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# **Investigation of sustainable supply chains implementation: A social network perspective**

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## **Abstract**

Sustainable supply chain management (SCM) has become a heating topic for academic research as well as managerial practice. Implementing sustainable SCM requires firms and their supply chains simultaneously commit to economic, environmental and social practices. From a social network perspective, this study aims to investigate the influence of social ties on supply chain network relationship, and the impacts on sustainable SCM implementation.

The research adopts a critical realism stance to guide methodological approach and research design, which drives the adoption of a mixed-method approach for data collection. A questionnaire survey yielded 476 usable responses, analysed through Structural Equation Modelling. Further, in-depth case studies of three supply chain networks with 16 companies were developed to elaborate the discussions and understand the drivers of sustainable SCM.

The survey shows that social networks between buyers and suppliers positively increase the flow of supply chain capital, including financial, social and human capital flow, which then enhances implementation of environmental and social sustainability in supply chains. The case studies have confirmed the statistical results, and further developed the insights of the topic. Three supply chain network structure were included in this study– pooled, sequential and reciprocal networks. Research shows that the drivers for implementation of sustainable SCM is multifaceted. Social networks impact on dependency, transparency and distance among supply chain actors, as a result of influencing network economic and governance in the constructed structure. However, institutional pressure remains the major driver for

sustainable practice, meanwhile, company strategy moderates the external drivers from social networks and institutional forces.

The current study contributes to investigating sustainable SCM from social network perspective to investigate how social networks influence supply chain capital flow, supply chain structure and network structure. Further contributions come from showing the connection between formal institutional and personal ties, external factors and internal strategy. There is also a methodological contribution based upon the adoption of social network theory and mixed method approaches in sustainable SCM research.

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# Chapter 1 INTRODUCTION

## 1.1 Research Background

### 1.1.1 Institutional pressures for sustainable SCM

During the last decade, closer attention to sustainable SCM has emerged following the Brundtland Report (1987). The three pillars of sustainable development – economic accountability, environmental stewardship, and social equity - carry across all sectors of development, including food, agriculture, infrastructure, transportation, and commercial production. From a historical perspective, three great waves of public pressure have shaped the environmental and sustainable agenda since 1960 (Elkington, 1994). The responsibility of governments and the public sector has mutated in response to each of these waves and will continue to do so.

*Wave 1* was built from the early 1960s, peaked from 1969 to 1973, and the downwave was felt from the mid-1970s to 1987. During this period, environmental legislation swept across the Organization for Economic Co-operation and Development (OECD) region, and industry showed a compliance mode.

*Wave 2* was a 'Green' pressure wave that began in 1988 with the publication of *Our Common Future* by the Brundtland Commission (UNWCED, 1987). It brought a wider realisation of new technologies and new products that were needed. As a result, the sense arose that businesses have to take the lead in sustainable development. However, even though the 1992 UN Earth Summit in Rio delayed the impending downwave, a falling trend in public concern occurred driven by the spikes from controversies associated with companies, such

as Shell and Nike and from public concern over the European-wide spread of 'mad cow disease'.

*Wave 3* began in 1999 and the downwave began in late 2002. Attention was called for in the profound changes in the governance of corporations and in the whole process of globalisation. In addition to the compliance and competitive dimensions, market creation is needed in business development. In the downwave, the focus has been drawn to new definitions of security, new forms of governance (both global and corporate), the access agenda – access to clean water, affordable energy, medicines and so on (Elkington, 2006).

Therefore, it is argued that sustainable SCM is driven by institutional pressure (Zhu, Sarkis and Lai, 2013). At international level, 173 parties signed the Paris Agreement in 2015 and each country agreed to determine, plan and regularly report its own contribution to mitigate global warming (The United Nations, 2017). Individual countries, such as France and China, have announced their sustainable development plan in coordination with the international agreements. Under this circumstance, various international corporations have set up sustainability goals and standards to inform practices, such as such as the GRI Sustainability Reporting Standards 2016 (2016) and Sustainable Development Goals from the United Nations (2016).

Under the institutional force, organisational practitioners have also reported their economic, environmental and social responsibilities performance for both internal and external stakeholders. Many companies, for example Ikea (2016), PepsiCo (2017), and Volvo (2016), have issued their sustainability performance and setup goals for protecting environment and

creating a healthier relationship with people and society. The increasing influence of sustainable SCM can be attributed to rising demand in competitive advantage and economic performance to satisfy consumers' and stakeholders' expectations of environmental and social responsibilities (Genovese *et al.*, 2017).

However, even though firms, particularly multinational companies, might have limited control over their suppliers' sustainable or unsustainable practices (Hartmann and Moeller, 2014), as such, many large firms are endeavouring to include multi-tier supplier involvement in sustainable SCM implementation (M. Tachizawa and Yew Wong, 2014a). For example, Coca Cola has included their suppliers' sustainable practices in the company's sustainability report (2016). Similarly, Puma has included up to the fourth tier of suppliers in their sustainability report (2016). Consequently, 'sustainability has forced the redefinition of operations function' (Dadhich P. Genovese A., Kumar N., 2015, p.344) in collaborative approaches (Chen & Hung, 2014).

### **1.1.2 Company strategy for sustainable SCM**

The Brundtland Report (1987) also raised the management of sustainable concerns as a strategic issue for corporations. Sustainable SCM is claimed to be a strategic process (Carter and Rogers, 2008), including collaboration in technological integration and logistical integration; risk management and learning; and stakeholder management (Beske, Land and Seuring, 2014a). It then comprises sustainable development not only at an institutional level, but also at an organisational level. Therefore, discussions address the role of company strategic management in environmental and social sustainability (Sharma and Vredenburg, 1998). Therefore, sustainable practices and corporate strategy should be closely interlinked rather being separated. For example, Unilever (2018) has made a clear strategy to integrate

sustainability into company strategy, developing innovation to help increase business growth so that stakeholders benefit.

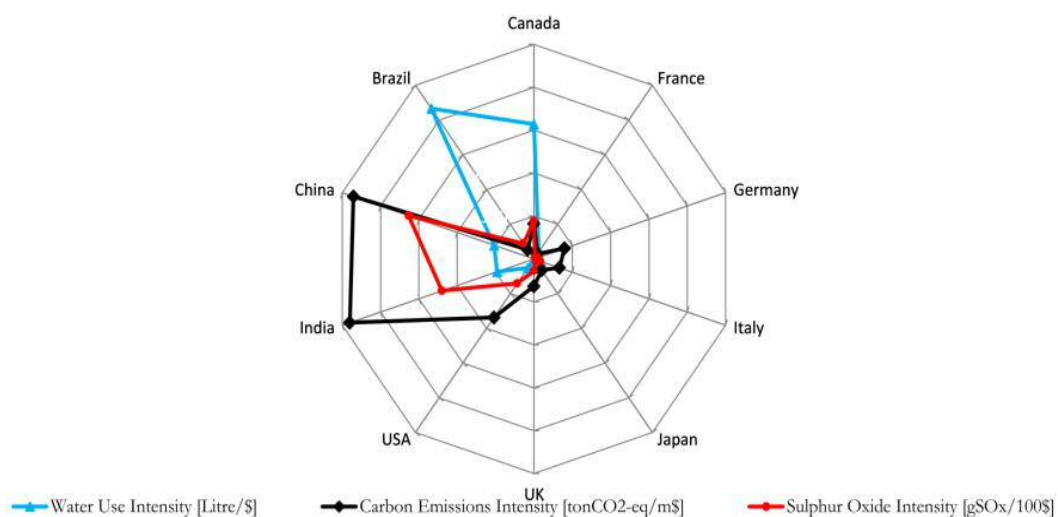
On the other hand, in strategy management, Kaplan and Norton (2004) claimed that company strategy should be closely aligned with tangible and intangible capital a company possesses. Without necessary capital, such as human capital and social capital, executive managers face difficulties in communicating with employees and suppliers and delivering a strategic plan into practice. In this regard, it is necessary to facilitate capital in supply chains for sustainable SCM implementation. This reflects the study of Victor (1991) that maintains sustainable development is the cultivation of necessary capital, such as human capital and financial capital, to effectively use natural and manufacturing resources in dealing with resource scarcity and cost efficiency.

## **1.2 Current problems diagnosis for sustainable SCM**

In the long run, organisations and their supply chains will gradually become more sustainable. However, currently, although an awareness of sustainable development, especially environmental management, exists in many companies, the majority of companies apply tactics with a reactive approach (Srivastava, 2007) and use the core value of sustainability as 'opportunity orientated' strategy for gaining competitive advantage (Harms, Hansen and Schaltegger, 2013, p.214). According to Beske and Seuring (2014), at the moment there is no supply chain that meets all the criteria to be 'truly sustainable' (Beske and Seuring, 2014, p.328). Given that sustainable SCM is institutionally driven, it then reflects a sector-specificity in policy relevance (Acquaye *et al.*, 2017). In other words, the performance of sustainability development is inherent in supporting information and policy-making towards

the industry to which organisations belong. Based on a 15-year time series study, Acquaye *et al.* (2017) have described the environmental sustainability performance model with campaigning empirical measurements of carbon emissions, sulphur dioxide emissions and water use in the electricity and chemical industries in EU-27 countries, BIC nations (Brazil, India and China) and G7 countries (Canada, France, Germany, Italy, Japan, UK and USA) for cross country analyses. As shown in the radar diagram (Figure 1.1), BIC nations appear to face serious environmental issues with poor performance indicators (further distance from the origins). Nevertheless, from a global supply chain perspective, the performance of developed nations' organisations is indirectly affected by the performance of their suppliers and sub-suppliers in the upstream supply chain. Meanwhile, developing countries maintain an 'ecological deficit' with developed nations (Acquaye *et al.*, 2017, p.580).

Figure 1.1 Environmental performance in different countries



Sources: Acquaye *et al.*, 2017

Over the past decade, the government in China, an important player in the global economy, has engaged in taking responsibility for sustainable development. Since the 1980s, China's

regulation on environmental protection and sustainable development has experienced great changes, in progressing from the adoption of environmental protection to sustainable development strategy as a basic state policy and changing focus from pollution control to ecological conservation equally (Zhang and Wen, 2008). China has also joined the Paris Agreement and by 2020, China will have faced serious tasks in controlling depletion of natural resources and environmental pollution. Nevertheless, this appears to be accompanied by an inconsistency in national government strategy (e.g. five-year sustainability plan) and industrial practices. Referring to the empirical analyses by Acquaye *et al.* (2017) and Steinz *et al.* (2015), there has been a significant increase in CO<sub>2</sub> emissions and local pollution related to contaminated water, soil and air in the country. Kolk *et al.* (2010) also found that Asian companies in China have paid less attention to corporate social responsibilities and sustainable development than western companies. Considerable effort has yet to be made in sustainable practices in emerging countries, including China. Therefore, this current study focuses on investigating the research topic in depth in China and seeking to contribute towards providing alternative solutions for improving environmental and social practices.

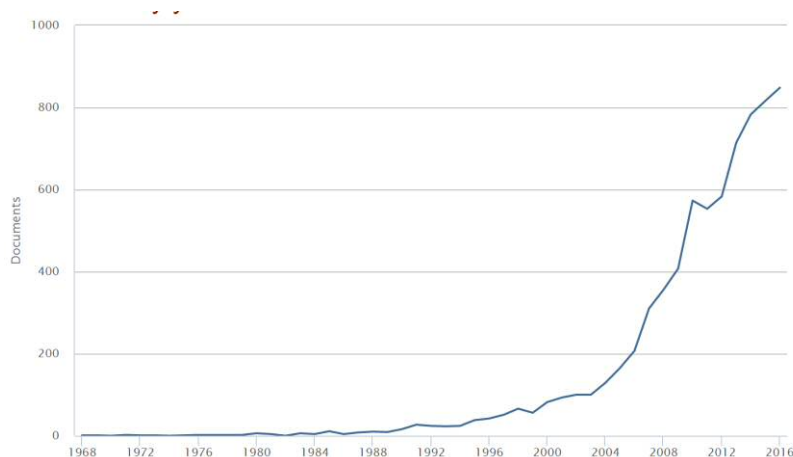
### **1.3 The role of social networks**

Social relations and social networks research has achieved a prominent position in the business and management field. Figure 1.2 provides the research result analysed in Scopus in the business and management field, illustrating the dramatic growth of research interests. Network studies have been extended and categorised as both micro direction, where emphases are on cognitive and personality, and macro level, focusing on network



configuration and evolution (Kilduff and Brass, 2010). One of the major contributions of the network approach is the distinctive lens it offers to examine a wide range of organizational and operational phenomena at different levels. Emerging topics at micro level include power (Brass, 1984), social influence (Sparrowe and Liden, 2005), interpersonal trust (Ferrin, Dirks and Shah, 2006), attitude similarity (Rice and Aydin, 1991), diversity (Ibarra and Andrews, 1993) and creativity (Burt, 1992; Perry-Smith, 2006). At the macro level, topics include interfirm relations (Westphal, Boivie and Chng, 2006), price-fixing conspiracies (Baker and Faulkner, 1993) and organisational reputation (Rhee and Haunschild, 2006).

Figure 1.2 Numbers of published articles in social networks in business and management



Source: Author

The SCM literature is now becoming aware of the necessity for managing relationships and supply networks (Borgatti and Li, 2009; Harland, 1996). The first researchers to use social network perspective in SCM study were Choi and Liker (1995) and Phillips and Phillips (1998). In the last two decades, SCM scholars have developed the research dimensions to relationships between network members (Zhou *et al.*, 2014; Thomas *et al.* 2016), investigated the impact of the strength of ties on knowledge transfer and information sharing (Ramasamy, Goh and Yeung, 2006; Cai, 2014) and examined the network

embeddedness of economic actions, such as customer satisfaction (Benedek, Lublóy and Vastag, 2014), distribution flexibility (Yu, Cadeaux and Song, 2013) and performance innovation (Raesfeld, Geurts and Jansen, 2012). These studies show the adoption of social network lens in SCM phenomena. However, additional phenomena that are inherently suited to network research still lack attention. Further research is called for in taking that into account with a social network perspective to investigate the effects of the diffusion of sustainability implementations in the supply network (Wichmann and Kaufmann, 2016).

*Guanxi*, the Chinese concept of social network in Confucian society, defines one's place in the social structure and 'provides security, trust and a prescribed role' (Hammond and Glenn, 2004, p.24). *Guanxi* has been widely investigated in supply chain activities. In previous studies, researchers have demonstrated the value of *guanxi* networks in facilitating effective collaboration and relational governance (Wong and Tjosvold, 2010) for sustaining business and operation management (Gao *et al.*, 2014; Luo *et al.*, 2015a). A number of studies have shown clear links between *guanxi* and supply chain performance elements, including improving product quality (Zhuang, Xi and El-Ansary, 2008), enhancing logistics competency (Li and Lin, 2006) and supporting knowledge transfer (Chen *et al.*, 2014) and ICT skills (Zhao *et al.*, 2011).

As such, increasing numbers of scholars have investigated the realm of the role of social networks in sustainable SCM. For example, empirical evidence was analysed by Cheng (2011a) and Luo *et al.* (2015) and shows that *guanxi* networks have significant impact on green supply chain and green-driven supply chain collaboration respectively. *Guanxi* is

broadly accepted to sustain long-term relationships and mitigate risks with flow of information (Hammond and Glenn, 2004). Therefore, this current study aims to investigate the topic of sustainable SCM and social networks further in this regard.

#### **1.4 Research aims**

This study was initially started from an investigation of the relationship between social networks and sustainable SCM implementation. Victor (1991) maintains that sustainable development is the cultivation of necessary capital, such as human capital and financial capital, to effectively use natural and manufacturing resources in dealing with resource scarcity and cost efficiency. Sociologists argue that all economic behaviours are embedded in social networks (Granovetter, 1985). Social network context has been well acknowledged in supply chain research (Bogatti and Li, 2010) as discussed, thereby the implementation of sustainable SCM is argued to be shaped in the network scope (Vurro, Russo and Perrini, 2009).

This motivates the author to investigate the context of social networks and the impact on sustainable SCM implementation. It is argued that, given that all social networks are constructed, being influenced by specific social norms and cultural backgrounds, and also dependent on individual positions in the networks, the distinctiveness of eastern social and cultural norms might embrace distinct contexts of social network (Chua and Wellman, 2015). Therefore, this study takes a closer look at social networks in China, aiming to submit rich and deep insights for discussion. As a result, the first three research aims have then been decomposed so as to answer the research questions of:

***RQ1: How are flows of supply chain capital influenced in social networks?***

***RQ2: What are the relationships between social networks and sustainable SCM implementations?***

***RQ3: How do social networks drive implementation of sustainable SCM?***

Furthermore, current literature and observation from the survey findings have indicated the drivers of institutional forces and company strategy to implementation of environmental and social responsibilities in SCM; therefore, this study also aims to investigate:

***RQ 4: How do institutional forces drive implementation of sustainable SCM?***

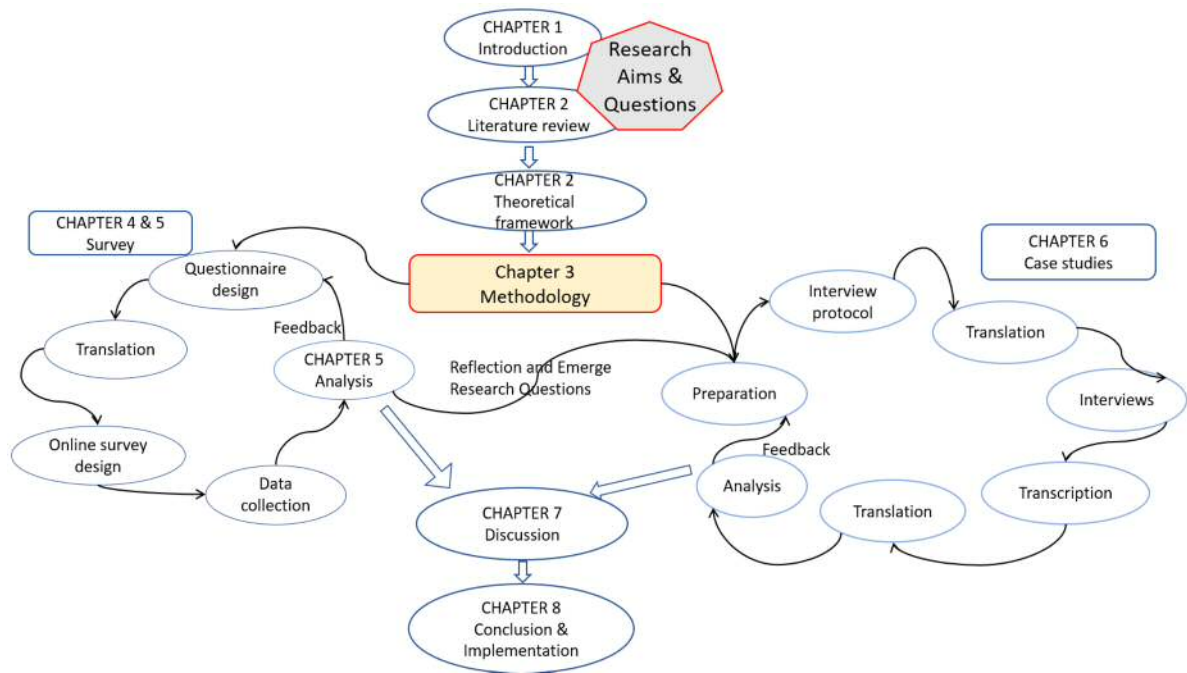
***RQ5: How do companies moderate the influence from social networks and institutional forces?***

## **1.5 Thesis structure**

Referring to Figure 1.3, the thesis begins by uncovering the gaps in the literature, then addresses the research questions and motivations. A narrative review of sustainable SCM clarifies the definition, current research and driving factors of sustainable SCM in the literature. There is a gap in the social networks and sustainable SCM literature and study has called for further investigation of the field (Wichmann and Kaufmann, 2016). Given that sustainability is integrated in SCM (Beske and Seuring, 2014), a systematic literature review of how social networks (*guanxi* in China) impact on the flow of SCM capital offers an overarching picture to create a bridge between social networks and sustainable SCM. This then provides support for theoretical framework building in Chapter 2.

The methodology chapter demonstrates the epistemological stance and how this drives the research design and mixed method approach adoption. As a critical realism researcher, I believe in the objectivism of the world, while also understanding that reaching the fact of truth is challenging and is underpinned by different phenomena and social constructs. Therefore, the evidence of this PhD relies on a mixed-method approach: quantitative findings from the survey (Chapters 4 and 5); and qualitative investigation in case studies (Chapter 6). Although the main method is a quantitative approach, qualitative components in the second phase of research help to elaborate and develop insights by considering supply chain networks, company strategy and institutional force in the topic (see Chapter 2). The choice of research methods and presentation of this study appear fitting with the research questions to be answered, as well as making a methodological contribution to SCM research, since it is criticised for a lack of methodological diversity in integrating dynamic and complex phenomena in logistics and SCM research (Näslund, 2002). In particular, mixed-methods research is rare (Golicic and Davis, 2012). The discussion chapter integrates the results from the quantitative and qualitative work to answer the research questions and elaborate on the research topic. The conclusion chapter summarises the research findings, theoretical contributions and practical implementations.

