and data analysis

We adopted a retrospective perspective, exploring how IPRs developed by the boundary spanners and other managerial staff from the focal case companies were transformed into IORs, and how the IPRs and IORs influenced SCI. Following the literature (Strauss and Corbin, 1990), a paradigm of axial and selective coding, and thematic analysis was adopted. Coding and analysis of recorded interviews and secondary materials collected provided a database for the examination of the focal firms' SCI at the organizational level and its influencing factors drawn from both IPRs and IORs. Through this process, the research focuses on how the four case firms proceeded in achieving their respective SCI through repeated interactions on both the interpersonal and inter-organizational level.

The data coding and analysis was in two stages. During stage one, verbatim transcripts from interviews and secondary material were carefully read to generate an overview of patterns for the incidents, events, and activities involving SCM. The conceptual themes running through

the case data were identified. More specifically, empirical data were coded into three sets of constructs including SCI, IPRs and IORs. At stage two, incidents, events, and descriptive evidence identified were mapped to match our theoretical concepts. Interview transcripts were analysed sentence-by-sentence and coded for conceptual content relevant to the identified research themes. Data analysis was an iterative process with the review of theoretical concepts and the identifying of empirical case material each informing the other. Data coding into each of these three constructs was aligned to the previously identified constructs in the "literature review" section. SCI data were captured whenever the case firms initiated or were involved in collaborative SC activities along the three dimensions of strategic alliance, information integration, and process integration. IPRs were coded whenever events and processes marked by IPR formation that manifested between boundary spanners of the four case firms and individuals from SC partners in their respective SCs. Similarly, data on IORs were coded whenever incidences and events occurred for the case firms along SCM activities relating to trust, commitment, and power at organizational levels. Thus, construct validity was achieved by multiple data sources for each case and maintenance of a chain of evidence (Zhang *et al*., 2016). The data results were then analysed and synthesised into case findings reported in the results section.

4.4 Findings

4.4.1 Overall influence of IPRs on IORs at different stages

As cooperative IORs development can be a long-term process, Ring and Van de Ven (1994) states that there are four main stages: negotiation, commitment, execution, and dissolution. This statement focuses on the procedural aspects of IORs while these stages do not necessarily follow a sequential process (Choi and Lee, 1997), the research simply classifies the process into formative stage and operational stage.

As demonstrated in ***Table 13***, empirical findings from this study reveal that IPRs significantly influence the establishing of IORs throughout the whole SCI process. All four case companies in the study have achieved SCI, although to different extents. For all four cases, personal networks took their origin from relations between individuals which then evolved into IORs when boundary spanners found SC-related business opportunities for their companies.

A major finding from our case companies is that IPRs can lead to IORs, but the effects of boundary spanners differ based on their organizational positions and also on firm size. In the two large case companies SIB and NIS, the IPRs developed by members of senior management were the most important in creating IORs, which eventually led to SCI. For example, the relationship of NIS with its biggest SC partner was initiated by NIS's visionary leader. Relying on personal relationships with senior executives of Microsoft, NIS was established 15 years ago as a SC partner both upstream and downstream of Microsoft. Since then, a high level of SCI between NIS and Microsoft as its primary SC partner has been achieved, revenue from Microsoft accounts for around 90% of NIS's total business. In this specific case, the top-level executives are the key boundary spanners. However, large companies can also rely on personal relationships developed by mid-level managers to gain new business. As a sales manager of SIB commented,

"We employed those salespeople with good relevant experience. They know the industry. They know the customers, potential customers. Their personal relationships absolutely help them to take in new customers."

In comparison, it seems that IPRs developed by boundary spanners at middle management and operational levels also played a more critical role for the smaller case companies, as demonstrated in the two small case companies of NZF and AKS. SCM activities at an operational level, regarding niche markets, products, and services, required a high level of technical expertise, which in turn led to an emphasis on IPRs developed by customer facing

staff. For instance, as AKS has neither the time nor budget to invest into marketing, IPRs were critical for AKS to develop its business.

"...all we have is our personal connections with potential customers. All our current customers are introduced by our friends, or friends' friends. It is very common and important for us to develop our market in New Zealand as it is a very small country and its culture is a little special."

Table 13 *Salient respondent quotations relating to the importance of IPRs on IORs*

Importance of IPRs at the formative stage of IORs	**Importance of IPRs at the operational stage of IORs**
"We started our food-processing plant in Hawke's Bay in 1995. Within a year we were carrying out the bottling and warehousing for 30 wineries. Most of these wineries were from my personal networks. In some way, I can say, it is my personal relationships and personal network that established our business in the early days" (SIB); "He [Microsoft Regional Director of NIS] is the guy that started the initial relationship with them [Microsoft HQ in America] 11 years ago" (NIS). (Regarding new business in Australia) "We got an introduction from an ex-client who moved to Sydney who helped us get one of our first clients. […]Microsoft Australia has also introduced us to a number of clients, so it's been handy having that help over there. " (NIS). "I establish business mainly based on my personal connections. For example, I have a new customer in Sydney; the project manager knew me when he worked in Auckland" (NZF); "…with the established personal relationships, our customers come to know our products and services in the beginning. Then, we have a chance to learn the customers' time and attendance system[…] and most of their systems are time-consuming and labour-intensive" (AKS).	"No, no, (interpersonal) relationships cannot work too well after the beginning. Customers demand our high quality products and services" (SIB); "…then we don't focus on (interpersonal) relationships anymore as our product and service will then do the job" (AKS).

Our empirical findings demonstrate a less significant role of IPRs in the operational stage, after IPRs initiated IORs, as illustrated in Table 13. At this stage, the formal IORs between SC partners play a more significant role in enabling SCI. As in western business culture, "business is business". One of our respondents commented;

After all, we do business with a company rather than the individuals in the company. Individuals can represent their company, but they are not the company. (SIB)

On the other hand, there is still a need to maintain and strengthen the IPRs that were developed during the formative stage, especially with key partners, as demonstrated in the case of Microsoft for NIS.

"*We used to send our regional director to spend a week there every two months: just rent a hotel room and we'd service it out of New Zealand, but we've just established an office at the start of this financial year, a physical presence there as opposed to a fly-in fly-out presence".*

Another interesting finding revealed from our cross-case analysis is the varied views of the influence of IPRs on IORs and SCI at different hierarchical levels of the management. While most of our respondents recognised the significance of IPRs, there are subtle differences between top management and more junior level boundary spanners in terms of attitudes towards IPRs and their perceived significance. At a lower level, the boundary spanners tended to attach a high level of significance to the role of IPRs, while at a higher level they expressed a tendency to restrain individual interactions out of concern their employees would be trapped between friendship on one hand and business interests on the other. Moreover, case analysis based on a comparison of the case companies with fewer but larger SC partner companies (e.g. NIS) with those that have more but smaller SC partner companies (e.g. NIS) demonstrated a likely correlation between the number of key partner companies and the influence of IPRs: the fewer key partner companies the more important IPRs become.

4.4.2 Influence of three IPR dimensions on IORs and SCI at different stages

As highlighted in ***Table 14*** , a selection of comments from our respondents, all three IPR dimensions appeared to have a significant effect on IORs. Among the three dimensions, the personal credibility of boundary spanners was regarded as the most likely to influence business transactions at an early stage. Before initiating a business relationship, our respondents reported that it is imperative to research and collect information about the credibility and trustworthiness of potential business partners and people in key positions therein. Our interviewees also emphasised the importance of first impressions in a business context. Conversely the role of personal affection tends to get weaker and more limited with time.

Table 14 *Salient respondent quotations relating to the significance of IPRs on different stage of IORs*

	Importance of IPRs at the formative stage of IORs	**Importance of IPRs at the operational stage of IORs**
Personal credibility	"Definitely we like to do business with someone who we believe is credible" (SIB); "Good personal credibility, means, the quality of trustworthiness; for example, if you always keep our promise, I will trust you, and then I would like to discuss the business" (AKS); "As we are so busy, we need to study the personal credibility to see if we should do business at all" (NZF).	"The role of personal credibility is limited—information sharing is something we agree between parties—we seldom associate or think about an individual's personal credibility in arranging or facilitating information sharing" (SIB); "More information will be forthcoming if a partner is seen as credible and capable for a long-term relationship" (NIS); "We would more readily will work with people we find personally credible to find solutions, and supplier-customer process integration is an example of needing to work together to find solutions" (NZF).
Personal affection	"If you don't like your customer…, you still need to carry on the business as business is business, although the dislike may affect the business somehow" (SIB); "We typically collaborate better with parties we have some liking towards" (NIS); "Of course you discuss business better and more happily with those you like" (NZF). "Only when one has a good impression of the other, do both really get on well" (NZF).	"Personal affection is not that significant but it certainly makes for having the discussion about what information will be shared easier" (SIB); "The level of like and dislike can fluctuate as the business goes on […] for example, the more you communicate, the more you know each other" (AKS).
Personal communication	"We used to send our regional director to spend a week there every two months … we've just established the office there to have a physical presence there as opposed to a fly in fly out presence. … it was a defensive move to the competitors as well as we figured it's about time we showed a bit more commitment" (NIS); "We tend to treat information through the emails as supplement of our contracts. Compared with the frosty emails, the voices from the telephone calls make us really feel the friendship, and then you have a kind of obligation to honour the commitments. You will react faster in solving any problems" (AKS).	

Our respondents ranked personal communication as the most important IPR factor affecting IORs. Unlike the intangible personal credibility and affection, communication is more external, direct and quantifiable. Personal communication can change personal affection, and modify perceptions of personal credibility. More importantly, it can help clarify the intentions, plans and strategies of SC partners, and thus facilitate both IOR formation and SCI by reducing risks and resolving conflict. In terms of approaches to communication, our respondents stated that traditional means seemed more influential. For example, one respondent observed that that emails were not only "frosty" but also "too formal", as receivers had to treat them as "part of the formal agreement"; other respondents remarked that traditional approaches, including telephone calls, seemed to be more direct and efficient. Based on the observation of our case companies, modern IT applications sometimes provide audio/video direct communication, but virtual interactions are still seemingly insufficient, as "*face-to-face meetings are necessary to improve personal affection* (NIS)."

All three dimensions of IPRs were found to be enabling factors of SCI. In regards to strategic alliances, a NIS executive commented that "a *strategic alliance needs to be fed, and regular meetings and catch-ups are necessary*." Similarly, a manager from AKS stated: "*personal communication will strengthen the relationship and is more likely to result in a mutually improved outcome.*" Evidence from NIS and AKS suggests that the impact of personal communication on information sharing seems even more significant. As for process integration, interviewees from all case companies suggested personal communication was required: "*it is helpful for a more harmonious integration of process between two parties.*"

4.4.3 The role of the three IPR dimensions on three IOR factors

We asked our interviewees how their IPRs with individuals from SC partners influence or not influence the relationships between the SC partners. Selected comments from our respondents are provided in ***Table 15***.

Table 15 *Salient respondent quotations relating to the influence of IPRs on IORs*

	Trust	**Commitment**	**Power**
Personal credibility	"if you are credible, then other parties know you will follow through" (SIB); "Yes, definitely our trust of a partner company is based on our trust for the people within it (an organization is its people)" (NZF).	"Some customers give me more jobs because of long term personal credibility" (SIB); "It can make for a slightly easier conversation when you are calling up to chase payment – you can play the 'I'm a valued service provider, so look after me with timely payment' card" (NIS); "The companies with trustworthy people are more likely to be consistent in their commitment stance" (NZF).	" Personal creditability is also linked to integrity – companies perceived to have more integrity are also likely to benefit from some elevation of power: I would like this to the halo effect" (NIS).
Personal affection	"Personal affection helps to create a bond to build up trust. If people get along with each other and share personal experiences, it encourages open and frank exchanges between people" (NIS); "Liking and trust are linked in respect, so it is easier and more natural to trust a company you like, rather than one you might dislike" (NZF).	"Commitment is stronger if personal affection is stronger" (SIB); "With good personal affection, people get on with making their contribution to integration" (AKS).	"Power implies one has a certain superiority over another because of occupation of resources" (SIB); "Power I think is more a matter of where in a supply chain you are, and a function of both scale and dependency" (NZF).
Personal communication	"Definitely, trust means that you understand and 'get' what that person wants" (AKS); "Trust is incredibly powerful if it [personal communication] is in place – generally not something you see in industry between businesses" (NZF).	"Influential when it is in place" (SIB); "Communication between individuals of organizations seldom gets to the level of 'personal communication'" (NZF).	"Not really that effective". (SIB) "[Microsoft] do have a tendering process. But quite often, because of the size of Microsoft, the guy setting up each unit will also have a fair degree of delegated authority, so that they don't have to go out to market, if the piece of work is under a certain threshold." (NIS) "To a lesser degree, power is typically a function of where in a supply chain the organization is, and what role each party has, i.e. buyer versus supplier, and scale". (NIS)

4.4.3.1 Influence of personal credibility on trust, commitment and power

As demonstrated by our respondents, the personal credibility of a managerial executive creates or at least enhances confidence and trust in her company, which facilitates SC coordination by saving time and resources. According to a manager from NZF, personal credibility is:

"*the 'trust' and 'respect' we build in other people's minds as a 'result of our actions' and the 'consistency and plausibility' of those actions*".

Our findings suggest that there is a strong and direct relationship between personal credibility and trust. Our respondents expressed similar views on the impact of personal credibility on relationship commitment. On the other hand, it seems to our respondents that the link between personal credibility and organizational power is not as direct and strong. Overall, our respondents rated the linkage of personal credibility with trust as more influential than that of either commitment or power.

4.4.3.2 Influence of personal affection on trust, commitment and power

As respondents stated, personal perception of their SC counterparts can influence their judgements regarding trustworthy of a partner company. Thus, it seems clear that personal affection influences organizational trust. As illustrated in the comments in Table 6, personal affection is also able to facilitate organizational commitment. On the other hand, the influence of personal affection on organizational power seems neither straightforward nor clear.

4.4.3.3 Influence of personal communication on trust, commitment and power.

Our respondents suggested that personal communication is the most important external attribute of IPRs. One interviewee elaborated regarding personal communication:

"*… the communication that happens often even without words – it is a level of relationship where the other party implicitly trusts someone – how to respond will be known as much by what is said as what is not.*"

Furthermore, a manager from NIS highlighted the influence of personal communication on organizational trust as "*incredibly powerful if in place*". In his view, NIS established an office close to Microsoft's HQ in order to have a "*physical presence there*" and enhance communication with Microsoft as it key supply chain partner. The impact of personal communication on organizational commitment is "*influential when it is in place*". But an NZF interviewee raised some doubt on the importance of personal communication on commitment at the organizational level. The influence of personal communication on power was regarded by our interviewees as being even more questionable.

4.5 Discussion

In this section, we examine the IPRs leading to IORs throughout the SCI process, based on the empirical findings from within and across case analysis and prior knowledge in the literature.

4.5.1 Role of IPRs in initiating IORs

Prior research has examined SCI mainly from the research setting of IORs, and hence overlooked the role of IPRs in enabling SCI to a large extent (Wang *et al*., 2016). Research on organizational dynamics suggests that in Western culture, formal IORs would be established first and then within this IOR context, informal IPRs, among individuals involved, can spring up, while in Chinese culture, IPRs often precede and lead to IORs (Park and Luo, 2001). For example, organizational ties play a leading role in initiating SC collaboration which is then passed to the individual boundary spanners for implementation on behalf of their firms (Ekanayake *et al*. 2017). However, evidence from our study demonstrates that the sequence of

IPRs and IORs is strongly related to the stage of SCI, and that IPRs are able to play the role of initiating IORs in the SCM context.

Resource dependence theory (RDT) emphasizes power and dependence as motivators for IORs because SC companies use IORs to gain control over critical resources (Parmigiani and Rivera-Santos, 2011). According to RDT, a SC firm is dependent on resources that are controlled by its SC partners, leading to power asymmetry and uncertainty (Pfeffer and Salancik, 2003). IORs can help reduce the uncertainty by balancing dependence and creating a platform for joint action (Parmigiani and Rivera-Santos, 2011), and by adopting a variety of organizational strategies (Drees and Heugens, 2013), such as integration. Consequently, a firm needs to select its best SC partners considering dependent resources to ensure competitive advantage (Guneri *et al*., 2009). But at the formative stage, power and uncertainty related to dependent resources wait to be fully realised while individuals may contact and interact with each other before IORs have been established. Therefore, IPRs can influence the SC partners' selection criteria, evaluation and review. For example, likeability from personal affection can affect the outcomes of interpersonal interaction (Pulles and Hartman, 2017) which may significantly influence the initiating and forming of IORs. Personal credibility in the industry can enahce trust from potnetial SC partners, leading to organizational collaboration. Through personal communication, a company may detect if the potential SC partners need resources such as product supply, the capabilities, or technology, service, and market requirments. Thus, the SC companies can partner with each other and reinforce individual and organizational relationships in order to access greater and more diverse sources of social capital (Parmigiani and Rivera-Santos, 2011).

Prior research suggests that IORs can be initiated by boundary spanners (Brass *et al*., 2004). Although the linkage between IPRs and IORs has not been explicitly applied to SCM research, evidence from our case companies provides empirical support to the notion that IPRs

are able to facilitate the initiation of IORs in the formative stage of SCI. Thus, we propose our first proposition:

P1. During the formative stage of SCI, IPRs play a central role in initiating relationships at the organization level, which subsequently leads to the development of formal IORs.

4.5.2 Role of the three IPR dimensions on IORs across different SCI stages

We observed that influences from three dimensions of IPRs on IORs displayed different influences at different stages of the SCI process (Figure 12 provides an indicative illustration regarding how these influences evolve). IPRs can be regarded as part of as a firm's resources since they are valuable, rare, inimitable, and non-substitutable (Barney, 1991). IPRs are closely related to IOR resource dependence. In the early formative stage, SC partners are still exploring the possibility and potential for exchange of resources before IORs are formed, so IPRs become a bridge through which SC partners can build up IORs. Personal credibility based on one's past behavior can be the first indicator as part of organizational resources to be researched before boundary spanners contact potential partners. During contact, personal affection and likeability gained through personal interaction can influence boundary spanners' willingness to further initiate IORs and exchange resources (Pulles and Hartman, 2017). Based on personal credibility, boundary spanners could build up personal trust, then initiate organizational level trust (Zaheer et al., 1998). Personal communication can help the boundary spanners learn more critical information about the required resources, to express the willingness to start the collaboration and to negotiate the conditions and terms under which resource exchange occurs, which can greatly influence the occurrence of IORs. But personal communication plays a limited role at the formative stage, as the individuals communicate in depth less frequently at this stage. Thus, based on the observation and discussion above, we propose:

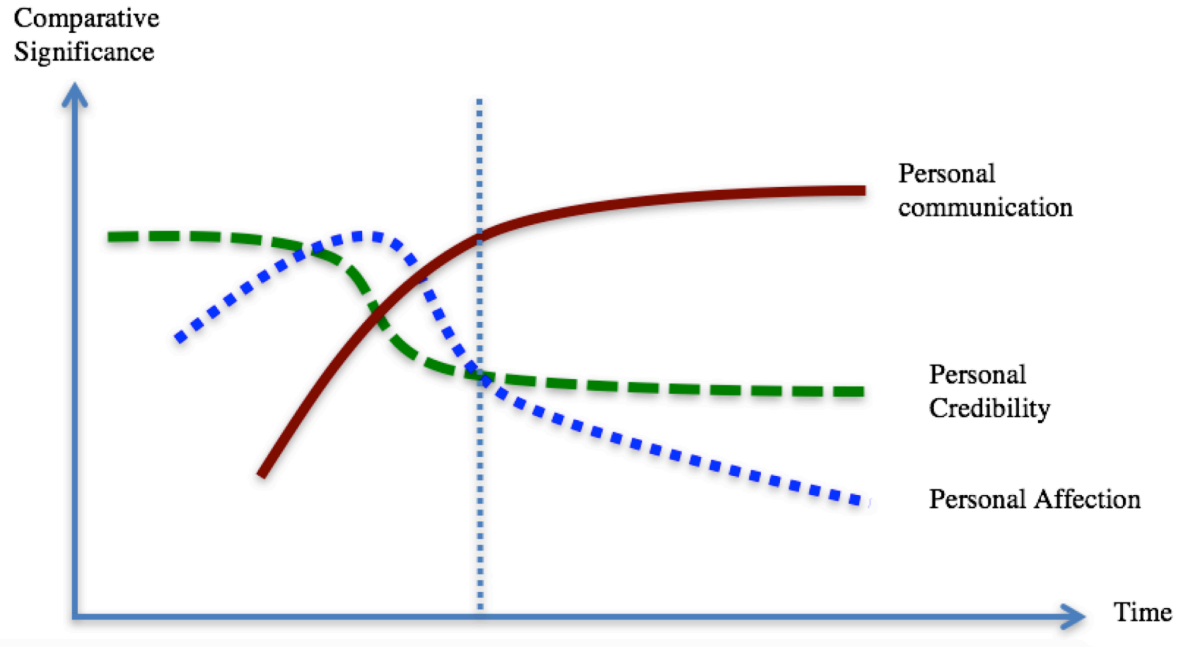
P2. Personal credibility, affection, and communication among boundary spanners can significantly influence the occurrence of IORs.

With the evolving IOR into the operational stage, the roles of the three dimensions change: the influencing role from personal credibility and affection on IORs tend to fade away, as firms then focus more on the interdependence in terms of SC relationships (Xia *et al*., 2014) in order to exchange potentially needed resources. According to RDT, a firm which controls more critical and vital resources would have more power over its SC partners (Pfeffer and Salancik, 2003). It is organizations rather than individuals that control the resources, so IPRs are subordinate to IORs. Under these circumstances, personal affection has limited influence because it can affect neither power nor its distribution of the resource exchange. Personal credibility may still have some influence because it generates personal trust in interactions during the SCI process which can enhance the organizational trust (Zaheer et al, 1998), consequently reducing uncertainty by balancing dependence (Parmigiani and Rivera-Santos, 2011). Comparably, personal communication, a flexible and important supplement to organizational communication (Gligor and Autry, 2012), can transfer information resources to influence the level of dependence on SC partners, as boundary spanners would have intensive interactions in terms of information exchange. Personal communication can not only help exchange information resources, but also coordinate the process of dynamic information-related resources exchange between SC partners, thus affecting organizational-level trust, relationship commitment, and power. Therefore, personal communication plays a more important role than personal credibility and personal affection.

The emergence concept regarding organizational behaviour suggests that IORs as a higher-level phenomenon are nested in and influenced by lower-level IPRs, but that the higher-level phenomenon may be more than the mere sum of the lower-level phenomena (Fulmer and

Ostroff, 2016). This emergence concept plays an important role in explaining organizational behaviour, although this concept has not yet been applied in the SCM domain (Schorsch *et al*., 2017). Following the logic of emergence, the factors of IORs, such as organizational trust, commitment, and power, can find their origins at lower level relationships, in other words, from the IPRs factors, such as personal credibility, personal affection, and personal communication. Although organizational behavioural literature has discussed the influence of IPRs on IORs, prior research has not addressed how these dimensional IPR factors affect higher level IORs with respect to IOR dimensional factors.

Figure 13 *Personal affection, credibility, and communication in SCI process*



All three IPR dimensions facilitate the sharing of information to facilitate the SCI process by reducing risks and resolving conflict. Based on our empirical findings it can be suggested that while all three IPR dimensions influence IOR dimensions, the scale of the influence from each of the IPR dimensions are different. As illustrated in ***Figure 13***, the influence from personal credibility and personal affection tends to decline, but the influence from personal communication is likely to increase throughout the SCI process. Thus, we propose:

P3. The effects of IPRs on IORs evolve as SCI develops; the influence of personal credibility and affection decline over time, whilst personal communication increases.

4.6 Conclusions

The majority of prior studies into supply chain integration take a macro or organizational level perspective. Through this research we have demonstrated the importance of the individual ties and resultant networks that underpin inter-organizational relationships. IPR play a critical role during the formative stages of supply chain integration as they lay the foundations for IORs. IPR continue to play a key role during the operational stage of SCI, especially via inter-personal communication. Inter-organizational trust, power and commitment are all influenced by IPRs, the effects of which evolve throughout the relationship life-cycle.

4.6.1 Managerial implications

This research can be used to assist management executives and SC managers by increasing their awareness of the role of IPRs in facilitating SCI and by providing a framework for practically assessing the development and use of IPRs in SCM activities.

The empirical support for the positive effects of IPRs in interacting with IORs and in facilitating SCI has significant implications for management executives in terms of their decision-making regarding integration of their SCs. Empirical findings from our study could motivate managers to make effective use of IPRs developed by boundary spanners in identifying business opportunities and in initiating collaborations with potential SC partners, while being mindful of the negative effects of IPRs that can lead to boundary spanner conflicts between personal friendships and business interests at the firm level.

Explicit conceptualisation of the three dimensions of IPRs could provide individual SC managers with clearly defined knowledge and skills in terms of IPRs required of boundary spanners. Equipped with an understanding of the role played by IPRs in interacting with IORs

to facilitate SCI, these boundary spanners would be able to more actively leverage their personal credibility, affection, and communication in relation to their counterparts from SC partner firms in order to improve organizational trust and commitment.

4.6.2 Limitations and future research

Our study has a few limitations, which readily suggest future research directions. Firstly, interactions between IPRs and IORs in enabling SCI are dynamic processes. Our study took a retrospective approach and collected data mainly from interviews, so recollection of the incidents and events might be subject to bias from our respondents. A longitudinal study would be preferred for a more in-depth study on how the factors drawn from both interpersonal and inter-organizational levels co-evolve and interact with each other, jointly influencing SCI. Another limitation of the study is related to the generalisability of the empirical findings, given its adoption of the case study method. Future studies could adopt alternative research approaches, such as survey research, such that a larger and more diverse firm population can be included to quantitatively test the interactions between IPRs and IORs and their joint influence in enabling SCI.