Figure 1.3 Thesis structure



Source: Author

## 1.6 Contributions

The contributions of this thesis are identified as follows:

1. This is the first study to consider all three dimensions (economic, environmental and social responsibilities) of sustainable SCM in the social network field. The research has explained the causality relationship between social networks and sustainable SCM with both quantitative and qualitative evidence. The consideration of social network has extended the discussion from individual company, dyadic relationship to a broader involvement of stakeholders in implementing sustainable SCM.
2. This research also explores sustainable SCM in terms of external and internal factors. It contributes to an examination of the driving roles of institutional pressures and social networks (external factors) and company strategy (internal factors) on

sustainable SCM implementation. The discussions bring an overarching view of factors influencing firms implementing environmental and social responsibilities, while investigating the interlinks among these factors to explain the comprehensive environment. The investigations of institutional force through comparison of three industries could serve to inform government policy making.

3. The discussion of the findings occurs on multi-levels: individual firm and supply chain network; individual person and their social networks. This investigates the topic from both macro and micro levels. The insightful findings can contribute to company practice and increase environmental and social responsibilities, not only for their company, but also for their supply chain and supply chain networks.

## Chapter 2 LITERATURE REVIEW

### 2.1 Introduction

The aim of this chapter is to review the study of sustainable SCM in the current literature and systematically review how social networks, particularly *guanxi* network, influence SCM and sustainable development. This is intended to clarify the research gap and provide support for a theoretical framework which is presented in the final section of this chapter. Moreover, this chapter will facilitate knowledge for answering ***RQ1: How are flows of supply chain capital influenced in social networks?***

Therefore, the structure is organised as: first, presenting a review of sustainable SCM and the driving factors of sustainable SCM from existing literature; second, conducting a systematic review to clarify the research gaps; finally, a theoretical framework is built to guide the conduction of this study.

### 2.2 Sustainable SCM

#### 2.2.1 Sustainable development and sustainable SCM

The topic of sustainable development has been widely acknowledged within the last twenty years following the Brundtland Report, from the World Commission on Environment and Development (WCED), in 1987. It has been defined as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (1987). Sustainability is also regarded as the cultivation of capital for the next generation's development (Victor, 1991). The concept of sustainability was explored much earlier and can be traced back to the 18<sup>th</sup> century, when Francois Quesnay and Thomas



Robert Malthus linked economic sustainability with poverty and starvation, and Adam Smith invoked equality, job safety and competitive wages for employees (Varsei and Polyakovskiy, 2017). In business management, sustainable development is argued to balance the responsibilities of economic, environmental and social dimensions of growth, which is also known as the triple bottom line, popularised by Elkington (1994, 1998).

Nowadays, sustainability has become fashionable in the broader facets of society, in government policy making, business practices and academic research. Institutions have invested effort in setting standards and goals in sustainability, such as the Sustainable Development Goals from the United Nations and Global Reporting Initiative (GRI) report for helping corporations understand and communicate their sustainability development impacts on the issues such as climate change, human rights and equality. It appears an ambitious and promising horizon, for example, to 'end hunger, achieve food security and improved nutrition and promote sustainable agriculture' by 2030 (United Nations, 2016, p.15) and a 'world free of poverty' by 2030 (The World Bank, 2017); equally, this is a challenging mission if we note there are over 700 million people living in extreme poverty (the poverty line is \$1.90 a day) in 2015 (The World Bank, 2017). In this global atmosphere of sustainable development, companies are critical to sustainable development; together with their supply chain, they are claimed to be 'larger systems' where strategic decisions and implementation of sustainable development at the supply chain level do matter (Varsei and Polyakovskiy, 2017, p.236).

Sustainability issues are integrated into many aspects of SCM (Beske and Seuring, 2014). A number of research studies, including literature reviews, have been published in recent

years, reflecting how the field is gaining maturity (Touboulic and Walker, 2015), while offering comprehensive insights into the state of sustainable SCM research. According to Miemczyk, Johnsen and Macquet (2012), there are different levels of defining sustainable SCM: namely, firm or dyad level; supply chain level; and network level (Table 2.1). Sustainability has been regarded as an internal analysis which is often shown in the research of procurement and purchasing on a dyadic level. Examples include Walker and Jones (2008) and Hamprecht *et al.* (2005), where evidence was collected to address relationships with suppliers together with practising environmental and social responsibilities. Supply chain level considers players as more than two supply chain actors. Research at this level is in relatively diverse spheres (Lambert, 2001; Walker, Di Sisto and McBain, 2008). This level of analysis implies endeavouring to span the boundaries of the value chain to include upstream and downstream players. Research topics, in this regard, often include life cycle analysis (Bhandari, Trudewind and Zapp, 2014; Del Borghi *et al.*, 2014; Manfredi and Vignali, 2014; Notarnicola *et al.*, 2017) and closed-loop supply chain (Savaskan, Bhattacharya and Van Wassenhove, 2004; Zhalechian *et al.*, 2016). At the network level, players are considered in a broader network of organizations, which are often shown in stakeholder studies, drawing on network theory (Lee and Humphreys, 2007; Miemczyk, Johnsen and Macquet, 2012)

Table 2.1 Definitions of sustainable SCM

<b><i>Examples of definitions of sustainable SCM at the firm or dyad level</i></b>	
‘Managing the optimal flow of high-quality, value-for money materials, components or services from a suitable set of innovative suppliers in a fair, consistent, and reasonable manner that meets or exceeds societal norms, even though not legally required.’	Eltantawy, Fo
‘Sustainable procurement (SP) is procurement that is consistent with the principles of sustainable development, such as ensuring a strong, healthy and just society, living within environmental limits, and promoting good governance.’	Walker and B
<b><i>Examples of definitions of sustainable SCM at the supply chain level</i></b>	
Green supply chain management (SCM) practices include internal environment management, external green SCM, investment recovery, and eco-design or design for environment practices.	Zhu and Sarki
‘SSCM (sustainable SCM) as the strategic, transparent integration and achievement of an organisation’s social, systemic coordination of key interorganisational business processes for improving the environmental, and economic goals in the long-term economic performance of the individual company and its supply chains.’	Carter and Ro
‘In order for firms to effectively implement green and lean supply chain strategies in a global context, managers must move beyond their silos, considering the entire supply chain and all of its participants.’	Bell, Mollenko
<b><i>Examples of definitions of sustainable SCM at the network level</i></b>	
SRB (Socially responsible buying) can be defined as the inclusion of the social issues advocated by organisational stakeholders in purchasing decisions. In this perspective, stakeholders are the agents that bring broad social demands to the attention of individual firms.	Maignan, Hill p.642
The sustainable supply chain discourse differs from mainstream supply chain management, as it involves the recognition of stakeholders within and beyond the supply chain	Maignan, Hi p.642, Hall an

Source: Miemczyk *et al.*, 201

Thus far, several research studies have shown what and how sustainability dimensions are being (or should be) adopted in SCM. This is notable in supporting the establishment of guidelines and/or standards as to how companies and their supply chains could approach sustainable SCM. Another view of defining sustainable SCM is from the capital flow perspective. Starting from this point, the current study adopts the definition of Seuring and Muller (2008) that sustainable SCM is:

*the management of material, information and capital flow as well as cooperation among companies along the supply chain while taking goals from all dimensions of sustainable development, i.e. economic, environmental and social, into account which are derived from customer and stakeholder requirements (p.1700).*

Apart from emphasising the TBL approach, Seuring and Muller (2008) also view sustainable SCM as the result of the management of flow – material, information and capital. This recalls the early work of Victor (1991) where he claims that sustainable development is the stock of capital. Furthermore, Seuring and Muller (2008) also argue that sustainable SCM exists through cooperation and collaboration with various stakeholders. In other words, they answered the question of whose responsibility it is to implement sustainable development. It is a collaborative effort, rather than a solo performance belonging to any individual player on the stage. In addition, from a network-oriented view, a supply chain is:

*... a network of organizations that are linked through upstream and downstream relationships in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer (Christopher, 1998).*

Therefore, this research adopts the view that sustainable SCM is the management of capital flow with cooperation among companies and stakeholders to better implement economic, environmental and social responsibilities in SCM.

### **2.2.2 Drivers of sustainable SCM**

To understand what drives sustainable SCM, this study starts by addressing the relevant theories as organisational theories 'describe and justify the behaviours, design or structures of firms' (Varsei and Polyakovskiy, 2017, p.244). This section particularly focuses on the various theories used in existing sustainable SCM research. The theoretical perspective adopted in this thesis is discussed in section 2.5.

Carter and Easton (2011) conducted a literature review to explore theories being used in sustainable SCM. Stakeholder theory and resource-based theory (RBV) were particularly highlighted in their findings. Sarkis, Zhu and Lai (2011) have reviewed the green SCM literature and arrived at a similar conclusion. Nine theories were identified in sustainable SCM, including RBV, stakeholder, institutional and social network. In Touboulic and Walker's (2015) review for theories in sustainable SCM, a tendency was revealed of importing theories into sustainable SCM research from other fields, with attention on RBV, stakeholder, and institutional theory (Table 2.2).

Examining such different theoretical lenses helps to identify the drivers for sustainability implementation and analyse the internal and external factors influencing organisations' implementation in sustainable supply chains (Rungtusanatham *et al.*, 2003). Accordingly, Varsei *et al.* (2014) have elaborated on the discussion of RBV, stakeholder, institutional and social network theory and identified three key drivers that influence sustainability implementation in supply chains: stakeholders, institutional pressures and proactive measures. Building on existing research, this study focuses on discussing the following three driving factors: institutional pressures, company strategy, and social network.

Table 2.2 Theories used in sustainable SCM research

Theory	Description	Reference	Sustainable SCM research
Stakeholder theory	Both internal and external actors influence activities of companies	Freeman (1984)	Carter & Easton (2011); Sarkis & Zhu (2011); Touboulic & Walker (2015)
Resource-based view (RBV)	A company's competitive advantage may be sustained by valuable, rare, imperfectly imitable and non-substitutable resources.	Barney (1991)	Carter & Easton (2011); Mohsen <i>et al.</i> (2014); Sarkis & Zhu (2011); Touboulic & Walker (2015)
Institutional theory	It examines how external pressures (coercive, mimetic and normative isomorphism) influence a company to adopt an organisational practice.	DiMaggio and Powell (1983)	Carter & Easton (2011); Mohsen <i>et al.</i> (2014); Sarkis & Zhu (2011); Touboulic & Walker (2015)
Transaction cost theory	Two entities, buyer and seller, involved in an exchange or activity incur costs and effort.	Williamson (1981)	Carter & Easton (2011); Sarkis & Zhu (2011); Touboulic & Walker (2015);
Social network theory	Organisational outcome as a function of the relationships among organisations and/or individuals in a firm.	Laumann <i>et al.</i> (1978)	Mohsen <i>et al.</i> (2014); Sarkis & Zhu (2011);

Source: Author

### 2.2.2.1 Institutional pressures

The notion of institutions defines the appropriate and legitimate boundaries in a society (Glover *et al.*, 2014); in other words, it renders unacceptable behaviours or actions beyond consideration (DiMaggio and Powell, 1983, 1991). Institutional environments place pressure on organisations' decision making to appear legitimate and prevailing norms of actions (Zander, Trang and Kolbe, 2016). Therefore, it has been argued that one of the main drivers for practitioners to decide and implement sustainability strategies is external pressure from institutions and governments, which is broadly reflected in the previous studies of environmental management (Ball and Craig, 2010; Glover *et al.*, 2014). Such pressures could be disseminated through formal legislation, such as national and international regulations

(e.g. national labour law, environmental law, and energy and waste directives) or via the form of soft policy instruments; for example, Sustainable Consumption, Production and Industry Action Plan (Chkanikova and Mont, 2015).

The concern of institutional pressures introduces a discussion as to how external social pressures influence organisations in acknowledging sustainability concepts and transforming them into their supply chain practices. By responding to regulations and conforming to the rules (including legitimacy, professional, societal and cultural practices), firms secure their alignment of sustainable practices with society's expectations (Touboulic and Walker, 2015).

#### **2.2.2.2 Company's strategies**

In organisational studies, the research on stakeholders can be traced back to much earlier dates with, for instance, influential articles from Freeman (1984) establishing a foundation for significant effort in defining and building stakeholder models, frameworks and theories. Prominent studies have addressed the impact of stakeholders on organisations' adoption and dissemination of better environmental and social practices (Wolf, 2014; Touboulic and Walker, 2015; Varsei and Polyakovskiy, 2017). Built on a 10-year research program, Clarkson has developed a RDAP (Reactive-Defensive-Accommodative-Proactive) Scale by introducing the element of 'Strategy' into the discussion of stakeholder pressure and company responsibility to corporate social performance (Table 2.3). Strategy, in his viewpoint, is one of two elements (in counter with performance) in adopting sustainable implementations and evaluating the levels of responsibility that a company should invest in response to stakeholder pressures and issues.

Table 2.3 The Reactive-Defensive-Accommodative-Proactive (RDAP) Scale

Rating	Strategy	Performance
1.Reactive	Denying responsibility	Doing less than required
2.Defensive	Admit responsibility but fight it	Doing the least that is required
3.Accommodative	Accept responsibility	Doing all that is required
4.Proactive	Anticipate responsibility	Doing more than is required

Source: Clarkson (1995)

By adopting Clarkson’s RDAP Scale, it is feasible to identify what strategy a company adopts in dealing with stakeholder pressures of sustainable SCM implementation and what performance or action is shown accordingly.

### 2.2.2.3 Social networks

The study of social networks has been well-developed in organisational studies. It is defined as ‘a set of nodes (e.g., person, organizations) linked by a set of social relationships of a specified type’ (Laumann, Galaskiewicz and Marsde, 1978, p.458). These social relationships could include kinship and social obligations, knowledge, and recognition of the identity of past and current transactors (Laumann, Galaskiewicz and Marsde, 1978, p.458). Weber’s (1964) preoccupation with the nature of bureaucracies and hierarchies in organizations is notably acknowledged in many ways; he has demonstrated a clear concern for the essential social nature and social relationship of action and ‘the course of action to the actions of others’ (Boden, 1994, p.27).



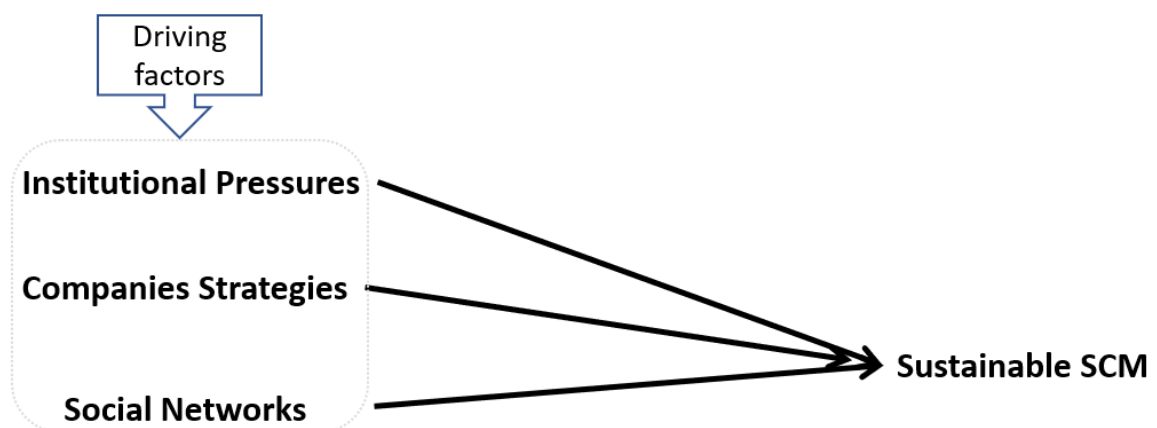
Systematic focus on the importance of individual behaviour and terms of 'formal' and 'informal' in organisational study began with Barnard's theory (1938). He set the frontier and argued that 'learning the organization ropes in most organizations is chiefly learning who's who, what's what, why's why of its interpersonal society' (Barnard, 1938, p.107). Direct observation of organisational behaviour substantially reveals 'organizations are operating in an interpersonal mode virtually all the time' (Boden, 1994, p29). Dalton (1966) merits the attention of 'managers on paper' where formal organisational charts and staff functions are shown, including inventory control, cost analysis, record storage, production planning and industrial relations. He emphasises interpersonal/unofficial work practices as a necessary supplementation of the formal for the protection of individual and group values and providing opportunities for indirect communication when conflicts are unresolved.

Social relations and 'course of action' between actors offer an informal governance mechanism in different staff functions and organisational practices. Research studies, including Burt (1980), Freeman (1978) and Hammer (1980) began introducing relational ties and social network studies into organisational study over the half century, reflecting the interdisciplinary nature of the field. A social relationship is either 'communal' when it is based on subjective feelings, such as affectual or traditional, or 'associative' when the orientation of social action rests on 'rationally motivated adjustment of interests' or similar values and agreements (Weber, 1964 p.137). Therefore, a network perspective views all systems as a set of nodes and any economic behaviours/actions are embedded within structured social relationships (Granovetter, 1985).

Although researchers, including Sarkis, Zhu and Lai, (2011b) and Mohsen *et al.* (2014), have introduced discussions of social network theory into studies of green SCM and sustainability

practices, there remains a lack of comprehensive insights in this topic. Recently Wichmann *et al.*, (2016) have embraced a similar perspective and called for further research into social network study in sustainable SCM. Therefore, social network perspective has been taken for further discussion in this study. Besides, even though both of institutional and company strategy have been explored in existing research as discussed above, there is a research gap to investigate how do the three factors act as internal and external drivers to sustainable SCM implementation as a whole. In this regard, the mechanism of how the factors of institutional pressures, company strategies and social networks drive implementation of sustainable SCM will be investigated (Figure 2.1).

Figure 2.1 Drivers of sustainable SCM



Source: Author

### 2.3 Sustainable SCM in industrial practices

Given that sustainable SCM in various industries might be diverse in terms of implementation, Easton (2011) has indicated that sustainability practices are relatively less emphasised in food and beverage industries; therefore, this sector will be investigated in the research. Automotive industry has been additionally considered for the fact of well-

developed international and industrial standards. Comparative findings are expected in the empirical studies.

### **2.3.1 Sustainability practices in the food and beverage industries**

Food and beverage industries both include food and drink processing and manufacturing as well as food supply, according to the definition from NACE (Nomenclature statistique des activités économiques dans la Communauté européenne, 2010, in: Turi, Goncalves and Mocan, 2014). The processing and manufacturing of food and drinks includes: 'meats, fish, fruit and vegetables, oils and fats, dairy, cereal related and starch products, beverage and sugar' and food supply includes 'wholesale and retail distribution of processed food and the catering sector' (Turi, Goncalves and Mocan, 2014, p.134).

Food and beverage industries are an example of a dynamic environment where stakeholders have high expectations for food safety, transparency and a growing demand for sustainably produced food (Beske, Land and Seuring, 2014b; Validi, Bhattacharya and Byrne, 2014). Sustainability practices in the food and beverage supply chain are both necessary and challenging. On the one hand, they are related to human health, social security and the balance of the eco-system; on the other hand, they relate to vast natural resources: water, land, and energy (Mena *et al.*, 2014). Maxime, Marcotte and Arcand (2006) have identified five categories of environmental issues and specificities of the food and beverage industry: 1) energy uses; 2) greenhouse gas (GHG) generation; 3) water use and wastewater production; 4) solid organic residue generation; and 5) packaging waste generation. The value chain can be voluntary when:

- *Products are not to be kept at the same temperature during store and/or transport;*
  - *The food is too crowded, thus the cold does not penetrate the products' depth;*
  - *The vehicle is not refrigerated in advance; the products can take in temperature until the truck is cooled;*
  - *Loading or unloading is taking too long; there is a rapid loss of cold.*
- (Turi, Goncalves and Mocan, 2014, p.135)

Over the last two decades, we have witnessed serious food quality issues throughout the world, such as contaminants found in vegetable proteins for pet food imported into the United States from China (USFDA, 2007); China Sanlu milk scandal which caused serious health problems diagnosed in children and completely destroyed market confidence for the consumption of domestic milk products; and the UK horse meat scandal. This indicates that suppliers, manufacturers, distributors, wholesalers and retailers are all responsible for sustainability practices in the food industry. It is essential to understand the root causes for process failures and highlight the fundamental principle of designing quality into processes (Giffi et al., 1990; Roth *et al.*, 2008). Roth *et al.*, (2007, p.21), proposed the 'six Ts' which are now widely adopted to consider supply chain quality management in the food industry:

- 1). Traceability: the ability to trace back product flow or attributes through the production process and supply chain;
- 2). Transparency: the systematic provision of product and processing information under interpersonal and formal agreements;
- 3). Testability: the ability to detect an attribute of a product;
- 4). Time: the duration of specific processes;
- 5). Trust: the expectation that parties will make a good-faith effort to behave in accordance with any commitments;
- 6). Training: the systematic process of developing knowledge, skills and attitudes regarding international standards of quality, food safety and best practices.

Additionally, in the food industry, poverty is a social issue that organisations and their supply chains need to consider. Katz and Krueger (1992) conducted a longitudinal study in Texas and found that several employers in fast food restaurants used teenage workers and paid a subminimum wage. According to statistical figures from the World Bank (2017), 836 million people still live in extreme poverty and approximately one in five people in developing regions live on less than \$1.25 per day. Consequently, in respect of sustainable SCM, not only should there be consideration of food poverty in terms of managing scarce resources to meet substantial demands from over population in the developing world (Dani, 2015), but there is also a task for social responsibility to increase wages and improve living standards in dealing with poverty issues for farmers and other low paid social groups.