Chapter 5. Conclusion

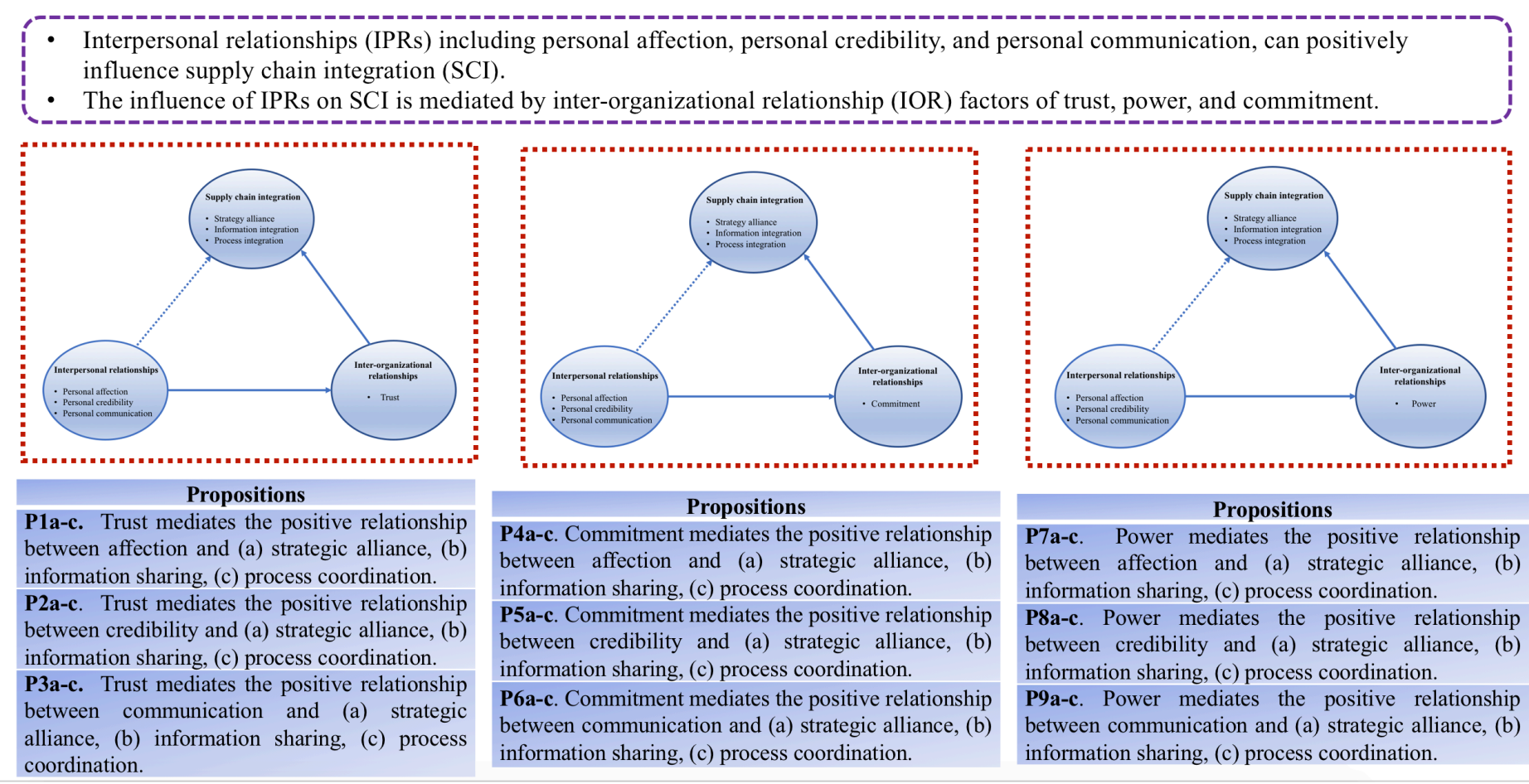
5.1 Research findings

SCI is regarded as a key approach to achieve superior SCM performance (Huo, 2012), but the implementation of SCI in practice is difficult and rare (Childerhouse *et al*., 2011). Moreover, the results of SCI are not ideal (Cao *et al*., 2015). Thus, it becomes necessary to study the enablers of SCI. Prior studies on SCI relational enablers focus on organizational level factors, overlooking factors at the individual level, which limits a deeper understanding of the inner mechanisms of supplier-customer interactions (Gligor and Holcomb, 2013).

This research addresses this gap and explores the SCI enablers from both interpersonal and inter-organizational perspectives for the first time. It investigates the relationships between IPRs, IORs and SCI in order to study the role of IPRs in SCI. As the IPRs-IORs-SCI system is extremely complex (Refer to ***Figure 2***), the time constraints under which this research was undertaken led to a focus on a simplified framework (Refer to ***Figure 3***). Since SCI-IORs relationships have been extensively studied (Huo, 2013; Zhao *et al*., 2011), this research concentrates first on the framework of the IPRs-IORs-SCI relationship, then scrutinizes the role of IPRs on SCI and IORs.

In order to explore IPRs-IORs-SCI relationships, this research postulates a series of propositions based on a comprehensive literature review. It suggests that IPRs can have positive influences on SCI but are mediated by IORs. These propositions provide the basis for this research to establish a conceptual model to link the three main constructs, IPRs, IORs and SCI, in a system (Refer to ***Figure 14***).

Figure 14 *Research Propositions on IPRs-IORs-SCI relationship*



Propositions
P1a-c. Trust mediates the positive relationship between affection and (a) strategic alliance, (b) information sharing, (c) process coordination.
P2a-c. Trust mediates the positive relationship between credibility and (a) strategic alliance, (b) information sharing, (c) process coordination.
P3a-c. Trust mediates the positive relationship between communication and (a) strategic alliance, (b) information sharing, (c) process coordination.

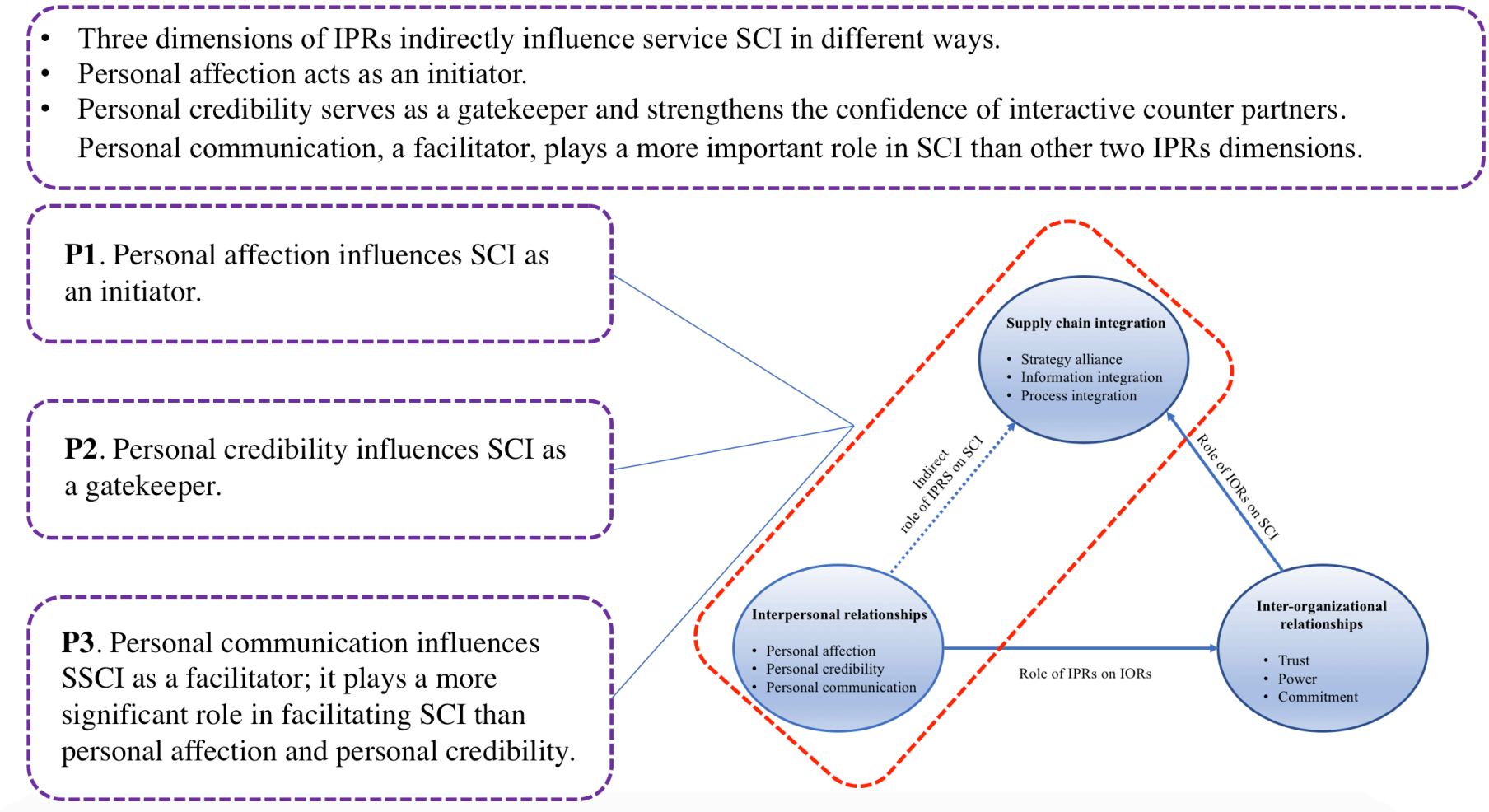
Propositions
P4a-c. Commitment mediates the positive relationship between affection and (a) strategic alliance, (b) information sharing, (c) process coordination.
P5a-c. Commitment mediates the positive relationship between credibility and (a) strategic alliance, (b) information sharing, (c) process coordination.
P6a-c. Commitment mediates the positive relationship between communication and (a) strategic alliance, (b) information sharing, (c) process coordination.

Propositions
P7a-c. Power mediates the positive relationship between affection and (a) strategic alliance, (b) information sharing, (c) process coordination.
P8a-c. Power mediates the positive relationship between credibility and (a) strategic alliance, (b) information sharing, (c) process coordination.
P9a-c. Power mediates the positive relationship between communication and (a) strategic alliance, (b) information sharing, (c) process coordination.

The original research plan was to apply quantitative approach to investigate the mechanism of IPRs on SCI mediating by IORs, but the in-depth exploring found that the research on role of IPRs in SCI and role of IPRs on IORs in different SCI stages were still emerging in its infancy which needs theory building, so the research was refined from quantitative approach to qualitative method. The research was implemented by two case study papers to explore the IPRs-SCI and IPRs-IORs relationships. The research found that the boundary spanners, using their personal affection, credibility, and communication resources, can initiate and start IPRs with those individuals in the targeted organization for SCI. As these individuals represent their own organizations, the individual level relationships can initiate, and further facilitate the firm-level relationships, consequently, the firm-level relationship can be built, further to achieve SCI.

In order to explore the role of IPRs on SCI, the research employed an exploratory approach via multiple case studies in the service sector. It investigated the inner mechanisms of how IPRs influence SCI indirectly. Personal affection can initiate SCI in terms of strategic alliances, information integration, and process integration. Personal credibility serves as a gatekeeper and strengthens the confidence of interactive counter partners to integrate the supply chain. Personal communication plays a more important role than personal affection and credibility in facilitating the integration of the supply chain (Refer to ***Figure 15***).

Figure 15 *Research findings on IPRs-SCI relationship*

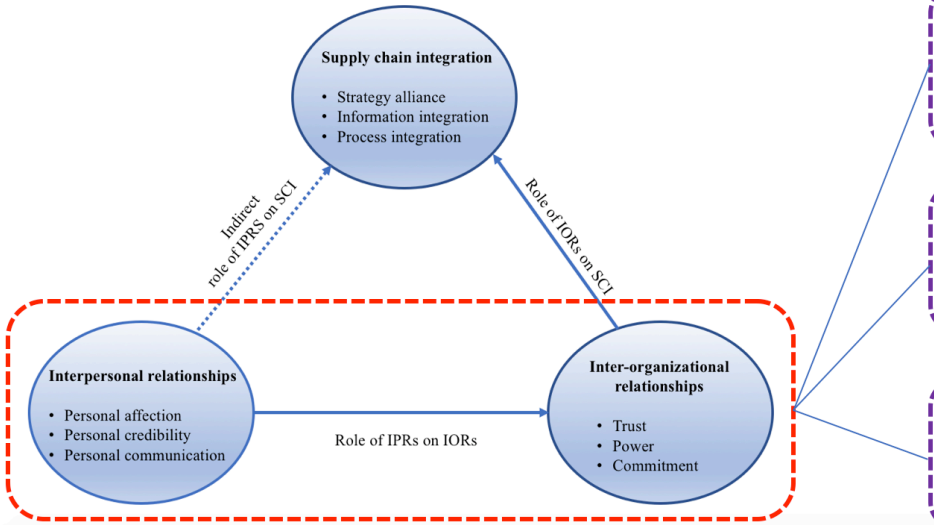


In order to investigate the role of IPRs on IORs in SCI, the research applied qualitative multiple case studies to explore how IPRs influence IORs during the formative and operational stages of SCI. For a better understanding the interaction between IPRs and IORs, the "content" of both IORs and IPRs can be considered to be the accrued stock in the perspective of process because both IPRs and IORs need time to be built. For example, regarding IOR activities, trust can only been built between supply chain partners over time (Lewicki and Wiethoff, 2000); similarly, commitment can be regarded as a matter of accrued investments (Alutto et al., 1973). Power, however, may shows different characteristics from trust and commitment as power is based on the control of resources valued or desired by others (Parmigiani and Rivera-Santos, 2011). In terms of IPR content, personal affection can be mainly generated and developed from the accrued "stock" of feeling over time (Wisner *et al*., 2016). Personal credibility is mainly based on the individuals historical data and records in the business. Personal communication can be mainly considered as the present level enabler as it reflects the updated and newest contents although the communication in the past still has some influences (Barnes *et al*., 2015).