### **2.3.2 Sustainable practices in automotive industry**

Automotive supply chains have commonly adopted the notion of green SCM or environmental SCM in their sustainability practices (Caniëls, Gehrsitz and Semeijn, 2013). Green SCM is 'an organisational philosophy which helps organizations and their partners to achieve corporate profit and market-share objectives by reducing environmental risk and impacts while improving ecological efficiency' (Azevedo, Carvalho and Cruz Machado, 2011, p.850). Therefore, it emphasises economic benefits, together with ecological purposes, to minimise negative impacts of firms' total supply chain processes throughout the product life cycle (Sarkis, 2001; Zhu, Sarkis and Lai, 2008).

Due to a high degree of outsourcing in automotive supply chains, with 60 to 80 per cent of the total manufacturing costs generated (Caniëls, Gehrsitz and Semeijn, 2013), the

achievement of sustainable SCM implementation is supplier dependent. Not only is an automotive Original Equipment Manufacturer (OEM) regarded as committed to sustainable responsibility, but also the performance is dependent on its supply chain members, particularly its suppliers (Awaysheh and Klassen, 2010). Thus, car manufacturers have realised the importance of collaborating with suppliers for environmental protection, new production development, and new technologies to sustain competitive advantage in the long term.

## **2.4 Systematic literature review of *guanxi* networks in SCM**

### **2.4.1 Research scope**

To finalise the research scope for the systematic literature review, exploratory searches were conducted in both the databases and publishers (Table 2.4). The search terms included terminologies of social networks in different regions (*guanxi*, *wasta*, *jeitinho*, *svyazi*, *blat*, ‘*pulling strings*’) and the relevant contents of social networks (‘interpersonal influence’, ‘interpersonal relationship’, ‘interpersonal relationship’) in title, keywords and abstract AND filtering terms in supply chain function (supply OR logistics OR warehouse\* OR inventory OR procurement OR Production OR manufactur\*) in all fields. Publishers included Science Direct, Emerald, Taylor & Francis, Sage and Wiley; databases covered Proquest, EBSCO, Web of science in order to compare the coverage of published papers in different sources. These initial searches were conducted from April to May 2014 and yielded 12211 peer review papers in the included publishers. Two issues occurred in these initial searches: first, given that social networks are socially constructed, there would be a lack of focus and specification in discussion of the constructs and influence; second, it is not feasible for a PhD program to

conduct such a broad scale of research. Therefore, to ensure research validity and reliability, this study focuses on social networks in Confucian societies, called *guanxi* networks in Chinese (Park and Luo, 2001; Hammond and Glenn, 2004).

The social network is multifaceted due to the complex nature of the network itself. It is very socially constructed (Granovetter, 1992) and different social and cultural backgrounds can provide various contexts and social norms for their understanding of social networks. Therefore, to ensure research validity and reliability, this study focuses on social networks in Confucian societies, called *guanxi* networks (Park and Luo, 2001; Hammond and Glenn, 2004)

Table 2.4 Initial process to finalise research scope

	Science Direct	Emerald	Taylor & Francis	Sage	Wiley	<b>Total (in publishers)</b>	Proquest	EBSCO	Web of Science
<i>Guanxi</i>	79	201	33	17	54	384	189	7	26
Wasta	4	6	1	1	1	13	5	0	0
Jeitinho	1	2	0	19	0	22	2	0	0
Svyazi	0	0	0	0	0	0	0	0	0
Blat	21	24	1	0	10	56	9	0	0
“pulling strings”	9	41	0	0	12	62	5	0	0
“interpersonal influence”	233	681	0	1	232	1147	3	0	0
“interpersonal relationship”	386	1243	0	0	389	2017	3	0	0
“interpersonal	1003	6607	1	7	891	8509	40	0	15

relationships									
Total	1736	8805	36	45	1589	12211	256	7	51

Source: Author

### 2.4.2 Guanxi network

Hierarchically, cultivated culture in Confucian societies encourages people to do things together (Xin and Pearce, 1996; Yen *et al.*, 2010), which then creates different types of social relations (Fan, 2002; Yang, 1994). From a cultural-historical perspective, people fall into a certain natural *guanxi* network through their socialisation process, from when they are born continuously developing their *guanxi* webs in their later social interaction with social activities. This indicates that *guanxi* network as a form of continuous ties to bond different social relations together. Transferability of *guanxi* – introducing one friend to another - creates a set of nodes to join various social connections and dyadic relationships in the social network (Park and Luo, 2001), implicitly maintained by mutual interests and benefits (Yang, 1994; Leung and Wong, 2001). Meanwhile, *guanxi* networks are distinct from discrete ties, in terms of so-called acquaintances or even weak ties where people might hear of others from their network members, or interact with occasionally through email or social networking software (e.g. Wechat, Whatsapp).

Therefore, to ensure research validity and reliability, this study focuses on social networks in Confucian societies, called *guanxi* networks (Park and Luo, 2001; Hammond and Glenn, 2004). Yang (1994) has conducted an empirical study over 10 years in China. She states that *guanxi* means literally ‘a relationship’ between objects, forces, or persons. When it is used to refer to relationships between people, not only can it be applied to husband-wife, kinship



and friendship relations, it can also have the sense of 'social connections', dyadic relationships that are based implicitly (rather than explicitly) on mutual interest and benefit. Once *guanxi* is established between two people, each can ask a favour of the other with the expectation that the debt incurred will be repaid at some time in the future (1994, p: 1-2).

*Guanxi* networks are rooted in family and extend to society with a hierarchical status (Park and Luo, 2001; Barnett, Yandle and Naufal, 2013). Emotional closeness and trust are often cultivated after long-term interactions (Hwang, 1987; Fan, 2002, 2012), while very often, in social interaction, *guanxi* tends to be utility driven and emphasises reciprocity, influence and power (Fan, 2002). When both emotional attachment and material goals are valued in *guanxi* relational ties, particularistic ties have been established (Hwang, 1987; Huang *et al.*, 2011). As such, *guanxi* is regarded as a business relationship management strategy by which to leverage internal company performance in response to political and socio-economic environments (Tsang, 1998; Cai, Jun and Yang, 2010; Chen, Huang and Sternquist, 2011).

There are four core values of *guanxi* - *renqing*, *ganqing*, *xinren* and *mianzi* (Table 2.5). *Renqing* is the owing of a favour (Wong and Leung, 2001); when people offer *renqing*, they often expect to receive a favour in turn. The notion of exchanging favours and reciprocity becomes a motive for building business *guanxi* (Yen, Barnes and Wang, 2011). *Ganqing*, a deep, emotional closeness between *guanxi* members, emphasising mutual, empathetic understanding, affection, sharing and emotional identification (Yang, 1994). According to (Jacobs, 1979), *renqing* and *ganqing* are complimentary; the methods of materialising and cultivating *ganqing* are also used as way of gaining *renqing*. *Xinren* is a Chinese term relating to trust (Chen, Zhang and Delaurentis, 2014; Chen and Chen, 2004), reliance, credence,

belief and dependency in a relationship (Yen, 2010). Trust plays a significant role in a *guanxi* network by facilitating smoother and more efficient transactions and eliminating opportunistic behaviour and risk (Leung and Wong, 2001). To understand *guanxi*, one must understand *mianzi* (facework), which represents one's social position and status, thus affecting one's ability to accumulate material wealth and social influence (Hwang, 1987; Park and Luo, 2001). This value is also emphasised in Arab cultures (Abosag and Lee, 2013).

Table 2.5 Constructs of *guanxi*

<b>Terms</b>	<b>Definitions</b>
<i>Renqing</i>	Similar to the English concept of owing favours (Leung and Wong, 2001)
<i>Ganqing</i>	Implies affection, sentiment and emotion (Yen <i>et al.</i> , 2011)
<i>Xinren</i>	Relating to trust (Chen and Chen, 2004)
<i>Mianzi</i>	Face, facework, impression management (Hwang, 1987)

Source: Author

In SCM, *guanxi* networks appear broadly in topics such as buyer-supplier relationships (Chen, Huang and Sternquist, 2011), supply chain integration (Cai, Jun and Yang, 2010) and knowledge sharing (Cheng, 2011b). However, the literature lacks comprehensive evidence showing how SCM is affected by *guanxi* networks from a capital view. Therefore, this study starts with a systematic literature review, aiming to capture how *guanxi* networks increase supply chain capital flow in order to build the bridge of *guanxi* networks and sustainable SCM, since sustainable development is integral in SCM.

### 2.4.3 Review design

To ensure a rigorous approach to the structured review, the research adopts the method suggested by Tranfield, Denyer and Smart (2003). It aims to achieve thoroughness in a replicable process and helps to develop the evidence base and minimises research bias. The method of content analysis (Seuring and Gold, 2012) has been used to synthesise 126 identified papers so as to compile comprehensive information and evidence.

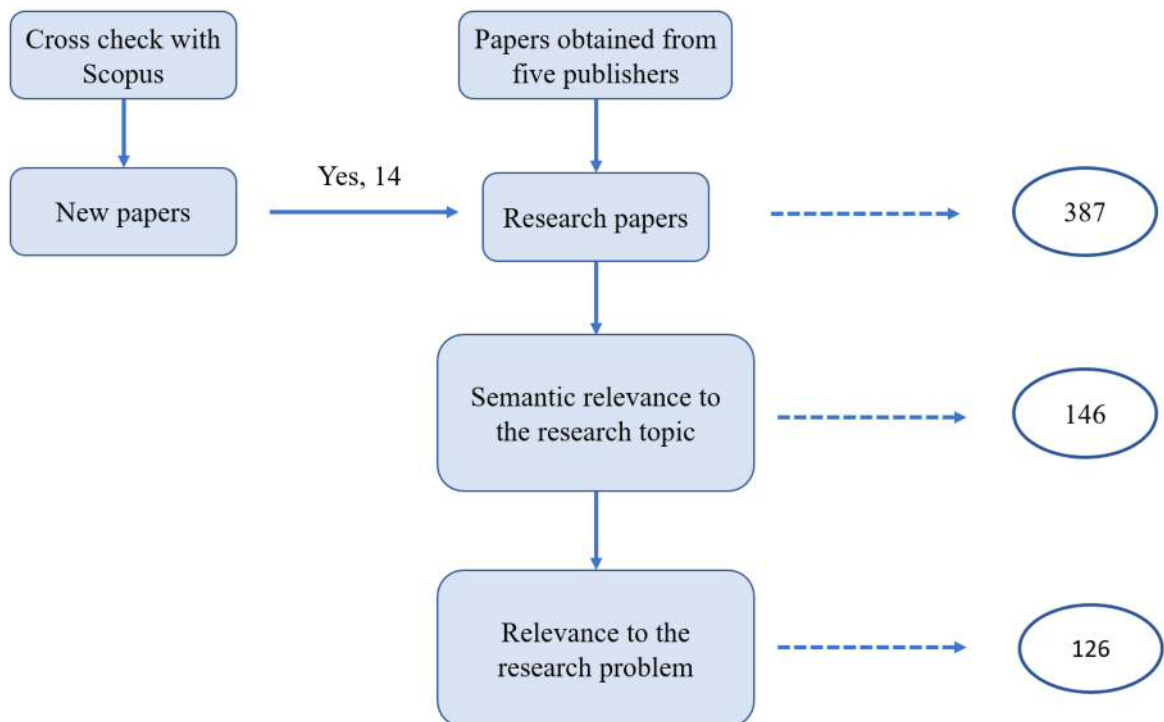
In line with Tranfield, Denyer and Smart (2003), the review was discussed by the review panel for the research design and choice of search terms. Coded categories include basic demographic information, constructs of *guanxi* networks, impacts on SCM and sustainable SCM regarding economic, environmental and social practices. Information for each category was recorded in an Excel spreadsheet. Results of pre-coding for the first 20 papers were compared within the panel in order to ensure the validity of coding and refine the research scope and coding criteria according to the research questions.

To identify publications, a broad range of terminologies in supply chain functions (including supply, logistics, procurement, production, inventory, warehousing and manufacturing) were searched in all fields in combination with *guanxi* in the title, abstract or keywords. The online databases of selected publishers were searched, including Elsevier (Science Direct), Emerald, Taylor & Francis, Sage and Wiley. The reason for selecting these databases was that they covered the most relevant management journals while not filtering out other topic related sources, such as Asia Pacific Business Review. To cross check the coverage and comprehensiveness of the study, 200 papers were found in the Scopus database, of which

14 papers are added to the sample. The timeframe covered from 1995 to 2015, after the initial research indicated no significant studies beforehand.

The selection process is summarised in Figure 2.2 and the research protocol is presented in Table 2.6. In total, 387 papers were found, including 14 papers from Scopus. To select the most relevant papers, the first filtering criterion was to select papers containing key terms with semantic relevance (for example, deselect studies that mentioned 'manufacturing' as the research industry rather than the study of a function). Further filtering identified those papers where there was substantive interaction between and *guanxi* and the supply chain functions. This yielded a final sample of 126 papers.

Figure 2.2 Material selection



Source: Author

Table 2.6 Research protocol for material selections

<b>Research protocol</b>	Context: set of 'SCM' and <i>guanxi</i>
<b>Conducts of review</b>	Descriptions
<b>Publishers &amp; database</b>	Elsevier (Science Direct), Emerald, Taylor & Francis, Sage and Wiley: publishers which covered the most relevant management journals while not filtering out other related sources. Scopus is used to cross check the coverage and comprehensiveness of the study
<b>Publication type</b>	Peer-reviewed papers only: These papers represent the final stage of completion. There is no restriction on the journals included because this is an international research topic which could be published to audiences with various interests.
<b>Language</b>	English only: this ensures the wide range of coverage, while avoiding heterogeneity in translation. Also, this ensures transparency and the ability to replicate the review.
<b>Data range</b>	After running initial search, no major studies were published before 1995. Therefore, the data range started from 1995.
<b>Search terms and Search fields</b>	Supply (OR logistics OR procure* OR production OR inventory OR warehous* OR manufactur*) in all fields AND ' <i>guanxi</i> in title, abstract or keywords. This approach captures a full picture of the influence of <i>guanxi</i> in a broad range of supply chain functions.
<b>Exclusion criteria #1 Semantic relevance to the research topic</b>	In the subject area selections, some topic areas are less relevant to the research topic, such as engineering, medicine, chemical engineering and could, therefore, be excluded directly in the sample. However, some areas, such as social science, psychology and humanities, could be relevant to the research topic depending on the contents of individual studies. In this case, the authors checked each paper one by one to select the most relevant to the research topic.
<b>Exclusion criteria #2 Relevance to the research problem</b>	In some cases, even though papers cover both research themes in the relevant topics, they did not provide evidence showing the interaction between two themes. Therefore, efforts were made to exclude such cases as they provide limited knowledge contributing to the research objects of this study.

#### 2.4.4 Analysis

In the review, the constructs of *guanxi* networks were inductively developed from previous studies of *guanxi* (e.g. Hwang 1987; Park and Luo 2001). Similarly, to capture the full picture of the influence on SCM capital in *guanxi* networks, categories were inductively developed

based on the definition of SCM and the content of each paper. The evidence was then synthesised as financial, human and social capital, according to the study of social networks by Burt (1992). Information of sustainable development, aligning with economic, environmental and social sustainability practices was recorded simultaneously to reflect the current stage of study of *guanxi* networks in the topic.

To ensure the validity of this work - particularly the accuracy and consistency of the categories and coding process - after coding the first 20 papers, the coding file and papers were circulated among the research team to formatively check their reliability as related to the research questions. The three tables containing all the attributes of the core values, motivations and outcomes of interpersonal relationships were presented to the research team at the end of the coding for further debate and to check the logic and consistency of each cluster. The cross check and debate in the research group served to confirm the findings, increase the validity of the coding process and improve the reliability of the content analysis (Potter and Levine-Donnerstein, 1999).

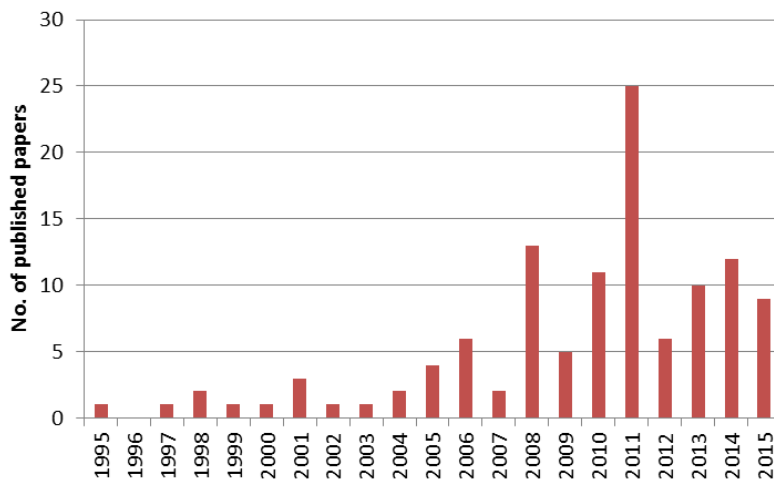
#### **2.4.4.1 Demographic information**

The first article from the review was published in 1995. Since then, *guanxi* networks have received increasing attention (see Figure 2.3). There has been a dramatic increase of academic interest in the topic; 86% of the papers related to this topic were published between 2006 and 2015, peaking in 2011. Thus, there is a good body of knowledge to draw on. Nevertheless, the observations of this review suggest a desaturation in studying *guanxi* networks in SCM. This is because, first, the sample papers were published across a wide range of disciplines, the majority of which were marketing and business studies (55 papers).

Second, even though the studies covered a broad range of research regions, such as comparative studies between companies from China and New Zealand (Gao *et al.*, 2014) and studies in the Arab world (Abosag, 2015; Khakhar and Rammal, 2013), the distribution was focused on China (including Taiwan and Hong Kong); as a result, 85 (73.9%) of the reviewed papers focus on guanxi. Third, 51 papers (48.1%) used quantitative research methods, while failing to provide detailed insights into industry sectors and firm size. This is probably because of a lack of feasibility for data collection; furthermore, it also reflects the predominant business research method used in China (Quer, Claver and Rienda, 2007). Finally, study indicates a non-theoretical tradition in 67 articles (63.2%), which reflects the fact of theory adoption in supply chain management generally (Walker *et al.*, 2015). These observations indicate that the present research topic is still at an exploratory stage where further insights can be investigated.

Further observations reveal that in all the papers, there was at least one author from the heritage and cultural background of the type of interpersonal relationship being studied. This helps to provide a thorough understanding of the social, cultural and economic differences within these regions (Roy *et al.*, 2001).

Figure 2.3 Number of papers published each year



Source: Author

#### 2.4.4.2 Constructs of *guanxi* networks

The constructs underpinning *guanxi* networks were identified in order to understand the architecture of social networks in Confucian societies. Coding yielded over 300 variables in the 115 papers. To synthesise these variables, 12 clusters were identified and aligned with the concepts of *ganqing*, *xinren*, *renqing*, and *mianzi* where possible. The results can be found in Table 2.4.

Variables coded in *renqing* include reciprocity, obligation, favour and behavioural exchange. *Renqing* is a focused dimension that emphasises social order and harmony through behavioural exchanges to gain material goals within stable social relationships (Yang, 1994; Park and Luo, 2001; Hwang, 1987). *Renqing* also embraces the core value of reciprocity. Reciprocity, a typical social norm in informal relationships, generates a specific power and benefit in a type of bilateral governance of (Park and Luo, 2001; Jia and Wang, 2013).



Individuals in informal relationships are interdependently connected in pursuing mutual transactional benefits.

*Renqing* embraces the social norms of exchanging favours and obligations (Millington, Eberhardt and Wilkinson, 2006; Wang and Woods, 2013) in order to secure and maintain relational ties. This then generates the implicit rule of equity and reciprocity in informal relationships; people can expect returned favours from their counterparts if they have offered help. Because of this rule, informal relationships are widely used as instrumental tools to deal with organisational issues (Bian, 1997; Chen, Ellinger and Tian, 2011). *Renqing* is also a 'hierarchically structured' relationship, which is maintained and enhanced by continuous interaction and satisfaction between both parties over a long time (Hwang, 1987). This review notes that evidence for this has been found in China, the Middle East (Abosag and Lee, 2013; Barnett et al., 2013), Russia (Hsu, 2005) and Japan (Hwang, 1987).

However, governance mechanisms based on spontaneous self-discipline and implicit rules could create relational uncertainty; the body that gains more power can break the 'rule of game' and not return the favour when it is asked for. In addition, over-reliance on interpersonal relationships can create operational risks and compromise company interests for the sake of obedience to reciprocal obligations (Nie *et al.*, 2011), such as using a family member as a supplier even when they are not the most sound business choice. Therefore, it is necessary to retain the power in the reciprocal interaction in social networks – proactively select the members in the social networks and the format of building and maintaining personal ties in the exchange of reciprocity and mutual benefits.

However, governance mechanisms based on spontaneous self-discipline and implicit rules could create relational uncertainty; the body that gains more power can break the 'rule of game' and not return the favour when it is asked for. In addition, over-reliance on informal relationships can create operational risks and compromise company interests for the sake of obedience to reciprocal obligations (Nie *et al.*, 2011), such as using a family member as a supplier even when they are not the most sound business choice. Therefore, it is necessary to remain judicious when making decisions on, building and using informal relationships to gain benefits while returning the necessary power in the reciprocal interaction to the other.

*Ganqing* is similar to 'feelings' and it implies the individual's emotions of affection and sentiment (Yen *et al.*, 2011). Variables in *Ganqing* include emotional closeness, relational bonds and commitment. It is an interpretation of the expressive ties of emotional closeness and attachment that exist within the social network (Wang, 2007; Shou *et al.*, 2011; Yen and Barnes, 2011; Abosag and Lee, 2013). The degree of *Ganqing* primarily depends upon continuously positive interactions and satisfaction (Xin and Pearce, 1996). *Ganqing* is related to the relational bonds that link mutual personal kinships with shared values and similarities (Barnes, Yen and Zhou, 2011). This could be posited as the process of social identity wherein individuals identify themselves in a group according to perceived similarities. *Ganqing* describes the quality of a relationship between interactions (Chen and Chen, 2004; Barnes *et al.*, 2011; Yen *et al.*, 2011). In social activities, people are more likely to grow *Ganqing* and thereby increase their levels of psychological commitment (Barnes *et al.*, 2011; Chen II., 2013; Jia and Lamming, 2012) to bring about a sense of cooperation and long-term orientation between relationship partners (Theingi, Purchase and Phungphol, 2008; Tian, Song and Tian, 2012)

*Ganqing* is complementary to *renqing* when it is materialised (Yen *et al.*, 2011). This concept is often criticised for encouraging unethical commitments such as gift-giving. When gift-giving is manipulated to achieve personal goals, the informal relationship takes on the qualities of corruption and bribery. When gift-giving is altruistic (Davies *et al.*, 1995), however, it is meant only to maximise the pleasure of the recipient and is therefore not necessarily unethical.

*Xinren* is a Chinese term referring to trust (Chen and Chen, 2004; Yen *et al.*, 2011); this study examines the variables of trust and credibility. Within the defined core values, this can either complement or substitute formal relationships. The purpose of formal relationships is often to reduce opportunistic behaviour and cost (Mellewigt, *et al.*, 2007). *Xinren* can complement this because informal relationships are strongly supported in the argument to reduce opportunism through trust and trustworthy behaviours (Lu *et al.*, 2008; Li and Sheng, 2011). Informal relationships are socially constructed; when one exhibits trustworthiness, one's degree of credibility increases due to a positive social reputation (Cui *et al.*, 2013; Lu *et al.*, 2010) and honour earned within the social network (Chan, 2008; Khakhar and Rammal, 2013). This generates valuable social capital that facilitates further business opportunities (Abramson and Ai, 1997; Ambler, Styles and Xiucun, 1999). Formal and informal relationships complement each other because both companies endeavour to maximise their own benefits while reducing contractual costs. Building and maintaining trust and informal relationships can be costly in terms of time and effort (Fock and Woo, 1998), however, so it may not lead to financial efficiency in the short term.

Building interpersonal relationship is a hierarchical process. When certain levels of cooperation and satisfying interaction occur, trust is established (McAllister, 1995). Trust was observed to be highly represented in the present review (Table 2.7), appearing in 71 of the 106 coded papers. We argue that it is the central core value of informal relationships. Behaviours become more predictable with traits such as consistency, responsibility and benevolence (Jeffries and Reed, 2000; Ring and Van De, 1994). This predictability then further enhances commitment and cooperation and reduces uncertainty in business activities. Although there are similarities and differences among the different forms of interpersonal relationships in different regions, the evidence shows that in emerging markets, such as Russia (Michailova and Worm, 2003), China and the Middle East (Abosag and Lee, 2013; Barnett *et al.*, 2013), people have a strong tendency to do business with people they trust.

Of the core values, *mianzi* surprisingly was not highly represented in the coded papers, but is still a crucial concept in Confucian/collectivist cultures where the respect, pride and dignity of individuals are important (Leung *et al.*, 2011). *Mianzi* has a similar meaning to facework, being defined as the 'projection of self-image and impression management' (Hwang, 1987, p.960). *Mianzi* is an intangible social resource which is affected by individual social position and, in turn, impacts on the ability to obtain material wealth (Park and Luo, 2001). Frequently, people offer and/or return favours to show respect and save the face of their counterparts (Shou *et al.*, 2011). *Mianzi* is also a hierarchical process wherein, over a certain period of committing to reciprocal social norms, people earn good reputations and build positive interpersonal relationships in their social networks, and their counterparts in this network save face as well. The higher social status a person has, the more powerful their

social status and influence, resulting in higher levels of trust and credibility (Barnes *et al.*, 2011; Chan, 2008).

Dependency and adaptation are core values that fall outside the four dimensions (Table 2.7). In informal relationships, the cultivation of relationships and benefits are interdependent (Yang, 2002). Individuals must make the effort of building and maintaining informal relationships to secure and sustain their own benefits. The three aspects of cultural adaptation are to understand, adjust and learn (Jia and Lamming, 2013). For organisations to enter a new market, especially when foreign companies enter emerging areas (such as Walmart and Carrefour in China (Chuang *et al.*, 2011) the building of informal relationships with local people in the targeted region can help companies to understand, learn and adjust to the local culture and thus overcome psychological distance and mitigate supply chain risks (Jia and Lamming, 2013).

Table 2.7 The constructs of guanxi networks

Clusters	Definition	Included aspects	No. of papers
<b>Renqing</b>			
Reciprocity	People within interpersonal relationships expect reciprocity concerning equity and the exchange of favours (Chen <i>et al.</i> , 2011)	Reciprocal expectation, utilitarian	50
Obligation	Interpersonal relationships require one to fulfil obligations in the form of reciprocation of gifts and favours	Social obligations	36
Favour	This refers to the exchange of favours to promote cooperation and shared social experience among individuals	Favouritism, indebtedness, personal favours	27
Behavioural exchanges	Interpersonal relationships refer to the interactive relationship between or among individuals with behavioural exchanges in order to establish mutual trust and cooperation	Mutual impacts, mutual benefits, personal exchanges	9
<b>Ganqing</b>			<b>126</b>

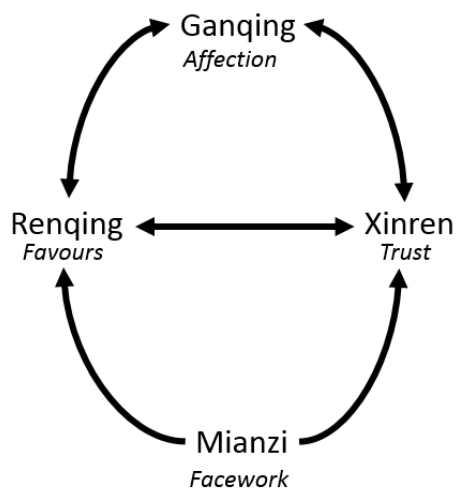
Emotional closeness	This reflects the tenor of a social relationship between individuals or organisations and the emotional attachment that exists among parties in a network	Human affection, human sympathy, interpersonal harmony	71
Relational bonds	Interpersonal relationships can be generally classified into three categories: family, helper and business	Blood ties, clanship, colleague ties, familial collectivism	32
Commitment	This type of Confucian relationship is holistic and embraces the involved long-term support of social, psychological and economic welfare of the whole person across all life domains	Protection, shared interests, cooperation, long-term orientation, longevity	23
<b>Xinren</b>			<b>108</b>
Trust	This refers to the confidence for the exchange within the partner and the willingness to take risks	Interpersonal trust, trusting relationships	87
Credibility	Credibility between individuals can increase trust, reliability and reputation	Social reputation, assurances	21
<b>Mianzi</b>			<b>44</b>
Facework	Saving face includes a set of behaviours aimed at preserving one's own and the other's dignity	saving face	44
<b>Others</b>			<b>31</b>
Dependency	One party who is dependent on its partner's resources and capabilities values the relationship and therefore seeks to advance and stabilise it	Interdependency	21
Adaptation	This refers to a form of international inter-firm and external cultural and social learning and localisation	Localisation, adaptation	10

Source: Author

Developing from the previous studies, we argue that the four dimensions of *guanxi* are interlinked (Figure 2.4). Jacobs (1979) believes that *renqing* and *ganqing* are complementary. When *Ganqing* is materialised, such as dining and gift giving, it is a way of exchanging *renqing* (Yen *et al*, 2011). *Xinren* is a notion either embedded in *Gganqing* or developed through repeated satisfaction in exchange of *renqing* (Yen *et al*, 2011). In turn, embracing *xinren* from both parties, in the long term, encourages the exchange of *ganqing* and *renqing* and

vice versa (Zhuang, Herndon and Tsang, 2014). This is how friendship enhances relational commitments (Ling and Li, 2011; Chen *et al.*, 2015). *Mianzi* shows the power and prestige, influencing the ability of granting favours in social networks (Hwang, 1987; Yen *et al.*, 2011). The higher social status a person has, the more powerful their facework, resulting in higher levels of trust and the ability to seek *renqing* (Barnes *et al.*, 2011; Chan, 2008; Zhuang *et al.*, 2010).

Figure 2.4 Interpersonal level of social networks in guanxi



Source: Author

#### 2.4.4.3: Supply chain capital in *guanxi* networks

This section attempts to understand the underlying mechanisms as to why people seek to embed *guanxi* networks in their SCM practices. The review findings are shown in Table 2.8.

When discussing the influence of *guanxi* networks, it is inadequate to suggest that *guanxi* is no longer important when institutional environments are becoming more transparent (Standifird and Marshall, 2000). The movement of eradicating corruption and bribery from Chinese government might create greater sensitivity in dealing with interactions with officers (Chan and Zhao, 2012). However, in the business environment, it is very naive to

draw a clear line between formal contracts and social networks. Table 2.8 shows an essential connection between *guanxi* networks and business operations. To synchronise the findings, the study adjusted discussions from Kilduff and Tsai (2003) and Kilduff and Brass (2010) that social networks influence individual cognition and organisation management and, more specifically, influencing capital flow in SCM (Figure 2.5).

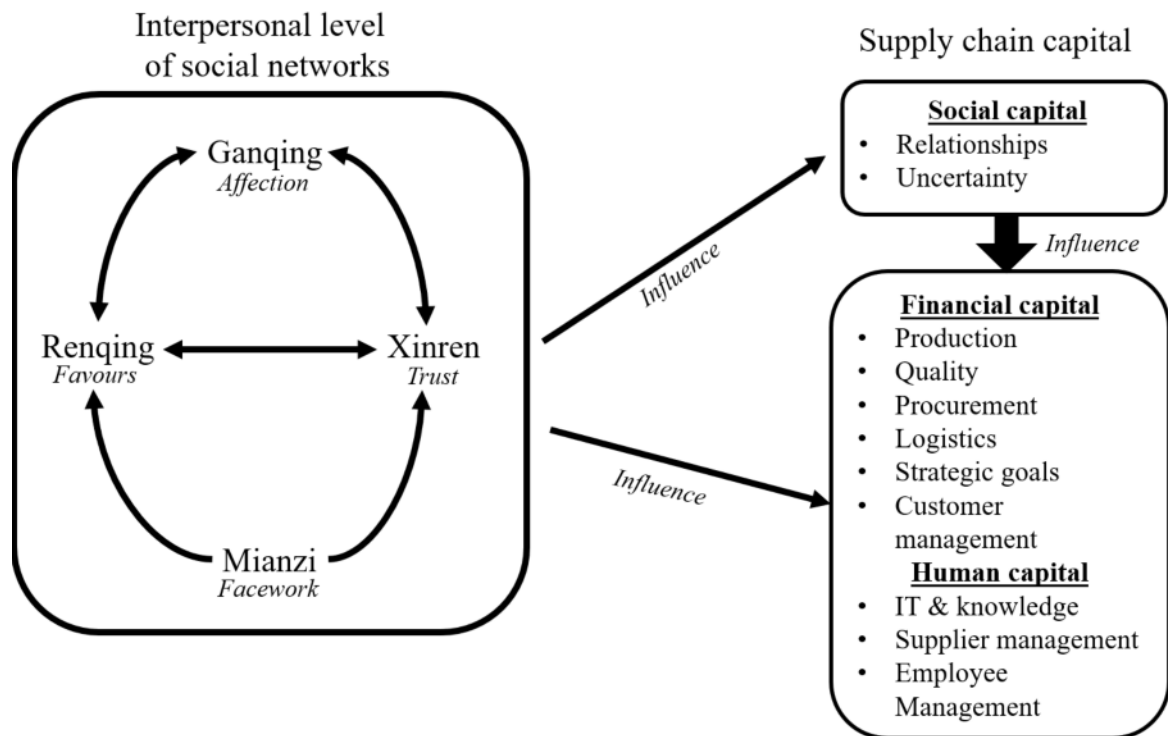
Table 2.8 Influence of *guanxi* networks in SCM

<b>Cluster</b>	<b>Impacts of <i>guanxi</i> networks</b>	<b>No. of papers</b>
<b>Social capital</b>		
Relationship	In social networks, firms tend to rely more on arm's length relationships to build good relationships and commit to formal and interpersonal collaborations	63
Reduced uncertainty	Social ties increasingly serve as mechanisms to reduce uncertainty and increase predictability because the players are likely to hedge their risk by using private or particularistic channels	25
<b>Financial capital</b>		
Procurement	They improve efficiency, save time and ease the procurement of necessary production resources	39
Production	It is important in internal integration, external adaptation and collaboration during production	34
Logistics	Global logistics competencies and logistics infrastructures can be enhanced by leveraging <i>guanxi</i> networks	18
Strategic goals	Through close personal relationships, the supply chain strategically forms a variety of flexible and synchronising prototypes	17
Customer management	An organisation can obtain operational benefits by including downstream parts of the SCM	9
Quality	Good <i>guanxi</i> with main suppliers can help companies acquire quality products and superior services	8
<b>Human capital</b>		
Supplier management	Personal relationships between individual buyers and suppliers can dramatically influence supplier selection, development and shared organisational values	21
Information technology	Information integration is necessary to help internal functions within the company identify critical issues	26
Employee management	Good <i>guanxi</i> with employees is expected to improve engagement and collaboration and control turnover rates	7
Knowledge and learning	Good <i>guanxi</i> fosters understanding of knowledge and market signals	7

Source: Author



Figure 2.5 Influence of supply chain capital in guanxi networks



Source: Author

Capital is defined, according to Herfindahl and Kneese (1974, p.68), as ‘anything which yields a flow of productive services over time and which is subject to control in production processes.’ There are many aspects of justifying different forms of capital in SCM. In this study, we focus on social, financial and human capital, which are diffused in the spread of a social network (Burt, 1992).

Economic behaviours are embedded in social networks; that is, through social networks come the opportunities to transform financial and human capital into profit (Burt, 1992).

**Social capital** lies in relations among people, identifying ‘certain aspects of social structures by their functions’ (Coleman, 1988, p. S101). *Guanxi* networks generate social capital for exchange of trust, benefits and reciprocity, driving long-term supply chain efficiency and

development (Cheng, 2011b; Yang and Wang, 2011). Relationships in this context enclose a wide range of involvement, including customers, suppliers and competitors. Interpersonal relationships and interactions facilitate better communication and understanding (Cai and Yang, 2014). Trust plays a central role to mitigate conflict and reduce uncertainty in SCM practices in production (Ling and Li, 2012), supply and demand (Cheng *et al.*, 2012) and information and technology turbulence (Chang, 2011). Certain levels of confidence in personal relationships with stakeholders encourage positive attitudes towards supply chain integration (Nonini, 2008) and collaboration (Ramasamy, Goh and Yeung, 2006) and maintain long-term partnerships (Wiegel and Bamford, 2014; Yen, Barnes and Wang, 2011).

While the usage of *guanxi* networks is shaped by uncertainty in specific institutional environments, which is influenced by individual's reputation and powers within the network (Chang, 2011), *mianzi* and trustworthiness are associated with strong network position and power so as to improve the tolerance level for uncertainty in supply chains (Cui *et al.*, 2013). Good relationships with various stakeholders reduce uncertainty about regulation, market changes, policy-making and new product features. Predictability increases with efficient information flow, driving to reduce institutional and operational risks (Cai, Jun and Yang, 2010; Wong, 2010; Berger *et al.*, 2015).

**Financial capital** is regarded as the economic resources used by companies to produce and serve their customers' needs, including aspects such as cash in hand, investments and lines of credit. *Guanxi* networks smooth transaction and reduce operational costs in procurement, production, product and service quality, logistics, customer management and long-term

strategic planning for supply chain effectiveness and efficiency (Berger and Herstein, 2015; Chung *et al.*, 2015)

Sustained *guanxi* networks ease the process of procuring necessary resources (Ramasamy *et al.*, 2006; Chen and Wu, 2011). Mutual understanding and interdependency with suppliers drive flexibility and transparency in negotiation for price (Giannakis, Doran and Chen, 2012), order quantity (Booi Hon, Ling and Richard, 2011), and payment deadlines (Chen and Wu, 2011). In addition, as a type of social capital, *guanxi* networks facilitate firms to access tangible materials and intangible information regarding local supply and demand (Chan, 2008; Chen *et al.*, 2013).

Peoples' networks of friends influence cognition in organisational networks (Kildull and Tsai, 2003) so as to improve operational behaviours. Interpersonal connections are often related to an employee's attitudinal and behavioural outcomes (Wong, Wong and Wong, 2010) including a good quality of products and services offered (Hsu, Liu and Huang, 2012), productivity and product development (Ling and Li, 2011). Empirical studies show that *guanxi* networks harmonise working environments and lubricate internal conflicts for better performance in Lean production (Wong, 2010), ERP implementation (Choi, Chow and Liu, 2013), and mass production (Chung, 2005).

In globalisation, it is essential to coordinate dispersed supply and manufacturing in order to achieve supply chain efficiency and responsiveness (Li and Lin, 2006). Studies show that a strong culture of *guanxi* networks among decision makers can strengthen their competence in terms of resource integration (Li and Lin, 2006), logistics services improvement (Chan and

Zhao, 2012) and accessibility to privileged information in terms of orders, forecasts, volumes and timely deliveries (Chen and Wu, 2011; Giannakis *et al.*, 2012).

Additionally, good personal relationships between staff members and their customers raise awareness in satisfying customers with dedicated care, such as producing specialised products and delivering just-in-time to customers (Lu *et al.*, 2009). Thereby, companies fulfil customer needs better than their competitors and mitigate switching behaviour in customers (Hsu, Liu and Huang, 2012; Chen, Chen and Huang, 2013). Following long-term satisfactory interactions, it is likely for actors to set up strategic goals to configure supply chains (Park and Luo, 2001) with an emphasis on supply chain flexibility (Lin *et al.*, 2012), market effectiveness (Chen and Wu, 2011) and operational efficiency (Lin *et al.*, 2012).

**Human capital** relates to the skills capabilities at certain tasks (Burt, 1992). Transferring knowledge and exchanging IT techniques in social networks improve employees' skills and working capabilities. Maintaining good interpersonal relationships with employees and suppliers provides support for employee and supplier management.

Based on mutual trust and reciprocity between players, *guanxi* networks encourage information sharing and technology integration in supply chains (Cai *et al.*, 2010; Chen, Chang and Lee, 2015). Through *guanxi* networks, information and technical support—such as technical innovation and manufacturing technologies—are shared and transferred from a company's staff to its customers and/or suppliers (Luk *et al.*, 2008). This then improves employee's working capabilities to ensure product quality (Wiegel and Bamford, 2015) and production effectiveness (Chang, 2011; Choi *et al.*, 2012; Ling and Li, 2011;). Consequently,

with enhancement of supply chain activities, *guanxi* networks mediate for supply chain efficiency and continuous improvement (Chan, 2008).

Supply chain effectiveness and efficiency rely heavily on commitment from employees. Good interpersonal relationships between managers and staff implicitly represent harmonious relationships between firms and their employees. Through efficient communication and shared understanding, synergistic sentiments are gradually cultivated among staff members, which enhances cooperating behaviours and institutional loyalty, (Wong *et al.*, 2001) while mitigating relational risks in employee management (Chen, Chen and Huang, 2013). Furthermore, driven by emotional commitments, managers are more likely to provide training to improve technical skills (Booi Hon, Ling and Richard, 2011), resulting in the increase of employees' working capabilities. In addition, Choi *et al.*'s (2012) case study reveals that a proper level of *guanxi* networks within operational companies—especially joint venture firms—benefits managing labour costs efficiently while sustaining competitive advantage.

#### **2.4.4.4 The current studies of *guanxi* networks in sustainable SCM**

Observations from the review (Table 2.9) show that *guanxi* networks have been investigated to identify improvements in economic performance, including a reduction in transaction costs (Kong, 2011, p.68), increased market performance (Li and Sheng, 2011), and financial profitability (Abramson & Ai, 1997; Tian *et al.*, 2012). However, sustainability is not only about economic performance. Few studies have mentioned social and environmental practices. The most relevant is the empirical study from Xu *et al.* (2006) showing the mediating role of *guanxi* networks in managers' decision-making in green supply chain

collaborations. *Guanxi* networks shaped stakeholders' knowledge and perceptions, resulting in the implementation of sustainable SCM. However, this field is neglected and needs further elaboration based on current literature.