The research found that IPRs can influence IORs across the whole SCI process and the three dimensions of IPRs show different characteristics during the formative and operational stages (Refer to ***Figure 16***).

Figure 16 *Research findings on IPRs-IORs relationship*

- IPRs are able to interact with IORs to influence SCI.
- IPRs can initiate IORs at the formative stage of SCI, subsequently leading to the development of formal IORs.
- Influences from IPRs' three dimensions on IORs tend to be of differing magnitudes and have different evolutional paths across formative and operational stages.
  - In the formative stage, personal credibility plays a more important role as a gatekeeper than personal affection (acting as an initiator) and personal communication.
  - In the operational stage, influence of personal credibility and affection is likely to decline while influence of personal communication is likely to increase significantly.



P1. During the formative stage of SCI, IPRs play a central role in initiating relationships at the organisation level, which subsequently leads to the development of formal IORs.

P2. Personal credibility, affection, and communication among boundary spanners can significantly influence the occurrence of IORs.

P3. The effects of IPRs on IORs evolve as SCI develops; the influence of personal credibility and affection decline over time, whilst personal communication increases.

5.2 Theoretical implications

This research makes a key contribution to SCI literature by offering a more comprehensive understanding of the relationship between IPRs, IORs and SCI in several ways.

First, this research extends SCI literature from macro, organizational level relationships to micro, individual level relationships. Most extant SCI literature has a notable weakness in focusing on firm level relationships and leaving individual level relationships unattended (Gligor and Holcomb, 2013). This research probes into the individual level relationships to explore the inner mechanism of SCI enablers for the first time. Although this research employs a simplified IPRs-IORs-SCI setting system, it establishes a conceptual framework to clarify the relationships between IPRs, IORs and SCI. It demonstrates that the role of IPRs in SCI should not be overlooked as research of the IORs-SCI link is only part of SCI enabler research. This research offers a more comprehensive understanding of the IPRs-IORs-SCI system and provides new insights about the inner motivation and driver of SCI.

Second, this research advances SCI theory by expanding the knowledge of IPRs' dimensions in interfirm relationship quality, and consequently financial performance (Barnes *et al*., 2015). It reveals a link between IPRs and SCI. It studies the different characteristics of personal affection, personal credibility, and personal communication in a SCI context. It also examines how they influence strategic alliance, information integration, and process integration in SCI. The results indicate that IPRs play a central role during the formative stage of SCI: personal affection works as an initiator, personal credibility serves as a gatekeeper, and personal communication functions as a facilitator.

This research also applies IPR dimensions to study the link between IPRs and IORs in a SCI context. Previous literature argues that in Western culture, IORs are established first and only then do IPRs develop within the IOR context (Park and Luo, 2001). One reason is that a

relational exchange in most Western cultures is more driven by legality and rules rather than by social norms (Wang, 2007). This research investigates how personal affection, credibility, and communication influence IORs regarding organizational trust, power, and commitment. The research results indicate that IPRs are able to shape and enable IORs in the formative and operational stage of a SCI context. This supports the statement that a company may not establish a relationship with another company unless it establishes the relationship between relevant individuals first (Gligor and Holcomb, 2013).

On the other hand, this research also suggests that the role of IPRs in SCI should be mediated by IORs. This result addresses the relationship status between IPRs and IORs in SCI. Given that SCI operates at the firm level, IPRs can only work through IORs to enable SCI, therefore IPRs are subordinate to IORs. The findings enrich current understandings of relationships between IPRs and IORs. In addition, the research provides evidence to the statement that all cultures in business share some basic characteristics, including mutual understanding, cooperative behaviour and long-term orientation (Wang, 2007).

Third, the research sheds light on the application of social related and resource related theories in SCI literatures. Social exchange theory (SET) explores the exchange between individuals or groups for expectations of a reward (Wu *et al*., 2014). This research extends SET to the exchange between different levels of relationships, i.e. IPRs and IORs in SCI. It investigates the application of social networks in SCI and finds that social ties and networks of IPRs and IORs can be overlapped and are exchangeable; initiation and development of IPRs can lead to a creation of social capital manifested as relational embeddedness in IORs (Gelderman *et al*., 2016).

This research also furthers resource related theories in SCI study. For instance, it applies a resource based view (RBV) on the basis that IPRs are the firm's critical resources because

they are more valuable, rare, inimitable, and non-substitutable (Barney, 1991). Also, it develops resource dependence theory (RDT) in relation to a SCI context. It demonstrates that a firm enters a SC to manage the level of its dependence on the external environment for resources in order to ensure its survival and win competition in the market (Cho *et al*., 2017; Pfeffer and Salancik, 1978). IPRs can affect the resource dependence level and related power on SC partners, thus facilitating the formation of IORs (Drees and Heugens, 2013). Consequently, SCI can be achieved by aligning inter-organizational arrangements and coordinating SC activities and processes.

In addition, this research explores resource orchestration theory (ROT) in SCI by suggesting that the fit or alignment of interdependent resources of IPRs and IORs should be considered. Possessing or merely combining abundant resources alone does not generate synergistic effects (Liu *et al*., 2016). All the available resources of IORs and IPRs, as well as IPRs' three dimensions, should be structured and bundled to build capabilities, and then leveraged to excel in performance for SC actors.

Last but not least, the research adopts strategic alliance, information integration, and process integration as the dimensions of SCI. Most extant SCI literatures prefer the scope of integration, i.e. internal and external (supplier/customer) integration; very few research has studied SCI three main contents simultaneously. This research regarded SCI including service SCI as a system and focused on SCI contents and studied the three dimensions of SCI as a whole. This content-based SCI classification encourages researchers and practitioners to concentrate more on SCI constituents, regardless of internal or external integration. It gives prominence to strategic alliances as the first concern of SCI, reflecting the strategic nature of SCI. Since information and material flows are the two main flows in supply chains to be synchronised with each other (Stevens and Johnson, 2016), information integration and process

integration should be synchronously managed in SCI. This research applies content-based SCI to supplement the scope-based SCI, enriching our understanding of SCI.

This research applies content-based SCI to supplement the scope-based SCI, enriching our understanding of SCI.

In summary, this research has accomplished a significant exploration of the inner mechanism of SCI enablers. It has furthered a deeper understanding of the behavioural complexities during the interaction between the buyer and supplier in SCI (Gligor and Holcomb, 2013; Sambasivan et al., 2013). Overall it enables a new direction to research SCI.

Table 16 briefly summarizes the contributions of this research.

Table 16 *Research contribution summary*

Overall contribution	Extend SCI literature from the macro-organizational level to the micro individual level and explore the role of IPRs in SCI.
Chapter	**Contribution**
Chapter 2. Enablers of supply chain integration: interpersonal and inter-organizational perspectives	Develop a new SCI enablers conceptual framework by proposing the influence of IPRs on SCI through mediators of IORs.
	Contribute to the understanding of SCI by adopting content-based dimensions, i.e. strategic alliance, information integration, and process integration, which differs to the popular scope-based dimensions approach that typically includes internal integration, external integration (supplier/customer integration)
	Link IPR dimensions, IOR dimensions, and SCI dimensions, contributing to SCI enabler research and to relationship management between different levels.
	Shed new light on the application of social exchange theory (SET) and a resource-based view (RBV) in a SCI context. Traditionally, SET concentrates on social exchange within the same level, whereas this research explores the exchange and interaction between IPR, IOR levels in SCI. It also shows that IPRs can be an important company resource to influence SCI.
Chapter 3. Service Supply Chain Integration: The Role of Interpersonal Relationships	Extend research on SCI from the usual focus on manufacturing to the service sector, and from physical supply chains to service supply chains.
	Regard service SCI as a system which will simultaneously study strategic alliance, information integration, and process integration.
	Identify the more significant roles IPRs play in facilitating service SCI because service SCs focus more on direct dyadic supplier-customer connections.
	Apply resource orchestration theory (ROT) to service SCI literature: all available resources including IORs, IPRs, and inherently related sub-resources of IPRs (personal affection, credibility, and communication) shall be orchestrated purposely to achieve superior performance in service SCI.
Chapter 4. Inter-personal and inter-organizational relationship drivers of supply chain integration	Contribute to SCI literature in terms of the roles and mechanisms through which IPRs shape and enable IORs in the formative and operational stage within a SCI context.
	Integrate factors from both IPRs and IORs to examine their interactive roles in enabling SCI.
	Identify the different roles of IPRs' three dimensions, personal affection, credibility, and communication, and examine how they interact with IORs to influence SCI.
	Show that the dimensions of IPRs follow different evolutionary directions in their influence on IORs during the formative and operational stages of SCI: influence from personal affection and credibility tends to decline over time whereas influence from personal communication tends to increase.
	Apply resource dependence theory (RDT) to SCI literature, demonstrating that the three dimensions of IPRs, personal affection, credibility, and communication, can affect IOR resource dependence and related power then influence the initiation and development of IORs.

5.3 Managerial implications

This research provides insights for managers to integrate the relationships between IPRs and IORs in SCI. It shows that IPRs are important resources which can initiate the formation of IORs and facilitate the development of IORs in a SCI context. This is particularly important for managers who have limited firm level resources: if managers can recognise the significance of IPRs' resources and utilise their firms' IPRs' resources to foster successful IORs, they consequently enable SCI and improve their firm's performance.

This finding has important implications for managers, especially in a Western culture. Many managers overlook the role of IPRs in SCI because relational exchanges in most Western cultures are driven by legality and rules (Wang, 2007). It has also been widely accepted that in Western culture, IORs would need to be established first before IPRs can develop (Park and Luo, 2001). However, this empirical research in New Zealand, an essentially Western culture country (Statistics New Zealand, 2013), shows IPRs may also initiate IORs in the formative stage of SCI. The research findings supplement the current literature and state that the sequence of IPRs and IORs is strongly related to the stage of SCI, so managers can employ IPR resources to initiate IORs to enable SCI in the formative stage. Therefore, practitioners even in Western culture can improve the awareness the significance of IPRs and treat its IPRs as critical and unique soft resources, especially when companies have limited "hard" resources such as technology, facilities, and finance.

On the other hand, "soft" relationship and behaviour components also play at least equally important roles in SCI as "hard" organizational processes and technologies (Huo et al., 2015; Sweeney, 2013). Results of the research indicate that IPRs are able to provide the flexibility to manage the dynamic and sophisticated SCI process (Boon-itt *et al*., 2017) by creating strong personal ties between SC partners (Leunbg *et al*., 2005). Therefore, managers should not only

focus on firm level factors to enhance SCI, but also pay attention to IPRs and be aware of its significance in SCI.

This research provides valuable guidance to managers about when and how to deploy IPR and IOR resources to achieve superior orchestration effect in a SCI process. In the formative stage of SCI, IPRs play a central role since traditional face-to-face contact may still be more effective, preferred, and necessary. As a result, managers should invest more time and funds to initiate and cultivate IPRs with their SC partners during this critical stage. As IPRs provide the basis for developing IORs, managers should still look to foster IPRs through strategies such as face-to-face meetings between individuals in order to cultivate personal affection and mitigate the isolating effects of modern information, communication technologies and smart applications. Managers should handpick staff with good character-based personal credibility, and train them to improve their reliability-based personal credibility. In the operational stage, as influence of personal communication becomes more important, managers should focus more on improving the personal communication skills of boundary spanners and utilizing these to facilitate firm level collaboration.

Furthermore, managers need to orchestrate IPR and IOR resources to excel in SCI. On the one hand, managers are able to actively leverage the personal affection, credibility, and communication of their boundary spanners so as to improve firm level trust, power, and commitment. Thus managers can make effective use of IPRs in identifying business opportunities and in initiating collaborations with potential SC partners. On the other hand, as IPRs can only work through IORs, IPRs are subordinate to IORs. Managers should advise boundary spanning individuals that the purpose of developing IPRs is to enhance IORs in order to enhance SCI performance, not the other way around. Managers should be cautious about

and mitigate the conflicts between primary business interests and subordinate interpersonal friendships.

5.4 Limitations and future research

Although this research has made significant contributions to SCI literature and practical implications, it also has a number of limitations.

Firstly, the content of this research has a limited scope. This research builds a simplified framework of the three key constructs, IPRs, IORs, and SCI, and examines one directional relationships, specifically the role of IPRs on IORs, and the role of IPRs on SCI. The influence of IORs and SCI on IPRs is an area that could be further examined in the future. Other areas that offer opportunities for further research include:

- The relationship between IPRs and IORs-SCI relationships,
- The relationship between IORs and IPRs-SCI relationships,
- The relationship between SCI and IPRs-IORs relationships.

These relationships are important and should not be ignored. For example, IORs can limit and affect the influence level of IPRs-SCI and vice versa. Similarly, SCI may affect the trade-off between IPRs and IORs while SCI performance may be affected by the balance of IPRs and IORs. Each construct has different defined dimensions, but this research concentrates on only some of these dimensions. For example, this research focuses on trust, power, and relationship commitment, even though IORs also encompass other factors such as leadership, justice, reciprocity, culture, and technology (Cao *et al*., 2015; Wu *et al*., 2014). The three dimensions of IPRs on which this research has chosen to focus, may also be open to dispute.