Table 2.9 The current studies of guanxi networks in sustainable SCM

<b>Impacts on social sustainability</b>	
<b>Factors</b>	<b>Author(s)</b>
Substantial rewards	Michailova and Worm (2003); Park and Luo (2001)
Customer satisfaction	Luo et al., (2011)
Employee satisfaction	Hong and EngestrÖM (2004)
Harmony of the community	Ling and Li (2011)
Local residents' health	Wang and Woods (2013)
Relationship quality with stakeholders	Chen et al., (2013)
Social satisfaction	Chen et al., (2011)
Employee working environment and human rights	Herndon (2008)Herndon (2008)
<b>Impacts on environmental sustainability</b>	
Green supply chain	Cheng (2011)
Influences implementation and environmental policymaking system	Hills and Man (1998)
Upgrade technology to deal with wastewater	Hills and Man (1998)Hills and Man (1998)
Wastewater, waste gap pollution	Wang and Woods (2013)

Source: Author

#### 2.4.5 Insight from the review

The SCM studies raise awareness of the contribution of network and network analysis (Capó-Vicedo, Mula and Capó, 2011), to explain the networks benefit (Galaskiewicz, 2011). This systematic literature review has constructively revealed the impacts of social network regarding the flow of supply chain capital to answer RQ1. The researcher found that good quality personal ties, between buyer and supplier, between company and its employees and among employees, drive social capital sufficiently in SCM to reduce opportunistic behaviours and promote long-term cooperation and collaboration. *Renqing* (reciprocity), *ganqing*

(emotional affection), *xinren* (trust) and *mianzi* (facework) are embedded among social ties, influencing human behaviours towards SCM activities. The smooth flow of social capital advocates unity of network relationships to increase the flow of financial and human capital. In coherence with current literature, *guanxi* networks boot economic benefits and efficiently reduce operation costs, meanwhile increasing the flow of knowledge learning and transference and information accessibility.

The observation from the literature also reveals a certain research gap. As one of the most popular issues in SCM, sustainable practices have come across in some studies but comprehensive insights remain lacking. Given the fact that capital is the derivation of sustainable development (Victor, 1991) and *guanxi* networks embed and diffuse the flow of supply chain capital, the significant research gap of this study is identified as the need to build a bridge between social networks and sustainable SCM, more specifically, to understand the interaction of social networks and sustainable SCM implementation by answering the questions:

***RQ2: What are the relationships between social networks and sustainable SCM implementations?***

***RQ3: How do social networks drive implementation of sustainable SCM?***

## **2.5 Theoretical underpinnings**

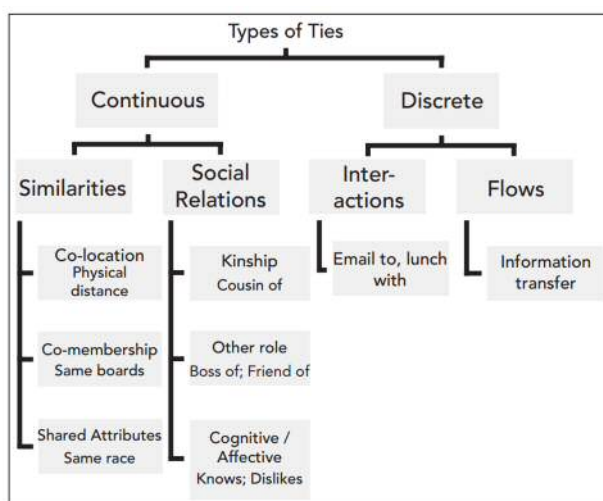
### **2.5.1 Social network theory**

In the last century, various sociologists (such as Marx (1995) and Weber (1964)) began to investigate social networks to describe social activities and organisational behaviours. This area of study encompasses different levels of analysis and diversity. Borgatti and LI (2009),

for example, have summarised the typology of ties between people among persons in social networks literature (Figure 2.6). The two basic types of ties are continuous and discrete. Continuous ties are those that are always ‘on’ for the duration of the connection (for example, family ties), while discrete ties are based on a series of discrete events (for example, sending email or messages for greeting).

As Figure 2.6 shows, the second level of typologies entails ties into four major groups: similarities, social relations, inter-actions and flow. Similarities refers to ‘dyadic conditions that might be said to be “prosocial” – things like co-membership in groups, or co-location in space’ (Borgatti and Li, 2009, p.6). Kanter (1977) attempted to explain ‘homosocial reproduction’ in organizations with the argument that people can trust one another because of the effects of social similarity and joint biography in social structure. It is difficult to tell whether the predictability of a friend’s behaviour is due to sharing common status, religion, social class, educational institution and background or is, instead, due to information shared across personal ties over a long time (Heimer, 1992).

Figure 2.6 Typology of types of ties in social networks literature



Source: Borgatti and Li (2009)



Social relation is another type of tie involving the study of sets of actors and the relations that connect and divide them (Freeman, 2004). It is continuously existing ties that are most likely to generate cognitive affection, such as trust. Unlike social relations, interactions consist of discrete events that could happen over a period, such as being 'talked with over the last month' (Borgatti and Li, 2009).

Flows is a tie consisting of the content that moves or switches between actors when they interact; for example, ideas, money, or stocks of inventory (Borgatti and Li, 2009). In theory, flows are often the most important kind of tie; however, in practice, flows are difficult to measure. Instead, flows are assumed to be embedded from interactions or social relations. For example, Borgatti and Cross (2003) used cross-sectional data to measure knowledge and information flow in social networks.

### **2.5.2 Institutional theory**

DiMaggio and Powell (1983) have discussed what makes organisations so similar, and explained that a set of organisations emerges as a field, which is led by three isomorphic processes – coercive, mimetic, and normative, also called institutional isomorphism in organisations and social change. Institutional theory has traditionally accounted for how organisations better secure their position by conforming to the rules (e.g. regulatory structures, governmental agencies, lay, professional, societal and cultural practices that exert conformance pressures) and norms of the instructional environment (DiMaggio and Powell, 1983, 1991; Scott, 2007). According to institutional theory, external pressures influence firms' strategies and organisational decision-making in satisfying stakeholders (Devereaux Jennings and Zandbergen, 1995).

There are three institutional isomorphisms in institutional theory with each carrying its own antecedents. **Coercive isomorphism** results from 'both formal and informal pressures exerted on organizations by other organizations upon which they are dependent and by cultural expectations in the society within which organizations function' (DiMaggio and Powell, 1983, p.150). **Mimetic isomorphism** raises awareness of uncertainty because not all institutional isomorphism is driven by coercive authority. When organisational technologies are partly understood and the environment is uncertain, they might attempt to imitate others for innovation, and others in turn will attempt to copy the uniqueness in the continuous innovation-imitation process (Alchian, 1950). **Normative isomorphism** is the third source of isomorphic organisational change stemming primarily from professionalisation (DiMaggio and Powell, 1983). Professionals must compromise with nonprofessional clients, bosses, or even regulators, to control 'the production of producers' (Larson, 1977, p.49-52), and to establish a cognitive base and legitimation for eruptive autonomy. In many cases, professional power should be assigned by the institutional bodies, and despite various kinds of professionals within an organization, they are subject to the same coercive and mimetic pressures, indicating some level of similarity to their counterparts in other organizations (Hall, 1968).

Scholars argue that sustainability practices can, to a large extent, ensure an organisation's legitimacy and social approval under formal and informal requirements from approaching sustainable responsibilities (Bansal and Roth, 2000; Glover et al., 2014; Russo, 2002; Sandhu, 2012;). Some organizations implement sustainable responsibilities proactively, not only because of coercive pressures and compliance with standards, legislation and social norms,

but also because of the uncertainty they foresee, so as to react by investing in professional knowledge, skills and equipment. Proactive strategies are not only applied in the organisation, but also extend beyond institutional boundaries across to supply chains (Zhu and Sarkis, 2004; Frota Neto *et al.*, 2008; Ciliberti *et al.*, 2009; Varsei *et al.*, 2014). Developed from these arguments, this study then extends the discussion to supply chain networks and social networks, to investigate how institutional pressures drive sustainable implementation in broader institutional and social scopes.

## **2.6 Theoretical framework building**

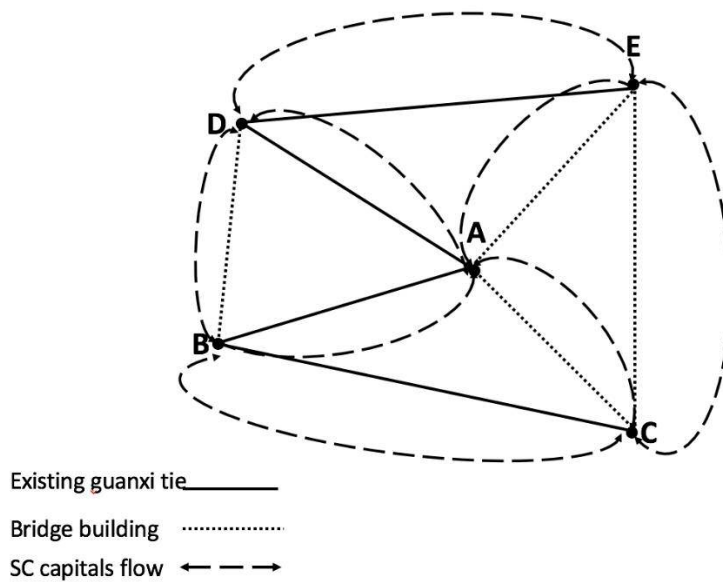
### **2.6.1 Flow of supply chain capital in social networks**

Flow is embedded in interactions or social relations, which 'consist of the content that (potentially) moves between actors when they interact, such as ideas or money or stocks of inventory' (Borgatti and Li, 2009, p.7). The impact of extending micro, individual friendship networks is the diffusion and flow of diverse phenomena, information, and opportunity within the constructed network structure (Granovetter, 1973; Christakis & Fowler., 2007).

The systematic literature review constructively demonstrates the influence of social networks on supply chain capital. *Guanxi* networks influence the financial, human and social capital in supply chains. The feature of transferability in *guanxi* networks ensures network extensions and the spread of supply chain capital (Figure 2.7). Supposing that *guanxi* ties A-B and A-D exist, A could act as a bridge to introduce B and D. Likewise, A could be connected to E and C through D and B. This is called transferability in *guanxi* literature (Park and Luo, 2001), while in social network study, it is referred to as connection of weak ties (Granovetter, 1973). The significance of weak ties (such as E-C), arguably would be more and shorter paths

from the creation of a local bridge (such as A-E and A-C) (Granovetter, 1973). Intuitively speaking, social networks enhance the flow of capital between strong ties where players have direct links and know each other very well; meanwhile, through the extension of social networks, a large number of people could be reached by traversing greater social distance in weak ties. Therefore, it is argued that social networks in an organisational environment increase efficient flow for SCM.

Figure 2.7 Flow of supply chain capital in social networks

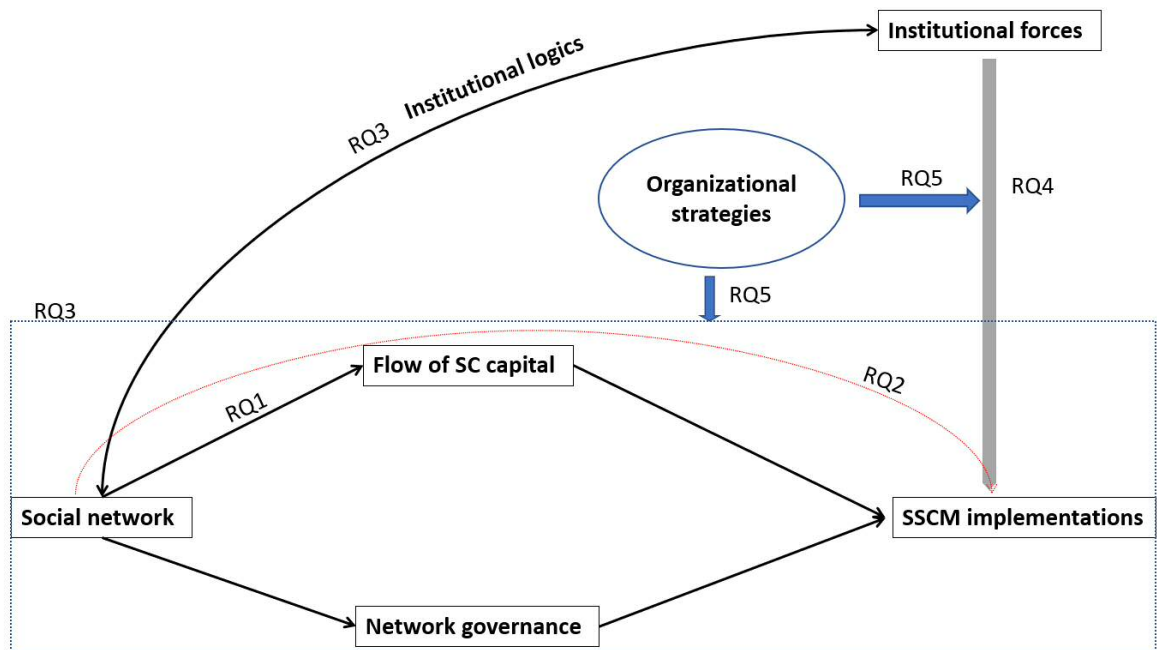


Source: Author

Reflecting on the RQ1 in the theoretical framework (Figure 2.8), individual friendship networks are assumed to diffuse and spread diverse phenomena, information, and opportunities within the constructed social networks (Granovetter, 1973; Christakis & Fowler., 2007). As shown in the structured review, guanxi networks drive the effective and efficient capital flow in financial, human and social capital in supply chains. The feature of

transferability in guanxi networks enable network extensions and the spread of supply chain capital (Figure 2.7).

Figure 2.8 Theoretical framework



Source: Author

## 2.6.2 Network governance in social networks

### 2.6.2.1 Carrier of institutional logics

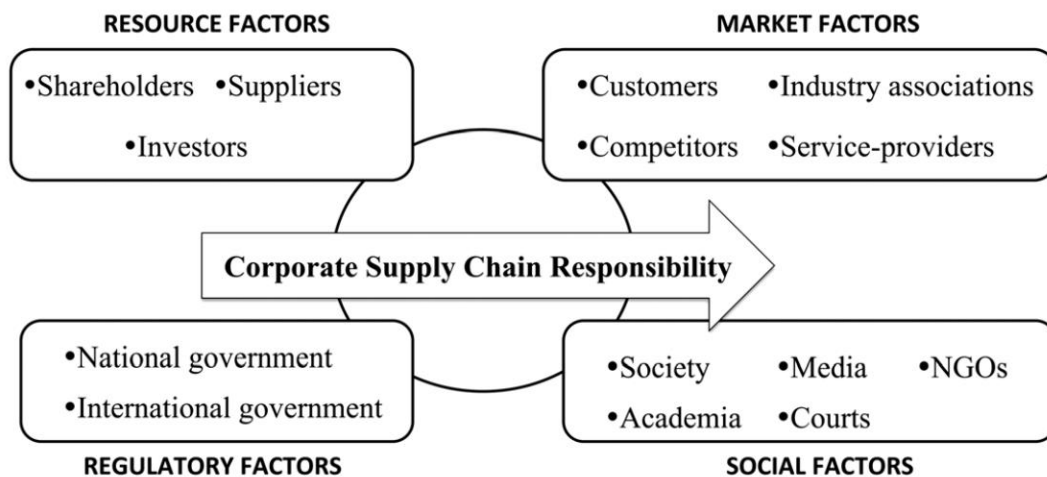
Institutional logics is defined as ‘the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meanings to their social reality’ (Thornton and Ocasio, 1999, p.804, In: Thornton and Ocasio, 2008).

Therefore, institutional logics provide the link between individual agency and cognition/socially constructed institutional practices and rules.

In social network study, it is argued that institutional forces create an institutional logic of sustainable SCM implementation because all organizations are positioned within the complexity of relational and institutional contexts (Owen-Smith and Powell, 2008). The elaboration of social networks rapidly spreads the institutional logic to various models of connections (DiMaggio and Powell, 1983), influencing sustainable SCM implementation in decision-making and organisational behaviours. Hence, the social network is the carrier of institutional forces for sustainable SCM. In other words, individual behaviours and decision-making are shaped by macro-institutional requirements.

For sustainable practices, there are both national and international government pressures and various factors causing coercive pressures, including from resource factors, market factors and social factors, apart from regulatory factors, referring to Chkanikova and Mont (2015). For sustainability practicable development, there are both national and international government pressures and various factors causing coercive pressures, including from resource factors, market factors and social factors, apart from regulatory factors, referring to Chkanikova and Mont (2015) (Figure 2.9).

Figure 2.9 Reasons for corporate supply chain responsibility

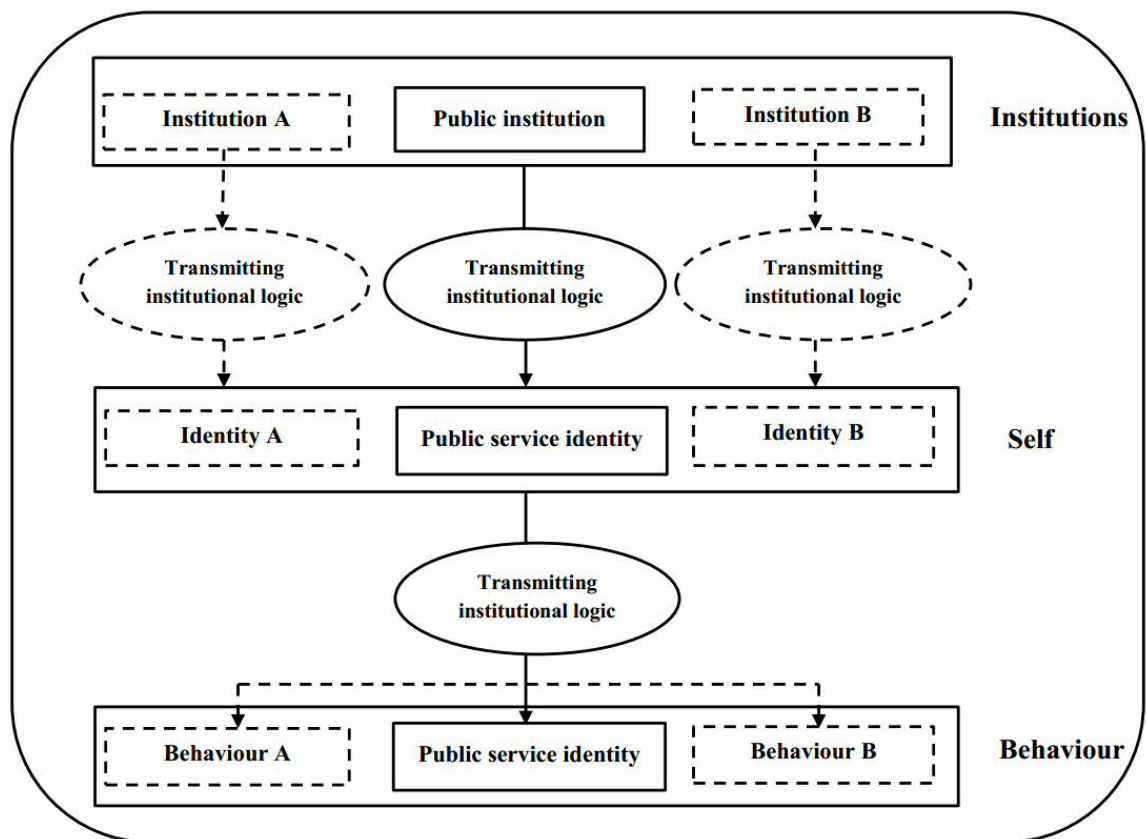


Source: Chkanikova and Mont, 2015.

Institutional theory proposes that institutional logic of sustainable practices are transmitted to the individual level through four distinct, but overlapping, mechanisms: socialisation, social identification, cultural preference and social learning (Figure 2.10).

Specifically, socialisation is the process of identifying with others in the institution and obtaining a 'new' social identify as an 'insider' of the institution and the social network. Social identification is the notion that individuals classify themselves by social categories, directing identities on this basis. Cultural preference is to share values of legitimacy from social practices. Referring to Perry and Vandenabeele (2008), individuals will respond and react to shared values in social networks, which then shape their behaviour, preferences and identities. Social learning involves processes of observational learning and modelling (i.e. imitation of behaviours from others) through which values and different forms of behaviour could be transmitted.

Figure 2.10 Carrier of institutional logic in social network



Source: Perry and Vandenabeele (2008, p. 57)

### 2.6.2.2 Network similarity and selection

Unlike authority, bureaucratic roles or institutional regulations, social networks generate mechanisms that govern individual behaviours in terms of network similarity and social selection. To be inclusively accepted in social networks, autonomous firms need to adapt, coordinate, and safeguard exchanges (Jones, Hesterly and Borgatti, 1997). In social networks, people tend to select relationships where they share similar attributes, termed homophily (Christakis and Fowler, 2007; Jones, Hesterly and Borgatti, 1997). In other words, sharing values and similarities, players are more likely to be included in *guanxi* networks. This is also influenced by the hierarchy constructs of *ganqing* and *xinren* (Mavondo and Rodrigo, 2001;



Yen *et al.*, 2011). In an empirical study of sustainable SCM, Walker and Jones (2012) found that leadership and internal integration are enablers that help implement sustainable SCM.

Social networks are also selective (Burt, 1992). Social networks carry institutional forces for sustainable SCM and provide incentives for collaborations leading to the flow of supply chain capital and trust generation. To be selected as a network insider, players have no choice but to follow institutional forces, which might consciously or unconsciously impact on decision making in SCM practices, such as supplier and customer selections and corporate codes of conduct and compliance for sustainability in value chains. As such, the governance of the *guanxi* social network is practised by the “imposition of the rules of inclusion” (Castells, 2011).

### **2.6.3 Shaping supply chain structure and supply chain network structure in social networks**

#### **2.6.3.1 Supply chain structures**

Awaysheh and Klassen (2010) have addressed three dimensions relating to the structure of supply chain, namely transparency, dependency and distance that potentially have significant impact on the tools, systems and programs that are applied to suppliers regarding social issues. This study develops their study and extends the full picture of sustainable SCM, with the intention of understanding the interdependencies and power among actors to work together for sustainable SCM goals and the impact from social networks.

The notion of transparency in the context of supply chains captures the extent to which information is available and flows to suppliers and/or customers (Awaysheh and Klassen,

2010). Supply chain transparency is defined as 'the degree to which a supply chain player has access to relevant information about products, processes and flow of capital without loss, noise, delay and distortion' (Beulene *et al.*, 2005, p.482. In: Bastian and Zentes, 2013). Transparency has become increasingly important for managing supply chain issues, such as product safety (Van Der Zee and Van Der Vorst, 2005). It is a substantial dimension to capture the extent to which 'information is readily available to end-users and other firms in the supply chain' (Awaysheh and Klassen, 2010), which is argued to be a key prerequisite for sustainable agri-food SCM (Bastian and Zentes, 2013).

Tachizawa and Wong (2014) have explored the contingency variables affecting sustainability practices, of which power, dependency and distance are highlighted in the framework. Power is the ability to influence other members of the networks in terms of decision-making and activities (Pilbeam, Alvarez and Wilson, 2012). Therefore, power distribution influences the approach and depth of collaboration between players in the networks (Kähkönen, 2014). According to Mena *et al.* (2013), there are two sources of power: possession of resources and supply chain position. In other words, the ability to offer contracts and influence counterparts depends on whether a firm/person has substantial accessibility to scarce resources and whether they have a strong position in the supply chain and supply chain network.

Dependency is interlinked with power. The degree to which one firm relies on another, mainly accounts for critical resources, components or capabilities (Awaysheh and Klassen, 2010). Distance among supply chain partners increases information asymmetry and coordination efforts (Simpson, Power and Samson, 2007; Mares, 2010; M. Tachizawa and Yew Wong, 2014). Therefore, the overarching objective of this section is to identify the

supply chain structures and supply chain network structures and their impact on supply chain relationships and integration for dealing with practical issues, including sustainable SCM.

Distance in supply chain includes geographical, cultural and organisational distance (Awaysheh and Klassen, 2010). Initially, as geographical distance expands, it is more difficult for firms to interact with their suppliers (Choy and Lee, 2003). To some extent, distance between the focal firm and its suppliers will reduce commitments from both parties. Consequently, companies might face having to establish monitoring and auditing systems to reduce supply chain risk and uncertainty (Koplin, Seuring and Mesterharm, 2007). Cultural distance recalls Hofstede's (1980) study which determines the difference that exists between societies where companies and managers are based. Cultural difference influences the approaches that managers choose to apply in communicating with their suppliers and customers. Organizational distance refers to the number of tiers that exist between focal firms and their suppliers and/or customers and the length of the supply chain (Banet, 1976). Increasing organizational distance tends to increase complexity in information sharing, product tracing, material specification, operational procedures and quality control.

### **2.6.3.2 Supply Chain network structures**

According to Lazzarini, Chaddad and Cook (2001), there are three types of supply chain network structure: sequential interdependence, reciprocal interdependence, and pooled structure. A sequential interdependence involves 'direct relationships between agents ordered in a serial fashion: one agent's input is another agent's output' ((Lazzarini *et al.*,

2001, p.12). This structure describes precisely a supply chain where sources and flows of value are adherent with buyer-supplier relationships (Borys and Jemison, 1989). The efficient governance mechanisms in this network structure attempt to reduce transaction costs and appropriate property rights in downstream and/or upstream of the chain (Lazzarini *et al.*, 2001). Reciprocal interdependence structure is where 'one agent's input is another agent's output and vice-versa' (Lazzarini *et al.*, 2001, p.12).

Apart from sequential and reciprocal structure, pooled interdependence is a third kind which involves discrete or autonomous agents (Lazzarini *et al.*, 2001). It is more akin to an independent network because the relationship between agents is sparse and indirect (Van De Ven, Delbecq and Koenig Jr., 1976) and, due to the emphasis on autonomous and loosely coupled agents, this network structure supports knowledge diversity where specialized agents exchange knowledge directly or indirectly through a third 'bridge' embodying such knowledge (Weick, 1976).

#### **2.6.4 Institutional forces and company strategy for sustainable SCM**

A macro perspective has been widely adopted in investigating the influence of institutional and government regulation on sustainable SCM (e.g. corporate codes of conduct). Institutional theory, aligning with explanations of changes in social values, technological advancements, and regulation, have been favoured in the discussions of decision-making for 'green' sustainable practices (Ball and Craig, 2010) and environmental management (Zhu, Sarkis and Lai, 2013). For example, Glover *et al.* (2014) have conducted 70 semi-structured interviews with various stakeholders across the supply chain and found that government

needs to play a role and powerful players in the supply chain use coercive isomorphic pressure to drive suppliers' sustainable practices, such as requiring 'carbon audits' and improvements.

### **2.6.5 The moderating role of company strategy for sustainable SCM**

Social networks and institutional forces are external drivers for sustainable SCM in discussion. However, Glover *et al.* (2014) also found that some suppliers are not really 'coerced' into sustainable practices in the dairy supply chain; the logic in their adoption of energy reduction practices is for reducing costs and increasing profits. Why do companies embrace different logic in implementing sustainable SCM when they are under a similar regulatory environment? This drives the motivation for investigating companies' strategy of sustainable practices. Clarkson (1995) explained that organisational performance is to accomplish less or more than is required by legislation and/or specific stakeholder groups. Therefore, he assimilated the perception of stakeholder relationships and responsibilities into the discussion of corporate social responsibilities, and proposed four scales of company strategy in sustainable practices: reactive, defensive, accommodative and proactive, which have been explained in Chapter 2.

Another argument about network governance is that through frequent interactions and communications, people cognitively share understanding and vision about sustainable SCM and reduce heterogeneous behaviour in the social network (Christakis and Fowler, 2007). Those companies passively reacting to sustainable SCM tend to balance the trade-off from adaptation and coordination in sustainable SCM with their network members and the

potential benefits in the networks. In this case, the implementation of sustainable SCM is moderated by the company strategy of sustainable practices.

## **2.7 Summary**

This chapter provided a comprehensive literature review for the research topic, and based on that, a theoretical framework was developed to guide the following empirical research. There were two sections in the literature review: a conventional review of sustainable SCM and its drivers, and sustainable SCM practices in food, beverage, and automotive industries. In the systematic literature review, this study was uncovered the constructs of guanxi networks, and their influences of social networks on supply chain capital flow – financial, human and social capital. A research gap was also revealed between guanxi networks and sustainable SCM, which then addressed the significance for this research.

In the theoretical framework building, social network theory and institutional theory were adopted to guide the discussions. Terminologies including flow, network governance, network similarity and selection were elaborated in this study from social network theory, showing the influence of social networks on sustainable SCM. For institutional theory, the three isomorphism – coercive, normative and mimetic isomorphism were discussed. Even though social networks and institutional force seem two irrelevant areas, the notion that social network is the carrier for institutional force connects the two concepts and explains the meaning of social networks. Because the study also interests in understand the research topic in supply chain network scope, thereby, this chapter has also brought supply chain structure and supply chain network structures into discussion.

## Chapter 3 METHODOLOGY

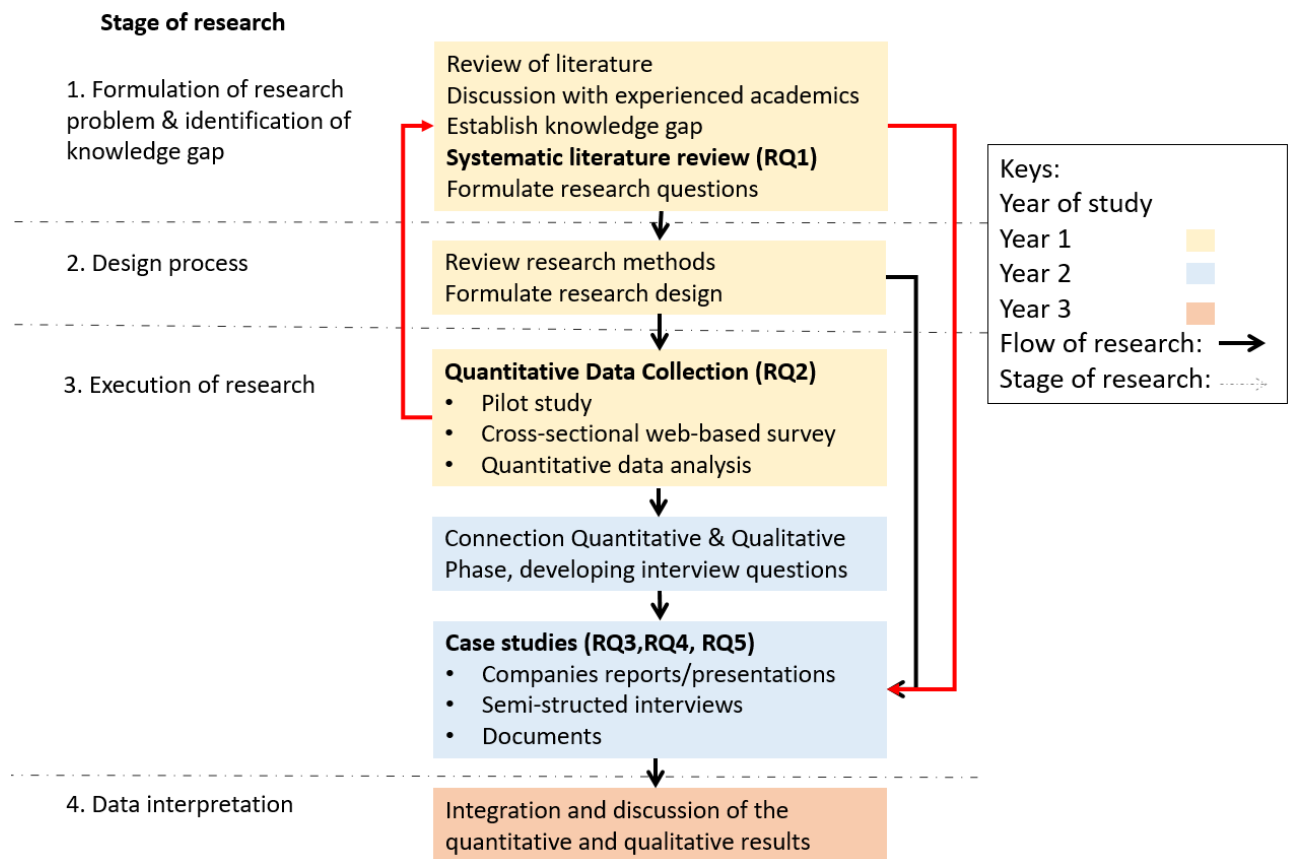
### 3.1 Introduction

This chapter, details about the methodology and research design are given to address the research aims and objectives. It is composed of two sections: research methodology and research design. The former considers the methodological choices and philosophical stances underlying different perspectives in SCM and sustainable SCM and the selection for this study. The latter reviews and evaluates various data collection methods, in order to select the most appropriate one to answer the research questions.

The structure of this chapter is as follows. The introductory section reviews the purpose and outline of the chapter, then follows with the philosophical and methodological debates of the field and the adoption of this study. This section also examines the available research methods in sustainable SCM and justifies the reason for employing mixed-method approaches in this study.

The third section of the chapter explains the research process and design employed to address and answer the research questions (Figure 3.1). Bearing in mind that every research method has its pros and cons, the final section critically evaluates the research design, using the risk management technique of 'cause, concern, countermeasure' to minimise the methodological limitations in this study.

Figure 3.1 Research Process



Source: Author

### 3.2 Research methodology

This section discusses the paradigm and philosophical stance in the field of SCM and sustainable SCM which determine the selected research methods. By doing so, the section attempts to explore and justify the selection of methods for this study to answer the research questions.

#### 3.2.1 Paradigm and philosophical stance

In scientific research, paradigm is viewed as ‘a set of linked assumptions about the world which is shared by a community of scientists investing the world’ (Deshpande, 1983, p.101).



There is detailed literature on the many methods and approaches that fall under the category of paradigm; these moments overlap and simultaneously operate in the present, which Denzin and Lincoln, (2008) have defined as:

- The traditional (1900-1950): this period is associated with the positivist, foundational paradigm;
- The modernist, or golden age (1950-1970) and blurred genres (1970-1986): these moments are connected to the postpositivist arguments. Meanwhile, a variety of new interpretive, qualitative perspectives were raised, including cultural studies and feminism. In the blurred genres phase, the humanities became the central focus for critical theory, and qualitative research was broadly conceived;
- The crisis of representation (1986-1990): the blurred genres phase produced the crisis of presentation where researchers found it difficult to locate themselves and their subjects in reflective texts. Social scientists turned to the humanities and refused to be read in simplistic, linear, incontrovertible terms;
- The postmodern (1990-1995): a period of experimental and new ethnographies, moving away from foundational and quasi-foundational criteria;
- The post-experimental inquiry (1995-2000): this inquiry in research involved deception. Aronson *et al.* (1990) suggested informing participants that they were deceived through false feedback may produce negative feelings in them. Another goal of debriefing was to raise participants' awareness of the purpose of the research (Aronson *et al.*, 1998).
- The methodologically contested present (2000-2004): qualitative is confronting a backlash associated with positivist/postpositivist conception of empirical research (Wright, 2006).The methodologically contested present (2000-2004): qualitative is

confronting a backlash associated with positivist/postpositivist conception of empirical research (Wright, 2006).

- The fractured future (2005-now): ‘a time marked by human, environmental, and climatic destabilization, and a time in which the social sciences are normative disciplines always already embedded in issues of value....’ (Goulah, 2009, p.193).The fractured future (2005-now): ‘a time marked by human, environmental, and climatic destabilization, and a time in which the social sciences are normative disciplines always already embedded in issues of value....’ (Goulah, 2009, p.193).

As Richardson (2000) has stated, philosophical paradigms ‘are fluid, indeed what should be category keeps altering, enlarging’ and ‘even as [we] write, the boundaries between the paradigms are shifting’ (In: Guba and Lincoln, 2008, p.264). Nevertheless, to provide readers with an understanding of different philosophical stances enabling their choice of inquiry, this study will focus on discussing the following paradigms, comprising: 1). positivism; 2) postpositivism (critical realism); 3). critical theory; and 4) constructivism, each with the three elements: 1). ontology; 2). epistemology; and 3) methodology (Guba and Lincoln, 1994). As Richardson (2000) has stated, philosophical paradigms ‘are fluid, indeed what should be category keeps altering, enlarging’ and ‘even as [we] write, the boundaries between the paradigms are shifting’ (In: Guba and Lincoln, 2008, p.264).

Before discussing each paradigm and how they are different/similar in ontology, epistemology and methodology, it is useful to define the concepts of each term. Briefly, ontology is the theories of being; in other words, it is the ‘reality’ that researchers investigate. Epistemology is the theories of knowledge; that is, the relationship between the reality and

the researcher. Methodology is the constituted, proper techniques researchers adopt to investigate the reality (Healy and Perry, 2000; Perry *et al.*, 1997). Table 3.1 has detailed the paradigms of each kind and their inquiry aim, nature of knowledge and goodness or quality criteria for guiding research conduction (Guba and Lincoln, 2008; Healy and Perry, 2000).

Table 3.1 Four categories of scientific paradigms and their elements

Element	Positivism	Postpositivism	Critical theory	Constructivism
Ontology	Naïve realism- reality is real and apprehensible	Critical realism- reality is 'real' but only imperfectly and probabilistically apprehensible	Historical realism - virtual reality shaped by social, political, cultural, economic, ethical, and gender values; crystallized over time	Relativism- multiple local and specific 'constructed' realities
Epistemology	Objectivist: findings true	Modified objectivist: critical tradition; findings probably true	Transactional/ subjectivist; value-mediated findings	Transactional/ subjectivist: created findings
Common methodologies	Experiments/ Surveys: verification of hypotheses, chiefly quantitative methods	Modified experimental/manipulate; critical multiplism; falsification of hypotheses; may include qualitative methods and by some quantitative methods such as structural equation modelling	Dialogic/ dialectical	Hermeneutical/ dialectical: researcher is a 'passionate participant' within the world being investigated
Inquiry aim	Explanation: prediction and control		Critique and transformation; restitution and emancipation	Understanding; reconstruction
Nature of knowledge	Verified hypotheses established as facts or laws	Non-falsified hypotheses that are probably facts or laws	Structural/ historical insights	Individual or collective reconstructions coalescing around consensus
Goodness or quality criteria	Conventional benchmarks of 'rigour': internal and external validity, reliability, and objectivity		Historical situatedness; erosion of ignorance	More informed and sophisticated

	and misapprehension; action stimulus	reconstruction; vicarious experience
--	--	--

Source: Guba and Lincoln, 2008; Healy and Perry, 2000.

**Positivism** assumes that researchers view the world through a ‘one-way mirror’ (Guba and Lincoln, 1994, p.11) that data and analysis are value-free while not changing because they are the observed objects. In other words, positivism is ‘presumably subscribing to the view that the former reflects the aims and tenets of the latter’ (Bryman, 1988). Positivism is often related to quantitative research with a deductive approach to exploring the relationships between variables (Creswell, 1994; Punch, 1998; Remenyi *et al.*, 1998). The distinctive objective of the positivist approach is ‘the ability to generalise from a sample to a population’ (Wass and Wells, 1994, p.10). However, positivism is inadequate when approaching phenomenon involving humans, social and cultural norms, and social experience. The stance fails to provide rich insights and deep explanations (Sachan and Datta, 2005).

The inquiry aims between positivism and postpositivism are similar, as Figure 4.2 illustrates, in explaining, predicting and controlling findings. However, they hold an epistemological difference in that postpositivists believe that findings might not be true – thereby, a critical tradition lies beneath. Ontological stance -critical realism has been developed (Bhaskar 1978; Archer, 1998; Lawson, 1997) to respond to the fundamental difficulty of maintaining a realist position in coping with criticism. Bhaskar (1978) has argued that no social theory can be purely descriptive; thus, there should be no split between facts and values. Social theory should be transformative to provide an explanation that logically entails actions (Bhaskar *et al.*, 1998). The original aims of critical realism are: to re-establish a realist view

of being (ontological domain) while accepting the relativism of knowledge (epistemological domain) as socially and historically conditioned (Bhaskar, 1978). Bhaskar (1998) formed the argument that critical realism begins with accepted occurrence and asks the causality of what must the world be like for the constant conjunctions of observable (or unobservable) events. The implications of this is to perceive the causal mechanisms that must be generated. To perceive the causal mechanisms, researchers must maintain the general process of science in both the natural and social domains but also accept the diverse characteristics of the social world bringing inevitable limits on that process.

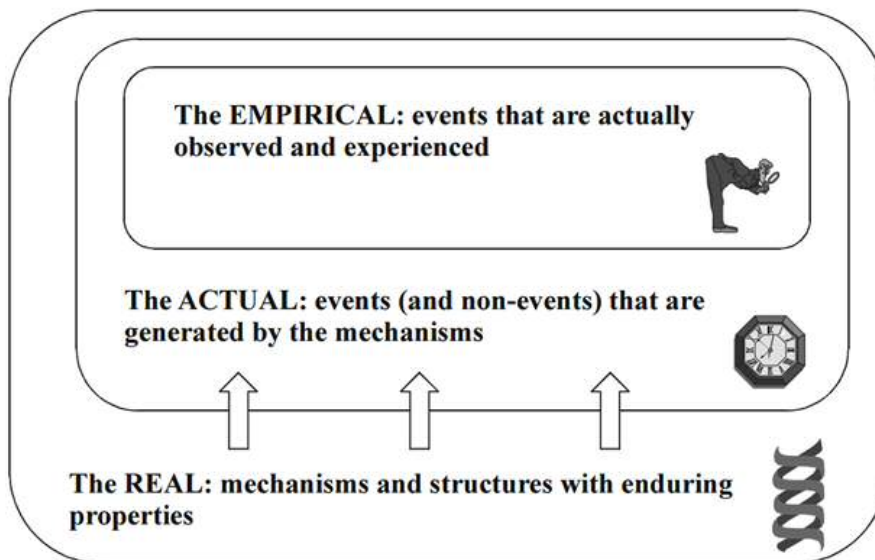
According to Bhaskar (1998), reality is both intransitive (independent existence) and stratified (hierarchically ordered). There are two forms of stratification. The first is between structures or mechanisms. The events that are generated and the subset of events that are actually experienced, which is known as the domains of the Real, the Actual, and the Empirical (Mingers, 2006).(Mingers, 2006). The real contains mechanisms, events and experience (the whole reality); the actual consists of events that do (or do not) occur; and empirical are events that are actually observed and experienced (Figure 3.2). The second form of stratification is within the reality of objects themselves, where causal powers at one level are regarded as generated by those of a lower level. The real world is, thus, a complex interaction between dynamic, stratified systems where constructed structures give rise to certain causal powers, often called by Bhaskar 'generative mechanisms' (Bhaskar, 1979, p.170).