Secondly, this research used an exploratory case study approach and empirical data from selected sample companies in New Zealand, which of course does not reflect the full range of

industry situations across the wider world. In examining the IPRs-SCI relationship within a specific service sector, the research findings may only represent a particular case of the model. Similarly, the research on IPRs-IORs used four case studies from the bottling, software, and 4PL industries, which again is not necessarily representative of other industries. In the two paper-based chapters, data collection was mainly from interviews, so the recollection of incidents and events may be subject to bias even from the same respondents. In addition, the propositions need to be further tested on a larger and more diverse firm population using a quantitative method. For example, the mediating role of IORs on IPRs and SCI is important but fell outside the scope of this research project. Indeed, a study of the complex IPRs-IORs-SCI system represents a promising, significant, and practical project for the future.

SCI process is closely related to the process between organizational level relationships. The long-term cooperative IORs process can be classified into different stages for different study purposes. For example, Ring and Van de Ven (1994) address four stages (including negotiation, commitment, execution, and dissolution) to discuss the sub-functions of the process. These stages do not necessarily follow a sequential process (Choi and Lee, 1997). This thesis on SCI process focuses more on the critical initial mechanism and enabling role of IPRs on SCI, so the research simply classifies the process into formative stage and operational stage.

Although the research has endeavoured to initiate the investigation by employing a qualitative case study approach, all the data were collected at a certain time point, thus these data may reflect the interviewees' thinking and perception of the events which were occurred in the past only. Without continuously observing to collect data in the follow-up study at different time points, this research design has an inherent weakness related to the data consistency, consequently it has potential risk to affect data reliability. The longitudinal qualitative data analysis may be more suitable for the research, however, it is too complex and

time consuming (Calman et al., 2013), which a 4-year PhD study may not implement it comprehensively. So, a more in-depth exploration of the whole system in the future is warranted.

Future studies in this area could adopt alternative research methodologies, such as survey research. A larger, general, and more diverse firm population in different industries across different countries and cultures could be included to quantitatively test the models and propositions postulated in this research. For example, the mediating role of IORs in IPRs-SCI needs to be empirically tested. This would enable a better understanding of the inner mechanisms of the role of IPRs in a SCI context. Future research may also benefit from undertaking a systematic exploration of the following relationships between the three main constructs.

- The influence of SCI on IPRs. Firm level SCI affects the interaction of boundary spanners and their IPRs. For example, strategic alliances are the responsibility of managers in every company (Hamel, 1991). Information sharing is related to personal attitudes (Jarvenpaa and Staples, 2000). Existing conflicts need to be solved by SC managers during the SCI process (Ballou *et al.*, 2000). All of these interactions can impact both SCI performance and the development of IPRs.
- The influence of IORs on IPRs. The firm level factors of trust, power, commitment, and others can also influence the relationships between boundary spanners. For example, good firm level relationships can increase people's trust (Gefen, 2000).

Lastly but not least, the influence of environmental factors such as culture and technology in SCI has not been studied in this thesis. According to Cao *et al* (2015), culture, as an important environmental factor, can even be regarded as one of the enablers of SCI. Culture has a collective programming results in social norms and values that guides people's behaviour and

beliefs (Doney *et al*., 1998). As this research was set in New Zealand, there was no doubt that the culture of country and organizations had some impacts on the nature of the comments which were collected in Chapter 3 and 4. New Zealand culture is essentially a Western culture and influenced by the unique environment and geographic isolation of the islands, and the input of the indigenous Maori and multi-ethnic migration (Statistics New Zealand, 2013). New Zealand culture is neither the relationship-oriented culture like some other Asian countries such as China and Japan, nor the institution-based western culture. Culture's influence on personal affection may be subjective and subtle while its influence on personal credibility might be not so significant as credibility is mainly based on 'track record'. Culture might have some influence on personal communication regarding attitude, preferred/traditional communication approaches/tools, and understanding. Anyway, the influence of environmental factors (also including uncertainties about the environment, technology, and demand) can also be examined in the IPRs-IORs-SCI system to provide additional insights.

References

Adobor, H. (2006), "The role of personal relationships in inter-firm alliances: Benefits, dysfunctions, and some suggestions", *Business Horizons*, Vol. 49 No.6, pp. 473-486.

Aitken, J., Childerhouse, P., Deakins, E., and Towill, D. (2016), "A comparative study of manufacturing and service sector supply chain integration via the uncertainty circle model," *The International Journal of Logistics Management*, Vol. 27 No. 1, pp. 188-205.

Alutto, J. A., Hrebiniak, L. G., and Alonso, R. C. (1973), "On operationalizing the concept of commitment," *Social Forces*, Vol. 51, No. 4, pp. 448-454.

Anderson, J.C., Hakansson, H. and Johanson, J. (1994), "Dyadic business relationships within a business network context", *Journal of Marketing*, Vol. 58 No. 4, pp. 1-15.

Arlbjørn, J. S., Freytag, P. V., and de Haas, H. (2011), "Service supply chain management: A survey of lean application in the municipal sector," *International Journal of Physical Distribution and Logistics Management*, Vol. 41 No. 3, pp. 277-295.

Ashcraft, K. L. (2006), "Feminist-bureaucratic control and other adversarial allies: Extending organized dissonance to the practice of 'new' forms," *Communication Monographs*, Vol. 73 No. 1, pp. 55-86.

Auster, E.R. (1989), "International corporate linkage: dynamic forms in changing environments", *Columbia Journal of World Business*, Vol. 22 No. 2, pp. 3-6.

Bachmann, R. (2001), "Trust, power and control in trans-organization relations", *Organzaiton Studies*, Vol. 22 No. 2, pp. 337-366.

Baltacioglu, T., Ada, E., Kaplan, M. D., Yurt And, O., and Cem Kaplan, Y. (2007), "A new framework for service supply chains," *The Service Industries Journal*, Vol. 27 No. 2, pp. 105-124.

Barnes, B. R., Leonidou, L. C., Siu, N. Y., and Leonidou, C. N. (2015), "Interpersonal factors as drivers of quality and performance in Western–Hong Kong interorganizational business relationships," *Journal of International Marketing*, Vol. 23 No. 1, pp. 23-49.

Barney, J. (1991), "Firm resources and sustained competitive advantage," *Journal of Management*, Vol. 17 No. 1, pp. 99-120.

Barney, J., Ketchen, D.J. Jr and Wright, M. (2011), "The future of resource-based theory: revitalization or decline?", *Journal of Management*, Vol. 37 No. 5, pp. 1299-1315.

Bask, A., Lipponen, M., Rajahonka, M., and Tinnilä, M. (2010), "The concept of modularity: Diffusion from manufacturing to service production," *Journal of Manufacturing Technology Management*, Vol. 21 No. 3, pp. 355-375.

Beth, S., Burt, D.N., Copacino, W., Gopal, C., Lee, H.L., Lynch, R.P. and Morris, S. (2003), "Supply chain challenges: building relationship", *Harvard Business Review*, Vol. 81 No. 7, pp. 64-73.

Bitsch, V. (2005), "Qualitative research: A grounded theory example and evaluation criteria", *Journal of Agribusiness*, Vol. 23 No. 1, pp.75-91.

Boon-itt, S., Wong, C. Y., and Wong, C. W. (2017), "Service supply chain management process capabilities: Measurement development," *International Journal of Production Economics*, Vol. 193 No. 1, pp. 1-11.

Borgatti, S. P., and Li, X. (2009), "On social network analysis in a supply chain context", *Journal of Supply Chain Management*, Vol. 45 No. 2, pp. 5-22.

Bowersox, D. J., Closs, D. J., and Copper, M. B. (2010), "Chapter 15. Relationship development and management," in Gordon, B. (Ed.), *Supply Chain Logistics Management* (3rd ed.), New York, NY: McGraw-Hill Irwin.

Brass, D.J., Galaskiewicz, J., Greve, H.R. and Wenpin, T. (2004), "Taking stock of networks andorganizations: a multilevel perspective", *Academy of Management Journal*, Vol. 47 No. 6, pp. 795-817.

Braunscheidel, M. J., Suresh, N. C., and Boisnier, A. D. (2010), "Investigating the impact of organizational culture on supply chain integration", *Human Resource Management*, Vol. 49 No. 5, pp. 883-911.

Brinkhoff, A., Ozer, O. and Sargut, G. (2015), "All you need is trust? An examination of inter-organizational supply chain projects", *Production and Operations Management*, Vol. 24 No. 2, pp. 181-200.

Brown, J.R., Lusch, R.F. and Nicholson, C.Y. (1995), "Power and relationship commitment: their impact on marketing channel member performance", *Journal of Retailing*, Vol. 71 No. 4, pp. 363-392.

Bruccoleri, M., Cannella, S., and La Porta, G. (2014), "Inventory record inaccuracy in supply chains: the role of workers' behaviour", *International Journal of Physical Distribution and Logistics Management*, Vol. 44 No. 10, pp. 796-819.

Bryman, A. and Bell, E. (2011), "Chapter 1: Business research strategies", *Business research methods*. (3rd Edition), Oxford University Press, pp. 3-38.

Cai, S., Jun, M., and Yang, Z. (2017), "The effects of boundary spanners' personal relationships on interfirm collaboration and conflict: A study of the role of guanxi in China," *Journal of Supply Chain Management*, Vol. 53 No. 3, pp. 19-40.

Cai, S. and Yang, Z. (2014), "The role of the guanxi institution in skill acquisition between firms: a study of Chinese firms", *Journal of Supply Chain Management*, Vol. 50 No. 4, pp. 3-23.

Calman, L., Brunton, L., and Molassiotis, A. (2013), "Developing longitudinal qualitative designs: lessons learned and recommendations for health services research", *BMC medical research methodology*, Vol. 13, No. 1, pp. 1-10.

Cao, Z., Huo, B., Li, Y., and Zhao, X. (2015), "The impact of organizational culture on supply chain integration: A contingency and configuration approach," *Supply Chain Management: An International Journal*, Vol. 20 No. 1, pp. 24-41.

Carter, C. R., Rogers, D. S., and Choi, T. Y. (2015), "Toward the theory of the supply chain", *Journal of Supply Chain Management*, Vol. 51 No. 2, pp. 89-97.

Cavanagh, A., and Freeman, S. (2012), "The development of subsidiary roles in the motor vehicle manufacturing industry," *International Business Review,* Vol. 21 No. 4, pp. 602-617.

Chen, I. J., and Paulraj, A. (2004), "Towards a theory of supply chain management: the constructs and measurements", *Journal of operations management*, Vol. 22 No. 2, pp. 119-150.

Chen, I.J. and Paulraj, A. (2004), "Understanding supply chain management: critical research and a theoretical framework", *International Journal of Production Research*, Vol. 42 No. 1, pp. 131-163.

Cheng, J. H. (2011). Inter-organizational relationships and information sharing in supply chains. *International Journal of Information Management*, Vol. 31 No. 4, pp. 374-384.

Chickering, A.W. and Reisser, L. (1993), *Education and Identity* (2nd ed.), The Jossey-Bass Higher and Adult Education Series, Jossey-Bass Inc. Publishers, San Francisco, CA.

Childerhouse, P., Bohme, T., Towill, D.R. and Disney, S.M. (2011), "Supply chain integration: an international comparison of maturity", *Asia Pacific Journal of Marketing and Logistics*, Vol. 23 No. 4, pp. 531-552.

Childerhouse, P., and Towill, D. R. (2011), "Arcs of supply chain integration," *International Journal of Production Research*, Vol. 49 No. 24, pp. 7441-7468.

Cho, B., Ryoo, S. Y., and Kim, K. K. (2017), "Interorganizational dependence, information transparency in interorganizational information systems, and supply chain performance", *European Journal of Information Systems*, Vol. 26 No. 2, pp. 185-205.

Chong, J. C. and Lee, S. H. (1997), "Chapter 2. A knowledge-based view of cooperative interorganizational relationships", *Cooperative strategies: European perspectives,* (Editor: Beamish, P. W. and Killing, J. P.), The New Lexington Press, San Francisco, pp. 33-57.

Cox, A. (2001), "Understanding buyer and supplier power: a framework for procurement and supply competence", *Journal of Supply Chain Management*, Vol. 37 No. 1, pp. 8-15.

Cousins, P. (2005), "The alignment of appropriate firm and supply strategies for competitive advantages", *International Journal of Production and Operations Management*, Vol. 25 No. 5, pp. 403-428.

Cousins, P. D., Handfield, R. B., Lawson, B., and Petersen, K. J. (2006), "Creating supply chain relational capital: The impact of formal and informal socialization processes," *Journal of Operations Management*, Vol. 24 No. 6, pp. 851-863.

Croxton , K. L., Garcia-Dastugue, S. J., Lambert, D. M., and Rogers, D. S. (2001), "The supply chain management processes", *The International Journal of Logistics Management*, Vol. 12 No. 2, pp. 13-36.

Cummings, L.L. and Bromiley, P. (1996), "The organizational trust inventory (OTI): development and validation", in Kramer, R.M. and Tyler, T.R. (Eds), *Trust in Organizations: Frontiers of Theory and Research*, Sage Publications, Thousands Oaks, CA, pp. 302-330.

Danese, P. and Bortolotti, T. (2014), "Supply chain integration patterns and operational performance: a plant-level survey-based analysis", *International Journal of Production Research*, Vol. 52 No. 23, pp. 7062-7083.

Das, R. C. (Ed.). (2016). *Handbook of Research on Global Indicators of Economic and Political Convergence*. IGI Global.

Diesner, J., Frantz, T. L., and Carley, K. M. (2005), "Communication networks from the Enron email corpus 'It's always about the people. Enron is no different.'" *Computational and Mathematical Organization Theory*, Vol. 11 No. 3, pp. 201-228.

Diener, E., Oishi, S., and Lucas, R. E. (2003), "Personality, culture, and subjective well-being: Emotional and cognitive evaluations of life," *Annual Review of Psychology*, Vol. 54 No. 1, pp. 403-425.

Doney, P. M., Cannon, J. P., & Mullen, M. R. (1998), "Understanding the influence of national culture on the development of trust", *Academy of management review*, Vol. 23 No. 3, pp. 601-620.

Drees, J. M., and Heugens, P. P. (2013), "Synthesizing and extending resource dependence theory: A meta-analysis", *Journal of Management*, Vol. 39 No. 6, pp. 1666-1698.

Dyer, J.H. and Singh, H. (1998), "The relational view: cooperative strategy and sources of interorganizational competitive advantage", *Academy of Management Review*, Vol. 23 No. 4, pp. 660-679.

Ebrahim-Khanjari, N., Hopp, W. and Iravani, S.M.R. (2012), "Trust and information sharing in supply chains", *Production and Operations Management*, Vol. 21 No. 3, pp. 444-464.

Eisenhardt, K. M. (1989), "Building theories from case study research," *Academy of Management Review*, Vol. 14 No. 4, pp. 532-550.

Eisenhardt, K. M. (1989), "Agency theory: An assessment and review", *Academy of management review*, Vol. 14 No. 1, pp. 57-74.

Ekanayake, S., Childerhouse, P., and Sun, P. (2017), "The symbiotic existence of interorganizational and interpersonal ties in supply chain collaboration", *International Journal of Logistics Management*, Vol. 28 No. 3, pp. 723-754

Ellram, L.M. (1991), "A managerial guideline for the development and implementation of purchasing parterships", *International Journal of Purchasing and Materials Management*, Vol. 27 No. 3, pp. 2-8.

Fawcett, S.E., Ellram, L.M. and Ogden, J.A. (2007), "Chapter 14 people management: bridge or barrier to SCM", in Pfaltzgraff, M. (Ed.), *Supply Chain Management: From Vision to Implementation*, Pearson Prentice Hall, pp. 433-462.

Fischer, C. S. (1982), "What do we mean by 'friend'? An inductive study", *Social networks*, Vol. 3 No. 4, pp. 287-306.

Flynn, B. B., Huo, B., and Zhao, X. (2010), "The impact of supply chain integration on performance: A contingency and configuration approach", *Journal of operations management*, Vol. 28 No. 1, pp. 58-71.

Freeman, L. C. (1978), "Centrality in social networks conceptual clarification", *Social networks*, Vol. 1 No. 3, pp. 215-239.

Frohlich, M.T. and Westbrook, R. (2001), "Arcs of integration: an international study of supply chain strategies", *Journal of Operations Management*, Vol. 19 No. 2, pp. 185-200.

Fugate, B., Sahin, F., and Mentzer, J. T. (2006), "Supply chain management coordination mechanisms," *Journal of Business Logistics*, Vol. 27 No. 2, pp. 129-162.

Fulmer, C. A., and Ostroff, C. (2016), "Convergence and emergence in organizations: An integrative framework and review", *Journal of Organizational Behaviour*, Vol. 37 (S1).

Galaskiewicz, J. (2011), "Studying supply chains from a social network perspective", *Journal of Supply Chain Management*, Vol. 47 No. 1, pp. 4-8.

Gelderman, C. J., Semeijn, J., and Mertschuweit, P. P. (2016), "The impact of social capital and technological uncertainty on strategic performance: The supplier perspective", *Journal of Purchasing and Supply Management*, Vol. 22 No. 3, pp. 225-234.

Gimenez, C., van der Vaart, T., and Pieter van Donk, D. (2012). Supply chain integration and performance: the moderating effect of supply complexity. *International Journal of Operations and Production Management*, Vol. 32 No. 5, pp. 583-610.

Gibbert, M., Ruigrok, W., and Wicki, B. (2008), "What passes as a rigorous case study?" *Strategic Management Journal*, Vol. 29 No. 13, pp. 1465-1474.

Glaser, B. G., & Strauss, A. L. (2017), *Discovery of grounded theory: Strategies for qualitative research*. Routledge.

Gligor, D. M., and Autry, C. W. (2012), "The role of personal relationships in facilitating supply chain communications: A qualitative study," *Journal of Supply Chain Management*, Vol. 48 No. 1, pp. 24-43.

Gligor, D. M., and Holcomb, M. (2013), "The role of personal relationships in supply chains: An exploration of buyers and suppliers of logistics services," *The International Journal of Logistics Management*, Vol. 24 No. 3, pp. 328-355.

Grayson, K. (2007), "Friendship versus business in marketing relationships", *Journal of Marketing*, Vol. 71 No. 4, pp. 121-139.

Griffith, D. A., Harvey, M. G., and Lusch, R. F. (2006). Social exchange in supply chain relationships: The resulting benefits of procedural and distributive justice. *Journal of operations management*, Vol. 24 No. 2, pp. 85-98.

Gundlach, G.T., Achrol, R.S. and Mentzer, J.T. (1995), "The structure of commitment in exchange", *Journal of Marketing*, Vol. 59 No. 1, pp. 78-92.

Hakansson, H. and Snehota, I. (1995), *Developing Relationships in Business Networks*, International Thomson Business Press, London.

Halldórsson, Á., Hsuan, J., and Kotzab, H. (2015), "Complementary theories to supply chain management revisited–from borrowing theories to theorizing", *Supply Chain Management: An International Journal*, Vol. 20 No. 6, pp. 574-586.

Handfield, R. B., and Bechtel, C. (2002), "The role of trust and relationship structure in improving supply chain responsiveness", *Industrial marketing management*, Vol. 31 No. 4, pp. 367-382.

Haq, A. N., and Boddu, V. (2017), "Analysis of enablers for the implementation of leagile supply chain management using an integrated fuzzy QFD approach", *Journal of Intelligent Manufacturing*, Vol. 28 No. 1, pp. 1-12.

Harrison, A. and van Koek, R. (2008), "Chapter 1 logistics and supply chain", *Logistics Management and Strategy Competing Through the Supply Chain* (3rd ed.), Prentice Hall, Harlow, pp. 3-32.

Harvey, M.G. and Lusch, R.F. (1995), "A systematic assessment of potential international strategic alliance partners", *International Business Review*, Vol. 4 No. 2, pp. 195-212.

Haytko, D. L. (2004), "Firm-to-firm and interpersonal relationships: Perspectives from advertising agency account managers", *Journal of the Academy of Marketing Science*, Vol. 32, No. 3, pp. 312-328.

Hemilä, J., and Vilko, J. (2015), "The development of a service supply chain model for a manufacturing SME," *The International Journal of Logistics Management*, Vol. 26 No. 3, pp. 517-542.

Helfat, C.E. and Peteraf, M.A. (2003), "The dynamic resource-based view: capability lifecycles", *Strategic Management Journal*, Vol. 24 No. 10, pp. 997-1010.

Hertz, S. (2006), "Supply chain myopia and overlapping supply chains", *Journal of Business and Industrial Marketing*, Vol. 21 No. 4, pp. 208-217.

Hines, T. (2004), *Supply Chain Strategy*, Elsevier Butterworth-Heinemann, Oxford.

Hitt, M. A., Xu, K., and Carnes, C. M. (2016), "Resource based theory in operations management research," *Journal of Operations Management*, Vol. 41 No. 1, pp. 77-94.

Hult, G. T. M., Ketchen, D. J., and Slater, S. F. (2004), "Information processing, knowledge development, and strategic supply chain performance", *Academy of management journal*, Vol. 47, No. 2, pp. 241-253.

Huo, B. (2012), "The impact of supply chain integration on company performance: An organizational capability perspective," *Supply Chain Management: An International Journal*, Vol. 17 No. 6, pp. 596-610.

Huo, B., Flynn, B. B., and Zhao, X. (2017), "Supply chain power configurations and their relationship with performance", *Journal of Supply Chain Management*, Vol. 53, No. 2, pp. 88-111.

Huo, B., Han, Z., Chen, H., and Zhao, X. (2015), "The effect of high-involvement human resource management practices on supply chain integration," *International Journal of Physical Distribution and Logistics Management*, Vol. 45 No. 8, pp. 716-746.

Huo, B., Qi, Y., Wang, Z. and Zhao, X. (2014), "The impact of supply chain integration on firm performance: the moderating role of competitive strategy", *Supply Chain Management: An International Journal*, Vol. 19 No. 4, pp. 369-384.

Ireland, R.D. and Webb, J.W. (2007), "A multi-theoretic perspective on trust and power in strategic supply chains", *Journal of Operations Management*, Vol. 25 No. 2, pp. 482-497.

Joyce, S. (2014). "The Small Business Sector Report 2014", *Ministry of Business, Innovation and Employment*. Wellington. New Zealand.

Kale, P. and Singh, H. (2009), "Managing strategic alliances: what do we know now, and where do we go from here", *Academy of Management Perspectives*, Vol. 23 No. 3, pp. 45-62.

Kannan, V.R. and Tan, K.C. (2004), "Supplier alliances: differences in attitudes to supplier and quality management of adopters and non-adopters", *Supply Chain Management: An International Journal*, Vol. 9 No. 4, pp. 279-286.

Ketchen, D. J., Wowak, K. D., and Craighead, C. W. (2014), "Resource gaps and resource orchestration shortfalls in supply chain management: The case of product recalls," *Journal of Supply Chain Management*, Vol. 50 No. 3, pp. 6-15.

Kim, Y., Choi, T. Y., Yan, T., and Dooley, K. (2011). "Structural investigation of supply networks: A social network analysis approach", *Journal of Operations Management*, Vol. 29 No. 3, pp. 194-211.

Krause, D.R. and Ellram, L.M. (1997), "Critical elements of supplier development", *European Journal of Purchasing and Supply Management*, Vol. 3 No. 1, pp. 21-31.

Krause, D.R., Handfield, R.B. and Tyler, B.B. (2007), "The relationships between supplier development, commitment, social capital accumulation and performance improvement", *Journal of Operations Management*, Vol. 25 No. 2, pp. 528-545.

Kwon, I.W. and Suh, T. (2004), "Factors affecting the level of trust and commitment in supply chain relationships", *Journal of Supply Chain Management*, Vol. 40 No. 1, pp. 4-14.

Kwon, I. W. G., and Suh, T. (2005). "Trust, commitment and relationships in supply chain management: a path analysis", *Supply chain management: an international journal*, Vol. 10 No. 1, pp. 26-33.

Lai, K. H., Wong, C. W. Y., and Lun, Y. H. V. (2014), "The role of customer integration in extended producer responsibility: A study of Chinese export manufacturers," *International Journal of Production Economics*, Vol. 147 No. 2, pp. 284-293.

Lambert, D.M. (2001), *Supply Chain Management: Processes, Partnerships, Performance* (3rd ed.), Supply Chain Management Institute, Sarasota, FL.

Lambert, D. M., and Cooper, M. C. (2000) . Issues in supply chain management. *Industrial marketing management*, Vol. 29 No.1, pp. 65-83.

Larsson, R., Bengtsson, L., Henriksson, K., and Sparks, J. (1998), "The interorganizational learning dilemma: Collective knowledge development in strategic alliances," *Organization Science*, Vol. 9 No. 3, pp. 285-305.

Lee, H. (2000), "Creating value through Supply chain integration", *Supply Chain Management Review*, Vol. 4 No. 4, pp. 30-36.

Lee, D. Y., and Dawes, P. L. (2005), "Guanxi, trust, and long-term orientation in Chinese business markets," *Journal of International Marketing*, Vol. 13 No. 2, pp. 28-56.

Leung, T. K. P., Kee-hung Lai, R., Chan, Y. K., and Wong, Y. H. (2005), "The roles of xinyong and guanxi in Chinese relationship marketing," *European Journal of Marketing*, Vol. 39 No. 5/6, pp. 528-559.

Leuschner, R., Rogers, D. S., and Charvet, F. F. (2013), "A meta-analysis of supply chain integration and firm performance", *Journal of Supply Chain Management*, Vol. 49 No. 2, pp. 34-57.

Lewicki, R. J., and Wiethoff, C. (2000), "Trust, trust development, and trust repair", *The handbook of conflict resolution: Theory and practice*, Vol. 1 No. 1, pp. 86-107.

Li, L., Qian, G. and Qian, Z. (2013), "Do partners in international strategic alliances share resources, costs, and risks?", *Journal of Business Research*, Vol. 66 No. 4, pp. 489-498.

Lillrank, P., Groop, J., and Venesmaa, J. (2011), "Processes, episodes and events in health service supply chains," *Supply Chain Management: An International Journal*, Vol. 16 No. 3, pp. 194-201.

Lian, P.C.S.and Laing, A.W. (2007), "Relationships in the purchasing of business to business professional services: the role of personal relationships", *Industrial Marketing Management*, Vol. 36 No. 6, pp. 709-718.

Lin, C.-W.R. and Chen, H.-Y.S. (2004), "A fuzzy strategic alliance selection framework for supply chain partnering under limited evaluation resources", *Computers in Industry*, Vol. 55 No. 2, pp. 159-179.

Lincoln, Y. S., & Guba, E. G. (1985), *Naturalistic inquiry* (Vol. 75). Sage.

Liu, H., Wei, S., Ke, W., Wei, K. K., and Hua, Z. (2016), "The configuration between supply chain integration and information technology competency: A resource orchestration perspective," *Journal of Operations Management*, Vol. 44 No. 1, pp. 13-29.