We then must recognise that the production of knowledge is very much the work of humans and the social world where occurrences are in the 'transitive' dimension (Bhaskar, 1989,

p.18). Acknowledgement of the work of sociologists and the practice of science is a social process 'drawing on existing theories, results, anomalies and conjectures (the transitive objects of knowledge) to generate improved knowledge of science's intransitive objectives' (Minger, 2000, p.22). Therefore, it is characterised as one of retrodution in the realist method of science, which is the same as 'abduction' developed by Peirce (Habermas, 1978, p.113). In contrast to induction and deduction, abduction and retrodution take the unexplained phenomenon and propose hypothetical mechanisms that, 'if they existed', would generate and cause that which is to be explained (Minger, 2000, p.23). Thus, the main feature of a critical realist approach to science is a concern for explanation in terms of the independent underlying causality and generative mechanisms of the unobservable phenomenon.

Critical theory emphasises social realities. Critical theory researchers aim to critique and transform social, political, cultural, economic, ethnic and gender values (Healy and Perry, 2000). This goes against the 'value-free' perception of positivists because assumptions and knowledge are grounded in social and historical backgrounds and are therefore value-dependent (Guba and Lincoln, 1994). Constructivism, similarly to critical theory, views reality as constructed by that which lies behind in the mind, so that the world in fact consists of 'multiple realities' (Healy and Perry, 2000, p. 120). Qualitative research methods are usually applied by critical theory researchers and constructivists.

Figure 3.2 The Real, the Actual, the Empirical



Source: Minger, 2000

### 3.2.2. Methodologies in logistics and SCM

Logistics and SCM lie within the traditional understanding that activities are something 'designable' – explained as a result of a deliberate choice of models and expected better performance (New and Payne, 1995). It is the actions of material and information flow across a chain, providing a basis for further advancement in understanding supply chain dynamics (Towill, Naim and Wikner, 1992; Lee and Ng, 1997). Therefore, positivism is the predominant research paradigm in this discipline (Aastrup and Halldórsson, 2008). Positivists invoke the quest for generalisation to judge rigour and research quality in the principles of a positivistic stream of research (Mentzer and Kahn, 1995; Aastrup and Halldorsson, 2008).

However, even though positivism is the predominant paradigm, it is necessary to understand 'soft ties' and 'soft issues' in modern SCM (Rodney, 2014). Positivism has failed to provide insights and explanations (Sachan and Datta, 2005) Supply chain phenomena produce inherent complexity resulting from socio-material systems, so that researchers have called

for consideration of 'embeddedness' (Aastrup and Halldorsson, 2008, p.750), a new epistemological stance to capture the underlying structure and mechanism of social behaviours in supply chain studies (New and Payne, 1995; Sachan and Datta, 2005; Tokar, 2010), which is yet to be absorbed in the field (Croom, Romano and Giannakis, 2000). Therefore, it appears of value to conduct research not only to describe causal relationships, but also to reveal the underlying mechanism of the causality.

### **3.2.3. Adopted paradigmatic stance in this study**

In empirical research of sustainable SCM, methods include case studies, action research, Delphi study, survey research, and literature reviews based on content analysis (Seuring, 2011). In empirical research of sustainable SCM, methods include case studies, action research, Delphi study, survey research, and literature reviews based on content analysis (Seuring, 2011). Carter and Easton (2011) have conducted a systematic literature review covering studies over approximately 20 years. They found that survey has been the primary research method in this field, with 78.13% of papers using this method from 1991-2000. Although more recent studies have applied (multiple) case study to explore depth, survey remains the major approach. Due to this research method, analysis of sustainable SCM shows a majority of descriptive statistics, regression, factor analysis and modelling. It is very difficult to justify the paradigms of previous studies in sustainable SCM. According to Healy and Perry (2000), the mainstream could be either positivism or realism. Bearing in mind the finding of Seuring (2011) that early published research in sustainable SCM is more exploratory and 'methodological choices included some deliberate planning' (p.474), such as Delphi study (Deuring and Muller, 2008b) and action research (Koplin *et al.*, 2007), this study, therefore, positions realism as the main paradigm in sustainable SCM.



In this study, the position adopted is critical realism. As discussed above, critical realism sits somewhere between positivism and constructionism to declare the existence of a complex stratified ontology and to challenge and contest ontological assumptions. A primary function of critical realism is to justify underlying structures and generative mechanism, to reveal different layers of social reality, and to construct modes in the systematic nature (Bhaskar 1989).

In this research, critical realism is employed in explaining the influence of social networks on sustainability implementation in SCM. The aim is to identify capital and social objects of sustainability in different supply chain activities, and understand the particular mechanism and the causal relationships that emerge in supply chain relationships. Particularly, social networks are socially constructed (Grannovetter, 1975). The links of human behaviours are closely related to cultural and historical events, as well as political environment (Yang, 2009). Therefore, the epistemology of critical realism guides the research design in answering the research questions, in investigating the relationships between social networks and sustainable SCM, and in exploring the mechanism of this topic.

### **3.3 Research Design**

Research design, also termed 'procedures of inquiry' (Creswell, 2014, p.3), is referred to as types of inquiry within quantitative, qualitative, and mixed-methods approaches that provide specific directions for procedures to address the nature of the research problems

and answer research questions. Research design, also termed 'procedures of inquiry' (Creswell, 2014, p.3), is referred to as types of inquiry within quantitative, qualitative, and mixed-methods approaches that provide specific directions for procedures to address the nature of the research problems and answer research questions.

### **3.3.1 Quantitative research**

Quantitative research is applied by those who invoke the positivism stance (Creswell, 2014). That is, quantitative purists believe that it should be treated in much the same way for entities in social observations and the observations are objective, as observers should be separate from the entities. Quantitative approach is usually used for the purpose of testing 'causes and effects ... operationalizing theoretical relations ... [and] measuring and ... quantifying phenomena ... allowing the generalization of findings' (Flick, 2009, p.3). Such an approach has also benefited 'time- and context-free generalizations' (Johnson and Ongwuebzue, 2004, p.14). Although individuals engaging in the debate about the 'logic of justification' (as an important aspect of epistemology) do not necessarily dictate the specific data collection and analytical methods that must be used (Bryman, 1984; Howe, 1992; Onwuegbuzie and Teddlie, 2003), researchers seem to follow an unwritten rule. Most alternative quantitative research studies include experimental designs and nonexperimental quantitative research (Creswell, 2014). Survey is one of the nonexperimental quantitative research methods to collect data for cross-sectional and longitudinal studies of quantitative or numeric description of a population (Fowler, 2008). Likewise, these designs have been elaborated into analysing complex relationships among variables in the technique of structural equation modelling, hierarchical linear modelling and logistic regression (Creswell, 2014).

Table 3.2 is provided to clarify the strengths and weaknesses of quantitative method, in order to facilitate the knowledge of whether or not to adopt this approach in the study. The major characteristics of traditional quantitative research are deductively testing hypothesis/theory, explaining cause-and-effect relationships, providing prediction, and collecting data in large samples to support statistical analysis (Johnson and Ongwuebuzie, 2004). Critiques of quantitative research are concerned with the tradeoff of reflecting local constituencies' understanding and individual cases and the depth of understanding. A critical issue raised over quantitative method is when the research problem is not to investigate a matter in social life, but the 'nature of the issues being raised in relation to it' (Bryman, 2006, p.110).

Table 3.2 Strengths and weaknesses of quantitative research

<b>Strengths</b>	Data analysis is relatively less time consuming (using statistical software).
Testing and validating already constructed theories about how (and to a lesser degree, why) phenomena occur.	The research results are relatively independent of the researcher (e.g. effect size, statistical significance).
Testing hypotheses that are constructed before the data are collected. Can generalize research findings when the data are based on random samples of sufficient size.	It may have higher credibility with many people in power (e.g. administrators, politicians, people who fund programs).
Can generalize a research finding when it has been replicated on many different populations and subpopulations.	It is useful for studying large numbers of people
Useful for obtaining data that allow quantitative predictions to be made.	<b>Weaknesses</b>
The researcher may construct a situation that eliminates the confounding influence of many variables, allowing one to more credibly assess cause-and-effect relationships.	The researcher's categories and/or theories that are used may not reflect local constituencies' understanding.
Data collection using some quantitative methods is relatively quick (e.g. telephone interviews)	The researcher may miss out on phenomena occurring because of the focus on theory or hypothesis testing rather than

	on theory or hypothesis generation (called the confirmation bias).
Provides precise, quantitative, numerical data.	Knowledge produced may be too abstract and general for direct application to specific local situations, contexts, and individuals.

Source: Johnson and Onwuegbuzie, 2004

### 3.3.2. Qualitative research

Historically, qualitative research emerged from anthropology, sociology, humanities, and evaluation. There are various types of approaches in qualitative design and it has become clearer during the 1990s and into the 21<sup>st</sup> century (Creswell, 2014). Qualitative purists reject so-called positivism; likewise, even though quantitative researchers tend not to deny the utility of qualitative research, they question the rigorousness and precision due to its exploratory and unstructured approach in qualitative studies (Bryman, 2006). This is what is known as the paradigm ‘wars’ (Johnson and Onwuegbuzie, 2004, p.14). Guba and Lincoln (1982) refer to quantitative and qualitative research resting on divergent paradigms, and therefore assumptions and approaches to social life. Qualitative research stands for constructivism, idealism, relativism, humanism, and sometimes postmodernism (Guba and Lincoln, 1989; Schwandt, 2000). These purists do not believe that time-and context-free generalizations are desirable or possible; they hold that research is value-bound and it is impossible to differentiate fully cause-and-effect relationships. The observational field of social societies/social reality has specific meanings and the relevant structure for carrying those meanings. To explore beings living, acting and thinking, research approaches include narrative research, phenomenology, grounded theory, ethnographies and case study (Creswell, 2014).

Johnson and Onwuegbuzie (2004) have listed the strengths and weaknesses of qualitative

research (Table 3.3). The major characteristics of traditional qualitative research are inductively collecting data based on participants' own categories, describing complex phenomena in depth, providing understanding and description of contextual and setting factors. Qualitative researchers are responsive to the changes of circumstance, while the major weaknesses of the qualitative approach are regarding the generalization of results, justification of credibility and predictions, and avoidance of personal bias from researchers.

Table 3.3 Strengths and weaknesses of qualitative research

<b>Strengths</b>	Qualitative approaches are responsive to local situations, conditions, and stakeholders' needs.
The data are based on the participants' own categories of meaning.	Qualitative researchers are responsive to changes that occur during the conduct of a study (especially during extended fieldwork) and may shift the focus of their studies as a result.
It is useful for studying a limited number of cases in depth.	Qualitative data in the words and categories of participants lead themselves to exploring how and why phenomena occur.
It is useful for describing complex phenomena.	One that can use an important case to demonstrate vividly a phenomenon to the readers of a report.
Provides individual case information.	Determine idiographic causation (i.e. determination of causes of a particular event).
Can conduct cross-case comparisons and analysis.	<b>Weaknesses</b>
Provides understanding and description of people's personal experiences of phenomena (i.e. the 'emic' or insider's viewpoint).	Knowledge produced may not generalize to other people or other settings (i.e. findings may be unique to the relatively few people included in the research study).
Can describe, in rich detail, phenomena as they are situated and embedded in local contexts.	It is difficult to make quantitative predictions.
The researcher identifies contextual and setting factors as they relate to the phenomenon of interest.	It is more difficult to test hypotheses and theories.
The researcher can study dynamic processes (i.e. documenting sequential patterns and change).	It may have lower credibility with some administrators and commissioners of programs.

The researcher can use the primarily qualitative method of 'grounded theory' to generate inductively a tentative but explanatory theory about a phenomenon.	It generally takes more time to collect the data when compared to quantitative research.
Can determine how participants interpret 'constructs' (e.g. self-esteem, IQ).	Data analysis is often time consuming.
Data are usually collected in naturalistic settings in qualitative researcher.	The results are more easily influenced by researcher's personal biases and idiosyncrasies.

Source: Johnson and Onwuegbuzie (2004)

### 3.3.3 Mixed-method approach

#### 3.3.3.1 Definition

Mixed-method research is defined as 'the class of research where the the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study' (Johnson and Onwuegbuzie, 2004, p.17). It has been claimed as the 'third wave' where a movement proceeds beyond the paradigm wars by offering an alternative to the understanding of a research problem. All methods have bias and weaknesses; researchers adopt a mixed-method approach on the assumption of neutralising the weakness of each form of data from quantitative and qualitative work. They reject traditional dualisms (e.g. rationalism vs empiricism, facts vs values, subjectivism vs objectivism) and hold more moderate versions of philosophical stance by recognising the existence and importance of natural work and emergence of the social psychological world (Johnson and Onwuegbuzie, 2004).

#### 3.3.3.2 Toward a typology of mixed research methods

Johnson and Turner (2003) have argued that the fundamental principle of mixed research is the position a researcher indicates to use different strategies, approaches, and methods in

complementary strengths and weaknesses of quantitative and qualitative research. Effective use of this principle is a major source of justification for the logic of using mixed-methods.

There are two major types of mixed methods research: mixed-model which mixes qualitative and quantitative approaches within or across the stages of the research process; and mixed-method that includes a quantitative phase and qualitative phase in an overall research study (Johnson and Onwuebuze, 2004). An example of within-stage mixed-model design is to use a qualitative interview that includes a quantifiable question, such as percentage. There are nine mixed method design approaches which are shown in Figure 3.3. Therefore, to construct a mixed-method research, researchers have to answer the following two primary questions (Morse, 1991):

- 1). Whether one method is a largely dominant paradigm; and
- 2). Whether different paradigms are in concurrent or sequential phrases.

The findings of research studies must be mixed or integrated (Johnson and Onwuebuze, 2004). For example, the qualitative phase should be conducted to inform the quantitative results sequentially; or quantitative and qualitative findings should be integrated in concurrent phases. According to Morgan (1998) and Morse (1991), researchers might consider the dimension of the paradigm, whether one paradigm dominates the other, or whether quantitative and qualitative are in equal status. Morgan (1998) and Morse (1991), researchers might consider the dimension of the paradigm, whether one paradigm dominates the other, or whether quantitative and qualitative are in equal status. Time ordering is another important dimension where phases are carried out sequentially or

concurrently, depending on the logistics of inquiry and choice of research methods applied to answer research questions.

Figure 3.3 Mixed-method design matrix

		Time Order Decision	
		Concurrent	Sequential
Paradigm Emphasis Decision	Equal Status	QUAL+QUAN	QUAL→qual qual→QUAN
	Dominant Status	QUAL+quan QUAN+qual	QUAL→quan/ qual→QUAN QUAN→qual quan→QUAL

Note: 'qual' stands for qualitative, 'quan' stands for quantitative, '+' stands for concurrent, '→' stands for sequential, capital letters denote high priority or weight, and lower case letters denote lower priority or weight.

Source: Johnson and Onwuebuze, 2004

There are different ways of categorizing different typologies of mixed-methods approaches.

According to Greene, Caracelli and Graham (1989), there are five major purposes/rationales for conducting mixed methods research:

- 1). Triangulation - seeking convergence and corroboration of results from different methods;
- 2). Complementarity – seeking enhancement, elaboration, illustration and clarification of the results from one method with results from the other method;
- 3). Initiation – discovering paradoxes and contradictions that lead to a re-framing of the research questions;
- 4). Development – using the findings from one method to help inform the other method;
- 5). Expansion – seeking to expand the breadth and range of research.



Additional illustrations of these rationales of categories in mixed-method purposes in evaluation practice are shown as follows (Greene, Caracelli and Graham, 1989): Additional illustrations of these rationales of categories in mixed-method purposes in evaluation practice are shown as follows (Greene, Caracelli and Graham, 1989):

*The evaluation instruments were designed to give overlapping [complementarity] and cross checking [triangulation] assessments of the perceptions of those involved (Peters et al., 1986, p.16)*

*Quantitative methods can establish the degree to which perceptions are shared, but uncovering the perception themselves must be done naturalistically [development] (Gray & Costello, 1987, p.12).*

*Qualitative in addition to quantitative methods were included so the evaluation could 'tell the full story' [expansion] (Hall, 1981, p.127).*

*The whole is greater than the sum of the parts when qualitative and quantitative approaches and methods are combined [initiation] (Smith, 1986, p.37).*

### **3.4 Choice of option in research method**

Overall, there are diverse approaches to knowledge by strict adherence to the philosophical stance and the rules of logic, including observational methods, survey research, questionnaire construction, unobtrusive measures (Frankfort-Nachmias and Nachmias, 1992) and case study (Yin, 2009) to collect the most relevant data for answering research questions. This section of the chapter examines the research design employed in the study. This research adopted a development of research methods, which is reflected on the critical realism approach where postpositivists argue that reality can hardly be fully apprehended,

but approximated (Guba, 1990). In accordance with, commend research methods in critical realism include quantitative method such as structural equation modelling and qualitative method (Table 4.1). In this study, the primary data collected for this study consisted of both quantitative and qualitative methods, with a sequence of firstly using questionnaire survey to build the statistical relationship between social networks and supply chain capital & sustainable SCM implementation (RQ1 & RQ2), then adopting case studies to investigate the underneath mechanism and answer RQ3, RQ4 and RQ5. The details of research design will be discussed in the following sub sections.

#### **3.4.1 Choice of option I: Systematic literature review**

According to Yin (2009), there are three major factors that need to be considered when selecting a research method (Table 3.4): the type of research question being formed, whether it requires control of behavioural events and whether the research questions are focused on contemporary events.

Chapter 2 has detailed the research method of systematic literature review and content analysis and how it was achieved to shape understanding of the topic and form research questions. Content analysis is 'any technique for making inferences by systematically and objectively identifying specified characteristics of messages' (Holsti, 1969, p.601). It is a method of observation and a method of data analysis (Frankfort-Nachmias and Nachmias, 1992). Different from observing people's behaviour, the researcher takes the communications that people have created and asks question(s) of the communication. This can include the content of letters, diaries, newspapers and published articles. In this study, content analysis was used to analyse published academic papers and previous research of

sustainable SCM from a social network perspective. Details of the research method have been delivered in Chapter 2. Adhering to Seuring and Gold (2012), this method enables the researcher to address arguments objectively and meanwhile provides an opportunity for different researchers to obtain the same results, replicating the same processes reported in the document.

Table 3.4 Situations for different research methods

<i>Method</i>	<i>Form of Research Question</i>	<i>Requires Control of Behavioural Events?</i>	<i>Focuses on Contemporary Events?</i>
Experiment	How, why?	yes	yes
Survey	Who, what, where, how many, how much?	no	yes
Archival analysis	Who, what, where, how many, how much?	no	yes/no
History	How, why?	no	no
Case study	How, why?	no	yes

Source: Yin, 2009, p.8

### 3.4.2 Choice of option II: Questionnaire Survey

#### 3.4.2.1 Definition and the logics of inquiry

In line with the systematic literature review finding, the major research aim in this phase is to answer the RQ2 of a ‘what’ question and build the theoretical gap between social networks and sustainable SCM, meanwhile contesting RQ1 by quantifying the influence of social networks on supply chain capital. According to Yin (2009), there are two possibilities of raising ‘what’ questions: exploratory and ‘what’ question is actually a form of ‘how many’

or 'how much' line of inquiry (Table 3.4) This study is in the second case where quantitative methods, such as surveys, are appropriate.

'A survey design provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population' (Creswell, 2014, p.155). Referring to Yin's (2009) logic of inquiry, researchers are supposed to have limited control over behavioural events to ensure validity and reliability of the findings and then draw inference to generalise the results to the population.

The final logic of inquiry is regarding the event of focus on contemporary, as opposed to historical, events. The concept of sustainable SCM is a contemporary topic which has emerged in the development of societies. Although social networks are a cultural-historical topic, human cognition and formulation of building and maintaining social networks are changing and evolving with the development of societies. For example, with broad use of internet and technology, the formulation and extension of social networks are undoubtedly influenced by social apps online, such as Facebook, Twitter and, in China, WeChat. Therefore, the research of interest in this phase is of contemporary events.

In survey research, methods including questionnaire and interview are suitable for data collection (Frankfort-Nachmias and Nachmias, 1992). Of these, questionnaires are the most frequently used tools in acquiring information within managerial and behavioural science (Baruch and Holtom, 2008). Data can be collected through various approaches, including by post, telephone, face-to-face questionnaire, e-mail and web-based surveys (Creswell, 2014;

Fowler, 2009). The rationale underlying the decision to use web-based surveys relates to the following considerations:

- Wide geographical dispersion of sample. Web link and QR code can be disseminated to potential respondents with no geographical limitation.
- Flexibility and control over format. Using the online system allows researchers to use flexible design in the format, such as layout, graphics, and innovative question displays (Granello and Wheaton, 2004). The most attractive, personally, is the setting of logic for individual questions. For example, if a respondent selects A, then systems will guide s/he to the next question; if they select B, then they are allocated to answer a question other than the next one.
- Feasibility for respondents to complete at their convenience. In the pilot study, one respondent shared the information that in China, people often answer online questionnaires when they are in the washroom.

Obtain additional response-set information. Using online questionnaires, researchers can observe respondents' answering process (Granello and Wheaton, 2004), such as identifying numbers of people who have or have not completed the questionnaires, internet IP, and time used to complete the questionnaire.