Loch, C. H., and Wu, Y. (2008), "Social preferences and supply chain performance: An experimental study," *Management Science*, Vol. 54 No. 11, pp. 1835-1849.

Lorange, P., Roos, J. and Bronn, P.S. (1992), "Building successful strategic alliances", *Long Range Planning*, Vol. 25 No. 6, pp. 10-18.

Lovett, S., Simmons, L.C. and Kali, R. (1999), "Guanxi versus the market: ethics and efficiency", *Journal of International Business Studies*, Vol. 30 No. 2, pp. 231-247.

Luo, Y. (2007), *Guanxi and Business* (2nd ed.). Singapore: World Scientific Publishing.

Lyles, M. A., Flynn, B. B., and Frohlich, M. T. (2008), "All supply chains don't flow through: Understanding supply chain issues in product recalls", *Management and Organization Review*, Vol. 4 No. 2, pp. 167-182.

Mackelprang, A.W., Robinson, J.L., Bernardes, E. and Webb, G.S. (2014), "The relationship between strategic supply chain integration and performance: a meta-analytic evaluation and implications for supply chain management research", *Journal of Business Logistics*, Vol. 35 No. 1, pp. 71-96.

Macintosh, G. and Lockshin, L.S. (1997), "Retail relationships and store loyalty: a multi-level perspective", *International Journal of Research in Marketing*, Vol. 14 No. 5, pp. 487-497.

Maloni, M. and Benton, W.C. (2000), "Power influences in the supply chain", *Journal of Business Logistics*, Vol. 21 No. 1, pp. 49-73.

Mandják, T., Szalkai, Z., Neumann-Bódi, E., Magyar, M., and Simon, J. (2016). Trigger issues in emerging relationships. *Industrial Marketing Management*, Vol. 58, pp. 137-147.

Maull, R., Geraldi, J., and Johnston, R. (2012), "Service supply chains: A customer perspective," *Journal of Supply Chain Management*, Vol. 48 No. 4, pp. 72-86.

Mayer, R.C., Davis, J.H. and Schoorman, F.D. (1995), "An integrative model of organizational trust", *Academy of Management Review*, Vol. 29 No. 3, pp. 709-34.

McEvily, B. and Marcus, A. (2005), "Embedded ties and the acquisition of competitive capabilities", *Strategic Management Journal*, Vol. 26 No. 11, pp. 1033-1055.

McKnight, D. H., Cummings, L. L., and Chervany, N. L. (1998), "Initial trust formation in new organizational relationships", *Academy of Management review*, Vol. 23, No. 3, pp. 473-490.

Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., and Zacharia, Z. G. (2001). Defining supply chain management. *Journal of Business logistics*, Vol. 22 No. 2, pp. 1-25.

Merriam, S. B. (1998), *Qualitative Research and Case Study Applications in Education. Revised and Expanded*. San Francisco, CA: Jossey-Bass Publishers.

Michailova, S. and Worm, V. (2003), "Personal networking in Russia and China: blat and guanxi", *European Management Journal*, Vol. 21 No. 4, pp. 509-519.

Miles, M. B., and Huberman, A. M. (2013), *Qualitative Data Analysis: A Methods Sourcebook* (3rd ed.). Thousand Oaks, CA: Sage.

Min, H. (2015), "Chapter 1: principles of supply chain management", in Neidlinger, A. (Ed.), *The Essentials of Supply Chain Management. New Business Concepts and Applications,* Pearson Education Ltd, Singapore, pp. 1-36.

Mocke, K., Niemann, W., and Kotzé, T. (2016), "The role of personal relationships between buyers and suppliers of third-party logistics services: A South African perspective", *Acta Commercii*, Vol. 16 No. 1, pp. 1-13.

Morgan, R.M. and Hunt, S.D. (1994), "The commitment-trust theory of relationship marketing", *Journal of Marketing*, Vol. 58, July, pp. 20-38.

Nahapiet, J. and Ghoshal, S. (1998), "Social capital, intellectual capital, and the organizational advantage", *Academy of Management Review*, Vol. 23 No. 2, pp. 242-266.

Nair, A., Jayaram, J., and Das, A. (2015), "Strategic purchasing participation, supplier selection, supplier evaluation and purchasing performance", *International Journal of Production Research*, Vol. 53 No. 20, pp. 6263-6278.

Narasimhan, R., and Nair, A. (2005), "The antecedent role of quality, information sharing and supply chain proximity on strategic alliance formation and performance," *International Journal of Production Economics*, Vol. 96 No. 3, pp. 301-313.

Neuman, W. L. (2006). *Social research methods: Qualitative and quantitative approaches* (6th Edition). US: Pearson Education. *Inc.*

Orlikowski, W. J., and Baroudi, J. J. (1991). "Studying information technology in organizations: Research approaches and assumptions", *Information systems research*, Vol. 2 No. 1, pp. 1-28.

Pagell, M. (2004), "Understanding the factors that enable and inhibit the integration of operations, purchasing and logistics," *Journal of Operations Management*, Vol. 22 No. 5, pp. 459-487.

Park, S. H., and Luo, Y. (2001), "Guanxi and organizational dynamics: Organizational networking in Chinese firms", *Strategic management journal*, Vol. 22 No. 5, pp. 455-477.

Patton, M. Q. (2015), *Qualitative Research and Evaluation Methods: Integrating Theory and Practice*. Thousand Oaks, CA: Sage Publications, Inc.

Paulraj, A., Lado, A. A., and Chen, I. J. (2008), "Inter-organizational communication as a relational competency: Antecedents and performance outcomes in collaborative buyer–supplier relationships," *Journal of Operations Management*, Vol. 26 No. 1, pp. 45-64.

Pearce, J. A., and Robinson, R. B. (2000), "Cultivating guanxi as a foreign investor strategy," *Business Horizons*, Vol. 43 No. 1, pp. 31-38.

Petersen, K. J., Handfield, R. B., and Ragatz, G. L. (2005), "Supplier integration into new product development: Coordinating product, process and supply chain design," *Journal of Operations Management*, Vol. 23 No. 1, pp. 371-388.

Pfeffer, J., and Salancik, G. R. (2003). *The external control of organizations: A resource dependence perspective*. Stanford University Press.

Piekkari, R., Welch, C., and Paavilainen, E. (2009), "The Case Study as Disciplinary Convention Evidence from International Business Journals", *Organizational Research Methods*, Vol. 12 No. 3, pp. 567-589.

Prajogo, D., and Olhager, J. (2012), "Supply chain integration and performance: The effects of long-term relationships, information technology and sharing, and logistics integration," *International Journal of Production Economics*, Vol. 135 No. 1, pp. 514-522.

Price, L. L., and Arnould, E. J. (1999), "Commercial friendships: service provider-client relationships in context", *The Journal of Marketing*, pp. 38-56.

Pulles, N. J., and Hartman, P. (2017), "Likeability and its effect on outcomes of interpersonal interaction," *Industrial Marketing Management*, Vol. 66 No. 1, pp. 56-63.

Ralston, P.M., Blackhurst, J., Cantor, D.E. and Crum, M.R. (2015), "A structure-conduct performance perspective of how strategic supply chain integration affects firm performance", *Journal of Supply Chain Management*, Vol. 51 No. 2, pp. 47-64.

Ramström, J. (2008), "Inter-organizational meets inter-personal: an exploratory study of social capital processes in relationships between Northern European and ethnic Chinese firms", *Industrial Marketing Management*, Vol. 37 No. 5, pp. 502-512.

Reimann, F., Shen, P., and Kaufmann, L. (2016), "Effectiveness of power use in buyer-supplier negotiations: The moderating role of negotiator agreeableness", *International Journal of Physical Distribution and Logistics Management*, Vol. 46 No. 10, pp. 932-952.

Rempel, J. K., Holmes, J. G., and Zanna, M. P. (1985), "Trust in close relationships", *Journal of personality and social psychology*, Vol. 49, No. 1, pp. 95-112.

Ring, P. S., and Van de Ven, A. H. (1994), "Developmental processes of cooperative interorganizational relationships," *Academy of Management Review*, Vol. 19 No. 1, pp. 90-118.

Ron Basu, J., and Wright, N. (2008), "Lean and agile supply chain," in *Total Supply Chain Management*. Oxford, U.K.: Butterworth-Heinemann – Elsevier.

Sako, M. (1992), *Price, Quality and Trust: Inter-firm relations in Britain and Japan*, Cambridge University Press, Cambridge.

Sambasivan, M., Siew-Phaik, L., Mohamed, Z.A. and Leong, Y.C. (2011), "Impact of interdependence between supply chain partners on strategic alliance outcomes", *Management Decision*, Vol. 49 No. 4, pp. 548-569.

Sambasivan, M., Siew-Phaik, L., Mohamed, Z.A. and Leong, Y.C. (2013), "Factors influencing strategic alliance outcomes in a manufacturing supply chain: role of alliance motives, interdependence, asset specificity and relational capital", *International Journal Production Economics*, Vol. 141 No. 1, pp. 339-351.

Sampson, S. E., and Spring, M. (2012), "Customer roles in the service supply chain and opportunities for innovation," *Journal of Supply Chain Management*, Vol. 48 No. 4, pp. 30-50.

Schein, E.H. (2010), Organizational Culture and Leadership, 4th ed., Jossey-Bass, John Wiley and Sons Inc., San Francisco, CA.

Schorsch, T., Wallenburg, C. M., and Wieland, A. (2017), "The human factor in SCM: Introducing a meta-theory of behavioral supply chain management," *International Journal of Physical Distribution and Logistics Management*, Vol. 47 No. 4, pp. 238-262.

Selviaridis, K., and Norrman, A. (2014), "Performance-based contracting in service supply chains: A service provider risk perspective," *Supply Chain Management: An International Journal*, Vol. 19 No. 2, pp. 153-172.

Sharma, N., Young, L. and Wilkinson, I. (2015), "The nature and role of different types of commitment in inter-firm relationship cooperation", *Journal of Business and Industrial Marketing*, Vol. 30 No. 1, pp. 45-59.

Silver, A. (1990). Friendship in commercial society: Eighteenth-century social theory and modern sociology. *American Journal of Sociology*, pp. 1474-1504.

Sinkovics, R. R., Penz, E., & Ghauri, P. N. (2008), "Enhancing the trustworthiness of qualitative research in international business", *Management International Review*, Vol. 48 No. 6, pp. 689-714.

Sirmon, D. G., Hitt, M. A., and Ireland, R. D. (2007), "Managing firm resources in dynamic environments to create value: Looking inside the black box," *Academy of Management Review*, Vol. 32 No. 1, pp. 273-292.

Sirmon, D. G., Hitt, M. A., Ireland, R. D., and Gilbert, B. A. (2011), "Resource orchestration to create competitive advantage: Breadth, depth, and life cycle effects," *Journal of Management*, Vol. 37 No. 5, pp. 1390-1412.

Smith, P.B., Huang, H.J., Harb, C. and Torres, C. (2012), "How distinctive are indigenous ways of acheieving influence? A comparative study of guanxi, wasta, jeitinho, and pulling strings", *Journal of Cross-Cultural Psychology*, Vol. 43 No. 1, pp. 135-150.

Statistics New Zealand. (2013), Census QuickStats about culture and identity.

Statistics New Zealand. (2015), *Regional Gross Domestic Product: Year ended March 2015*. http://www.stats.govt.nz/browse_for_stats/economic_indicators/NationalAccounts/RegionalGDP_HOTPYeMar15.aspx

Stevens, G. C., and Johnson, M. (2016), "Integrating the supply chain…25 years on," *International Journal of Physical Distribution and Logistics Management*, Vol. 46 No. 1, pp. 19-42.

Stock, G.N., Greis, N.P. and Kasarda, J.D. (2000), "Enterprise logistics and supply chain structurer: the role of fit", *Journal of Operations Management*, Vol. 18 No. 5, pp. 531-547.

Strauss, A.L. and Corbin, J. (1990), *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, Sage Publications, Newbury Park, CA.

Strauss, A. L., and Corbin, J. (1998), *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Sweeney, E. (2013), "The people dimension in logistics and supply chain management – its role and importance," in Passaro, R. and Thomas, A. (Eds.), *SCM Perspectives, Issues and Cases*. Milan: McGraw-Hill, pp. 73-82.

Swink, M., Narasimhan, R. and Wang, C. (2007), "Managing beyond the factory walls: effects of four types of strategic integration on manufacturing plant performance", *Journal of Operations Management*, Vol. 25 No. 1, pp. 148-164.

Tan, K. C. (2001). A framework of supply chain management literature. *European Journal of Purchasing and Supply Management*, Vol. 7 No. 1, pp. 39-48.

Teece, D.J. (2007), "Explicating dynamic capabilities: the nature and micro foundations of (sustainable) enterprise performance", *Strategic Management Journal*, Vol. 28 No. 13, pp. 1319-1350.

Teece, D. J., Pisano, G., and Shuen, A. (1997), "Dynamic capabilities and strategic management," *Strategic Management Journal*, Vol. 8 No. 7, pp. 509-533.

Tellis, W. M. (1997), "Application of a case study methodology", *The qualitative report*, Vol. 3 No. 3, pp. 1-19.

Tsanos, C. S., and Zografos, K. G. (2016), "The effects of behavioural supply chain relationship antecedents on integration and performance", *Supply Chain Management: An International Journal*, Vol. 21 No. 6, pp. 678-693.

Tsanos, C.S, Zografos, K. G., and Harrison, A. (2014), "Developing a conceptual model for examining the supply chain relationships between behavioural antecedents of collaboration, integration and performance", *The International Journal of Logistics Management*, Vol. 25 No. 3, pp. 418-462.

Turner, J. C. (2005), "Explaining the nature of power: a three-process theory", *European Journal of Social Psychology*, Vol. 35 No. 1, pp. 1-22.

Uusipaavalniemi, S., and Juga, J. (2008), "Information integration in maintenance services," *International Journal of Productivity and Performance Management*, Vol. 58 No. 1, pp. 92-110.

Vanpoucke, E., Vereecke, A. and Wetzels, M. (2014), "Developing supplier integration capabilities for sustainable competitive advantage: a dynamic capabilities approach", Journal of Operations Management, Vol. 32 No. 7, pp. 446-461.

Walsham, G. (1995), "Interpretive case studies in IS research: nature and method", *European Journal of information systems*, Vol. 4 No. 2, pp. 74-81.

Wang, B., Childerhouse, P., Kang, Y., Huo, B., and Mathrani, S. (2016), "Enablers of supply chain integration: Interpersonal and interorganizational relationship perspectives," *Industrial Management and Data,* Vol. 116 No. 4, pp. 838-855.

Wichmann, B. K., and Kaufmann, L. (2016), "Social network analysis in supply chain management research", *International Journal of Physical Distribution and Logistics Management*, Vol. 46 No. 8, pp. 740-762.

Wichmann, B.K., Carter, C.R. and Kaufmann, L. (2015), "How to become central in an informal social network: an investigation of the antecedents to network centrality in an environmental SCM initiative", *Journal of Business Logistics*, Vol. 36 No.1, pp. 102-119.

Wieland, A., Handfield, R., and Durach, C. F. (2016), "Mapping the landscape of future research themes in supply chain management," *Journal of Business Logistics*, Vol. 37 No. 3, pp. 1-8.

Wiengarten, F., Humphreys, P., Gimenez, C., and McIvor, R. (2016). Risk, risk management practices, and the success of supply chain integration. *International Journal of Production Economics*, Vol. 171, pp. 361-370.

Wisner, J.D., Tan, K.C. and Leong, G. (2016), "Chapter 13 supply chain process integration", in Wisner, J.D., Tan, K.C. and Leong, G. (Eds), *Principles of Supply Chain Management: A Balanced Approach* (4th ed.), Cengage Learning, Boston, MA, pp. 459-494.

World Bank. (2015), Data: Services, etc., Value Added (% GDP). Available at: http://data.worldbank.org/indicator/NV.SRV.TETC.ZS. License : CC BY-4.0

Wu, I.L., Chuang, C.H. and Hsu, C.H. (2014), "Information sharing and collaborative behaviours in enabling supply chain performance: a social exchange perspective", *International Journal Production Economics*, Vol. 148, February, pp. 122-132.

Wu, W.Y., Chiag, C.Y., Wu, Y.J. and Tu, H.J. (2004), "The influencing factors of commitment and business integration on supply chain management", *Industrial Management and Data Systems*, Vol. 104 No. 4, pp. 322-333.

Xia, J., Ma, X., Lu, J. W., and Yiu, D. W. (2014), "Outward foreign direct investment by emerging market firms: A resource dependence logic", *Strategic Management Journal*, Vol. 35 No. 9, pp. 1343-1363.

Xu, D., Huo, B. and Sun, L. (2014), "Relationships between intra-organizational resources, supply chain integration and business performance: an extended resource-based view", *Industrial Management and Data Systems*, Vol. 114 No. 8, pp. 1186-1206.

Yang, J., Wang, J., Wong, C.W. and Lai, K.H. (2008), "Relational stability and alliance performance in supply chain", *Omega*, Vol. 36 No. 4, pp. 600-608.

Yeung, J. H. Y., Selen, W., Zhang, M., and Huo, B. (2009), "The effects of trust and coercive power on supplier integration," *International Journal of Production Economics*, Vol. 120 No. 1, pp. 66-78.

Yilmaz, K. (2013). Comparison of quantitative and qualitative research traditions: Epistemological, theoretical, and methodological differences. *European Journal of Education*, Vol. 48 No. 2, pp. 311-325.

Yin, R. K. (2003), *Case Study Research Design and Methods* (Vol. 5). Thousand Oaks: Sage Publications, Inc.

Yin, R. K. (2014). *Case Study Research: Design and Methods*. Thousand Oaks: Sage Publications, Inc.

Zacharia, Z.G., Nix, N.W. and Lusch, R.F. (2011), "Capabilities that enhance outcomes of an episodic supply chain collaboration", *Journal of Operations Management*, Vol. 29 No. 6, pp. 591-603.

Zaheer, A., McEvily, B. and Perrone, V. (1998), "Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance", *Organization Science*, Vol. 9 No. 2, pp. 141-159.

Zhang, M., and Huo, B. (2013). "The impact of dependence and trust on supply chain integration," *International Journal of Physical Distribution and Logistics Management*, Vol. 43 No. 7, pp. 544-563.

Zhang, M., Zhao, X., Voss, C., and Zhu, G. (2016), "Innovating through services, co-creation and supplier integration: Cases from China," *International Journal of Production Economics*, Vol. 171 No. 2, pp. 289-300.

Zhao, X., Huo, B., Flynn, B. B., and Yeung, J. H. Y. (2008). "The impact of power and relationship commitment on the integration between manufacturers and customers in a supply chain". *Journal of Operations Management*, Vol. 26 No. 3, pp. 368-388.

Zhao, X., Huo, B., Selend, W. and Yeunga, J.H.Y. (2011), "Impact of internal integration and relationship commitment on external integration", *Journal of Operations Management*, Vol. 29 No. 1, pp. 17-32.

Zikmund, W. G., Babin, B. J., Carr, J. C., and Griffin, M. (2013). *Business research methods*. Cengage Learning.

Zott, C. (2002), "Dynamic capabilities and the emergence of intraindustry differential firm performance: insights from a simulation study", *Strategic Management Journal*, Vol. 24 No. 2, pp. 97-125.

Appendix

Interview Protocol

Opening

Thank you for arranging time to meet with me. I would like to explain our research project to you.

I am from Massey University and we are trying to understand how supply chain managers interact with managers from your suppliers or customers' companies. I would like to interview you because you are the expert with successful experience in this area and I can learn a lot from your perspectives.

Our interview today will be open and conversational. There are no true/false answers. You have the right to stop the conversation at any time at your will. **All the research/interview process will strictly follow the ethical regulation of Massey University and protect your and your company's security and benefit. All the interview contents will be kept strictly confidential.** As we need to study the conversation contents so I would like your permission to record our conversation.

Interview questions

- Could you tell me about your position here at (company's name) and what your responsibilities include? (probe question to understand the interviewee's background, role and orientation)
- Can you tell me some companies which your company has collaborated in the business for long time, for example, five years or more? These companies can be your suppliers or customers or logistics service providers.
- What are the main factors to contribute to the long term collaboration with them?
- Now, place your interactions with them clearly in your mind. Could you tell me if you have developed a personal relationship with any of their managers with whom you interact? (If yes, then)
    - How did it begin to develop?
    - What does the relationship mean to you?
    - Do you agree that the personal relationship is related to personal affection (e.g. likeability)? (If yes, then)

        - How important is the personal affection when you started your business relations?
        - How important is the personal affection when you develop your business relations?
        - What, if any, impact does the personal affection have on your business relations (e.g. trust, power, and commitment)?
    - Do you agree that the personal relationship is related to personal credibility? (If yes, then)
        - How important is the personal credibility when you started your business relations?
        - How important is the personal credibility when you develop your business relations?
        - What, if any, impact does the personal credibility have on your business relations (e.g. trust, power, and commitment)?
    - Do you agree that the personal relationship is related to personal communication?(If yes, then)
        - How important is the personal communication when you started your business relations?
        - How important is the personal communication when you develop your business relations?
        - What, if any, impact does the personal communication have on your business relations (e.g. trust, power, and commitment)?
- Apart from personal affection, credibility, and communication, what else of interpersonal relationship would you like to point out?
- What is your opinion about the relationship between the organizational level relationships and the interpersonal relationships?
- *Does personal relationship procure IORs or visa versa?*
- *During the process, which one is the first one to play roles?*
- What is your opinion on developing personal relationships between your company and your suppliers or customers?

Floating prompts

- Could you tell me more about that, please?

- Could you explain that in more detail, please?
- That's interesting—please continue.
- Could you give me one example, please?
- What happened next?
- How did you cope with that (situation)?

Wrap-up

- Thank you for your time for the interview. You have been very helpful. I may email you or call you for some unclear conversation. We would like to share with you about the research report after all the research has done. If you have any questions or viewpoints to share with me, please feel free to contact me.

Statements of contribution to doctoral thesis containing publications

DRC 16

MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

STATEMENT OF CONTRIBUTION
TO DOCTORAL THESIS CONTAINING PUBLICATIONS

(To appear at the end of each thesis chapter/section/appendix submitted as an article/paper or collected as an appendix at the end of the thesis)

We, the candidate and the candidate's Principal Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of Candidate: Bill Wang

Name/Title of Principal Supervisor: Professor Paul Childerhouse

Name of Published Research Output and full reference:

Bill Wang, Paul Childerhouse, Yuanfei Kang, Baofeng Huo, Sanjay Mathrani, (2016) "Enablers of supply chain integration: Interpersonal and interorganizational relationship perspectives", Industrial Management & Data Systems, Vol. 116 Issue: 4, pp.838-855, https://doi.org/10.1108/ IMDS-09-2015-0403

In which Chapter is the Published Work: Chapter 2

Please indicate either:

- The percentage of the Published Work that was contributed by the candidate:

  and / or

- Describe the contribution that the candidate has made to the Published Work:

  Bill Wang, as the PhD candidate, led this research, wrote the draft of the paper. Dr. Sanjay Mathrani once gave advice at the beginning of the draft of the paper. Professor Paul Childerhouse and Dr. Yuanfei guided Bill to revise the paper following the reviewers' comments and to deal with the journal editorial queries. Professor Huo acted as corresponding author, dealing with the journal submission processes.

Bill Wang Digitally signed by Bill Wang Date: 2018.01.22 15:47:35 +13'00'
Candidate's Signature

22/1/2018
Date

Paul
Principal Supervisor's signature

01/06/2018
Date

GRS Version 3– 16 September 2011

DRC 16

MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

STATEMENT OF CONTRIBUTION TO DOCTORAL THESIS CONTAINING PUBLICATIONS

(To appear at the end of each thesis chapter/section/appendix submitted as an article/paper or collected as an appendix at the end of the thesis)

We, the candidate and the candidate's Principal Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of Candidate: Bill Wang

Name/Title of Principal Supervisor: Professor Paul Childerhouse

Name of Published Research Output and full reference:

Wang, B., Kang, Y., Childerhouse, P., Huo, B. (2018), "Service Supply Chain Integration: The Role of Interpersonal Relationships". Industrial Management and Data Systems. 118 (4). pp. 828-849

In which Chapter is the Published Work: Chapter 3

Please indicate either:

- The percentage of the Published Work that was contributed by the candidate:

  and / or

- Describe the contribution that the candidate has made to the Published Work:

  Bill Wang, as the PhD candidate, led this research inquiry, collected and analysed the data with the help of Dr. Yuanfei Kang, wrote the draft of the paper. Professor Paul Childerhouse and Dr. Yuanfei helped Bill to revise the paper following the reviewers' comments and dealing with the journal editoral queries. Professor Huo acted as corresponding author, dealing with the journal submission processes.

Bill Wang Digitally signed by Bill Wang Date: 2018.01.22 15:51:35 +13'00'
Candidate's Signature

22/1/2018
Date

Paul
Principal Supervisor's signature

01/06/2018
Date

GRS Version 3– 16 September 2011

DRC 16

MASSEY UNIVERSITY
GRADUATE RESEARCH SCHOOL

STATEMENT OF CONTRIBUTION
TO DOCTORAL THESIS CONTAINING PUBLICATIONS

(To appear at the end of each thesis chapter/section/appendix submitted as an article/paper or collected as an appendix at the end of the thesis)

We, the candidate and the candidate's Principal Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of Candidate: Bill Wang

Name/Title of Principal Supervisor: Professor Paul Childerhouse

Name of Published Research Output and full reference:

Wang, B., Kang, Y., Childerhouse, P., Huo, B. (2018), "Inter-personal and inter-organizational relationship drivers of supply chain integration" (Accepted), Industrial Management and Data Systems

In which Chapter is the Published Work: Chapter 4

Please indicate either:

- The percentage of the Published Work that was contributed by the candidate:

  and / or

- Describe the contribution that the candidate has made to the Published Work:

  Bill Wang, as the PhD candidate, led this research inquiry, collected and analysed the data with the help of Dr. Yuanfei Kang, wrote the draft of the paper. Professor Paul Childerhouse and Dr. Yuanfei helped Bill to revise the paper following the reviewers' comments and dealing with the journal editoral queries. Professor Huo acted as corresponding author, dealing with the journal submission processes.

Bill Wang Digitally signed by Bill Wang Date: 2018.01.22 15:49:39 +13'00'
Candidate's Signature

22/1/2018
Date

Paul
Principal Supervisor's signature

01/06/2018
Date

GRS Version 3– 16 September 2011