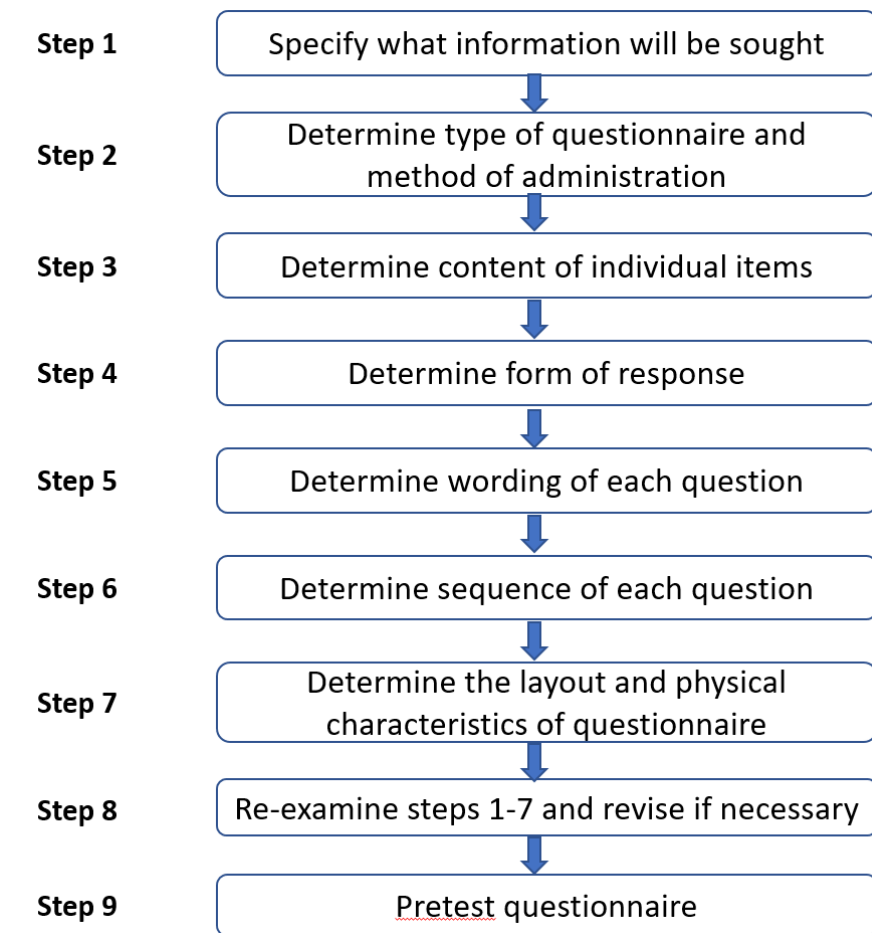
- However, it is also important to observe and prepare for the limitations of online data collection, including representativeness of the sample, response rate and measurement errors (Granello and Wheaton, 2004). Representativeness of the sample in this study is practitioners being in charge of job responsibilities related to supply chain functions. To tackle this issue, in the invitation letter, which was attached as the introduction page in the online survey, it was clearly stated that *'if you work in a company involving buying and/or selling, and you acknowledge supply*

*chain related activities in your company, including procurement, production, logistics, information sharing and supplier/customer management, risk management, knowledge transfer and sharing, can you please fill this questionnaire?’* To increase respondent rate, the surveys were sent via various means, including collaboration with researchers undertaking consultancy for companies, to disseminate the questionnaire to the most relevant practitioners. Measurement errors are related to the psychometric implications of using an electronic format of survey rather than traditional paper-and-pencil (Wyatt, 2000; Arnau, Thompson and Cook, 2001). However, the online questionnaire design should be as close as possible to the traditional format, with clear instructions and simple format.

#### **3.4.2.2 Questionnaire development process**

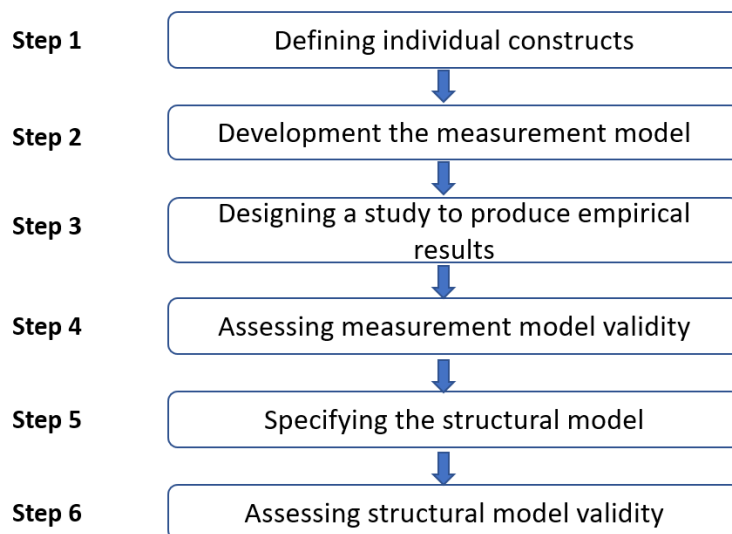
This section presents the step-by-step procedure of questionnaire development in this study. According to Churchill and Iacobucci (2002), there are nine steps in developing a questionnaire (Figure 3.4), meanwhile applying the analytical tool of structural equation modelling (SEM) requires specific processes (Figure 3.5) and critical issues should be considered from the pre-analysis stage, including conceptual issues, sample size issues and degrees of freedom and model identification (Shah and Goldstein, 2006). Therefore, a questionnaire development process tailored for SEM analysis in the current study has been designed in Figure 3.6.

Figure 3.4 Questionnaire development process



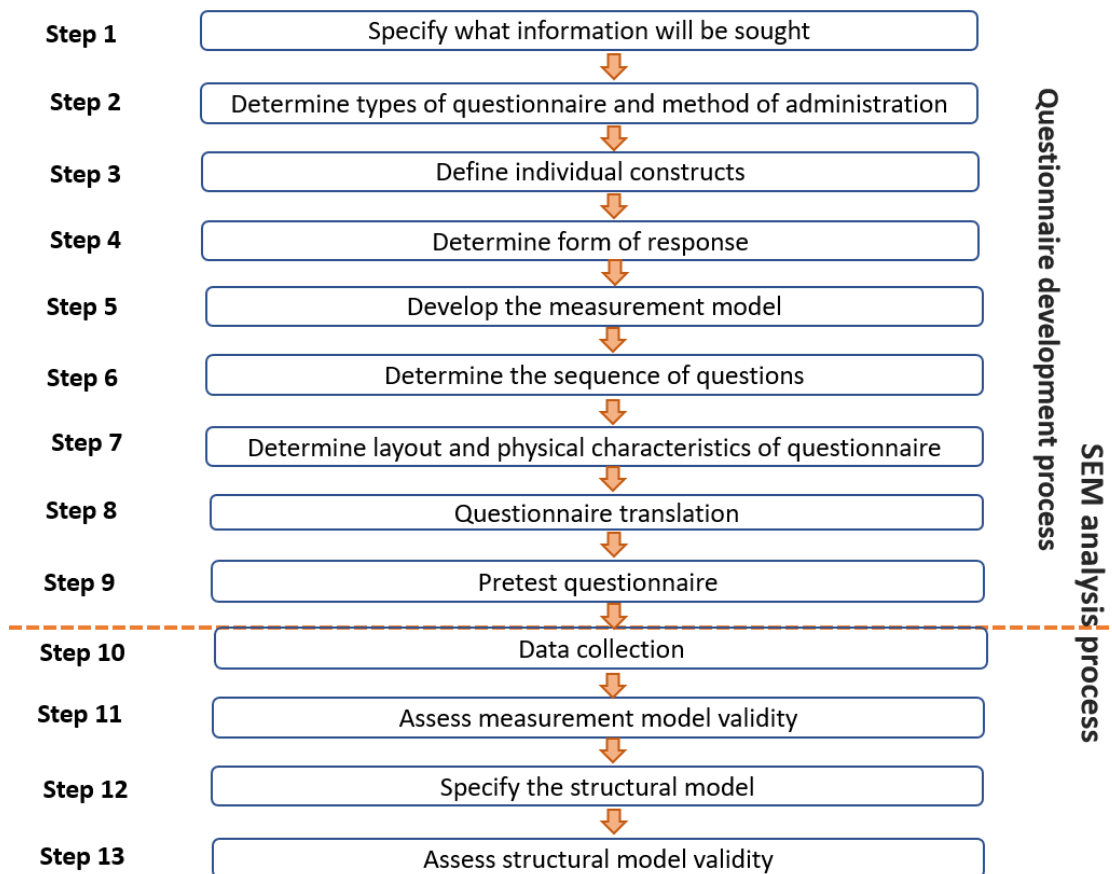
Source: Churchill and Iacobucci (2002)

Figure 3.5 A six – step process for structural equation modelling



Source: Hair *et al.* (2010).

Figure 3.6 Questionnaire design and SEM analysis procedures



Source: Author

**Step 1: Specify what information will be sought**

The specific seeking of information for the current study depends on the hypothesized relationships presented in Chapter 4. More specifically, the measured instrument was designed in accordance with the constructs interpreted in the conceptual framework. Demographic information and control variables were also incorporated into the questionnaire to gain a better understanding of the respondents' profile and obtain rich insights into the structural model.



**Step 2: Determine types of questionnaire and method of administration**

For method of administration in questionnaires, it could be either self-administered or investigator-administrator (Mitchell and Jolley, 2010). A self-administered questionnaire is completed by the respondents; on the other hand, an investigator-administrator questionnaire is completed in the researcher's presence. In this study, self-administered questionnaires were delivered because this allows the respondent to provide anonymous answers that best represent the real thoughts of the participants (Mitchell and Jolley, 2010). Moreover, due to the expectation that a suitable sample size would be received to ensure adequate statistical power (Shah and Goldstein, 2006), it was therefore not feasible for the researcher to employ investigator-administrator in application.

**Step 3: Define individual constructs**

A good theoretical definition of constructs is an essential condition for obtaining useful results in SEM (Hair *et al.*, 2010). This definition then draws attention to the foundation of selecting each indicator item. Scale items can either come from established study(ies) or be developed by researchers. In either case, a researcher's selection should be theoretically based and each construct should be reflected to the SEM analysis principle. In the current research, the majority of constructs were established from the previous studies. This approach appears to be the most commonly used in academic research (Hair *et al.*, 2010), including supply chain studies (e.g. Zhu and Sarkis, 2004). All questions were measured within a 5-point Likert scale (1=strongly disagree, 2=disagree, 3=neither disagree nor agree, 4=agree, 5=strongly agree). The following contexts interpret the details of the measured

constructs, including *guanxi*, supply chain capital, sustainable SCM implementation and sustainable SCM performance (Table 3.5).

***Guanxi*** Eleven items on measuring *guanxi*, adopted from Yen *et al* (2012) who has conducted a survey to explore the measurement scale for *guanxi* in buyer-seller relationships.

**Supply chain capital** By investigating the influence of *guanxi* on supply chain capital, different studies were crafted to reflect the research questions and conceptual framework. One of the key papers was delivered by Zhao *et al.* (2011) where authors conducted an empirical study to examine the impact of international integration and relationship commitment on external integration. Measured financial capital, items adjusted from this study included integration with supply chain partners (F1), sharing forecasting information (F2) and production information (F4), improving procurement network (F3) and production system (F5). Additionally, Cheng, Yip and Yeung (2012) have collected survey data and found that *guanxi* between buyer and supplier improves trust level and supplier performance, such as investment for inventory (F6).

Table 3.5 Constructs of individual questions

<b>Construct</b>	<b>Items</b>	<b>Description</b>
<i>Guanxi</i>	RQ1	I feel a sense of obligation to this representative for doing him/her a favour
	RQ2	If I were to change this business company, I would lose a good friend
	RQ3	I would consider whether the representative's feelings would be hurt before I made an important decision
	RQ4	I am happy to do a favour for this representative, when he/she requests one
	GQ1	I feel a sense of obligation to this representative for doing him/her a favour
	GQ2	I think that 'calling in' favours is part of doing business with this representative
	GQ3	I would consider whether the representative's feelings would be hurt before I made an important decision
	GQ4	I would try my best to help out this representative when (s)he is in need because (s)he is a friend of mine
	XR1	This representative is only concerned about himself/herself
	XR2	The people at my firm do not trust this representative
	XR3	This representative is trustworthy
<i>Supply chain capital</i>		
Financial capital	F1	Improving quality of sourcing network
	F2	Sharing forecasting information with supply chain partners
	F3	Improving strategic procurement
	F4	Share production information between the company and its major supplier/buyer
	F5	Improving product quality
	F6	Reducing average investment in purchased parts inventory
	F7	Increasing new business opportunities through the social networks
Human capital	H1	Reducing lead time
	H2	Improving delivery reliability
	H3	Technical support to improve supply chain practicing processes (e.g. production, delivery, inventory)
	H4	Knowledge sharing about customers
	H5	Enhancing logistics management capability
Social capital	S1	Increasing new business opportunities through the social network
	S2	Reducing demand and supply uncertainty
	S3	Committing to close buyer-supplier relationships
	S4	An Expectation of long-term buyer-supplier relationships
	S5	Proprietary information being provided if it can help the other party
	S6	Reducing the power asymmetry between buyer and supplier
<i>Sustainable SCM</i>		
Environmental practices	Env1	Increasing commitment to environmental SCM from managers

	Env2	Providing design specification from buyers to suppliers that include environmental requirements for purchased item
	Env3	Increasing cooperation between buyers and suppliers to meet environmental objectives
	Env4	Providing environmental audit for the internal management of buyers or suppliers
	Env5	Working together to upgrade technology to deal with environmental issues
	Env6	Cooperating to imply and enforce the formal environmental policymaking system
	Env7	Requiring ISO14000 certification for buyers or suppliers
Social practices	Soc1	Encouraging a better work/life balance cross the supply with your counter parts
	Soc2	Introducing employee health and safety compliance and auditing systems with your counterpart
	Soc3	Helping counterpart company to obtain health & security certificate
	Soc4	Increasing transparency within the <i>guanxi</i> network in supply chain practices
	Soc5	Ensuring our counterpart do not use child labour or forced labour
	Soc6	Ensuring our counterpart pay their worker a living wage
	Soc7	Ensuring our counterpart have regulated over-time wage
	Soc8	Ensuring our counterpart do not discriminate against its own workers
	Soc9	Ensuring that our counterpart provide a healthy and safe working environment for their employees
<i>Sustainable SCM Performance</i>		
Economic performance	Ecop1	Supply chain total costs
	Ecop2	Investment for helping major supplier/customers to implement SSCM
	Ecop3	Operational costs
	Ecop4	Training costs
	Ecop5	Costs for purchasing environmentally friendly materials
	Ecop6	Costs of maintaining good <i>guanxi</i>
	Ecop7	Profits
	Ecop8	Market share
Environmental performance	Envp1	Air emissions
	Envp2	Waste water
	Envp3	Solid wastes
	Envp4	Consumption of natural resources
	Envp5	Consumption of hazardous/harmful/toxic materials
	Envp6	Flexibility to react to national and international environmental requirements
	Envp7	Flexibility to react to counterpart's environmental requirements
	Envp8	Frequency of environmental accidents

	Envp9	Air emissions
Social performance	Socp1	Health risks for consumers
	Socp2	Health and safety hazards for employees
	Socp3	Monitoring safety in your counterpart's operation suppliers' operation
	Socp4	Unethical activities within the supply chain, such as using child labour
	Socp5	Level of equality and fairness throughout the supply chain
	Socp6	Level of volunteers at local charities
	Socp7	Counterpart's knowledge and skills of SSCM
	Socp8	Gift giving, bribery between company representatives and partner companies

Source: Author

Five items were developed to measure human capital. Chen *et al.* (2010) have considered human capital resource in managing logistics performance in China. In their research findings, the relationships between guanxi and logistics performance, including reducing lead time (H1), improving delivery reliability (H2), and enhancing logistics capability (H5), have been tested. In addition, this research also considers technical support between players and the impact on supply chain practicing processes (H3), referring to Booi Hon, Ling and Richard (2011). A key determinant of implementing sustainable SCM is the sharing of knowledge and learning. In this regard, Cheng (2011) has collected data from green manufacturing firms to test the influence of inter-organizational relationships on knowledge sharing, moderating by guanxi (H4). The measurement of social capital contains six items. Relationship commitments (S3, S4) were adopted from Zhao *et al* (2011) to identify the willingness of developing, maintaining stable and long-lasting relationships from supply chain partners, which is assumed to influence the flow of capital and supply chain performance. The argument for cultivating social capital in supply chain is often linked with the capability of dealing with uncertainty and sharing information. In this regard, the items of reducing demand and supply uncertainty (S2) and providing proprietary information (S5)

were adopted from Chen *et al.* (2011) and Zhao *et al.* (2011) to examine the related impacts from *guanxi*. Furthermore, power asymmetry between buyer and supplier (S6) is another factor influencing relational risk and behavioural collaboration for supply chain activities, adopted from Cheng, Yip and Yeung (2012). Finally, due to the argument of network economics (Grannovetter, 1992), S1 was added to investigate whether social network increases new business opportunities as *guanxi* is argued to access tangible and intangible resources and opportunities (Park and Luo, 2001; (Zhuang, Xi and El-Ansary, 2008).

**Sustainable SCM implementation.** In investigating the adoption of green supply chain management in Chinese manufacturing enterprise, Zhu and Sarkis (2004) have used empirical results from 186 respondents to evaluate the results. They have made a niche contribution to examining environmental management and performance in the survey; therefore, this study has employed their measurement items for testing the influence of *guanxi* on companies' environmental responsibilities and performance. An additional question was added to examine whether social network can influence policymaking systems for environmental practice (Env6). For social dimension, this study adopted the items from Awaysheh and Klassen (2010) to examine the implementation of human rights and labour practice. Transparency (Soc4) is additionally considered, as it is a major factor in some areas, such as the food industry (Mena *et al.*, 2014).

**Sustainable SCM performance.** Items for measuring social performance were mainly adopted from Marshall *et al.* (2015), whereas variables taking into account local charities' (Socp6) knowledge and skills of sustainable SCM (Scop7) were supplemented from Carter

(2005). Given the fact that the process of building guanxi might also relate to unethical practice, such as gift giving and bribery (Fock and Woo, 1998), the item of Socp8 was therefore added. With regard to economic performance, Zhu and Sarkis (2004) have examined economic performance, including investment (Ecop2), operational costs (Ecop3), training costs (Ecop4) and costs for purchasing environmental friendly materials (Ecop5). This study also considers conventional study of guanxi and the impact on SCM, listed as supply chain total costs (Socp1), profits(Scop7) and market share (Scop8)

#### **Step 4: Determine form of response**

In a questionnaire, questions can be structured as either open-ended or closed ended (Frankfort-Nachmias and Nachmias, 1992). In this study, a closed-ended or structured questionnaire was used for data collection. Respondents were offered a set of answers which were consistent with the questions being asked and they were directed to choose the closest answer representing their views. By applying such an approach, questions were easy to ask and quick to answer. More importantly, in SEM each construct was structured according to a measured model designed to test the hypothesized relationship (Hair *et al.*, 2010). Thus, closed-end questions were suitable for meeting the research purposes.

#### **Step 5: Develop the measurement model**

Step 4 has presented the measured indicator variables; this next step includes the latent constructs in the model and to define the overall measurement model. Therefore, this stage can be seen as the 'assigning individual variables to constructs' (Hair *et al.*, 2010, p.657). It

is to measure 1) relationships between items and constructs; 2) correlational relationships between constructs; and 3) items' error terms (Hair *et al.*, 2010).

**Step 6:** Determine the sequence of questions

The sequence of questions directly influences the outputs of the research effort (Churchill and Iacobucci, 2002). Poor and illogical question sequencing could reduce the motivation of answering the questionnaire, confuse respondents, and bias responses (Rea and Parker, 2005). To ensure good research design, this study has followed the guidelines proposed by Churchill and Iacobucci (2002). First, easy answered questions, such as basic information, were illustrated to build respondent confidence and capture their attention for involvement in the research. Following that were more comprehensive questions. Furthermore, similar questions and items measuring the same concepts were grouped together to sound logical and flow easily.

**Step 7:** Determine layout and physical characteristics of questionnaire

The layout and physical characteristics of a questionnaire can influence the cooperation from respondents (Churchill and Iacobucci, 2002). This study designed the questionnaire in a web-based format with a professional appearance. A cover letter was instrumented in the opening section to indicate the research interests, population and assurance of confidentiality. This helped to convince for cooperation and useful responses (Churchill and Iacobucci, 2002). A clear page break was applied between sections to ease the negative motion of completing various questions. In a further move, a 5-point Likert scale design made it feasible and tidy in terms of layout when respondents scanned and completed the



questions with mobile devices. This made it easier to diffuse and, from the respondents' perspective, to answer the questionnaire, while increasing the possibility of obtaining a larger simple size.

#### **Step 8: Questionnaire translation**

After revising steps 1- 7 in terms of wording and sequence, bias induction and construct feasibility, the instrument then needed to be translated into Chinese before pre-testing and main data collection. According to Cha et al. (2007), the use of previously established instruments with good properties could help save time and effort and increase validity of constructs. However, due to the nature of cross-cultural research in this study, accurate translation is of vital importance to ensure validity of the research outputs.

Accordingly, there are various translation techniques in cross-cultural study, including direct translation, back translation and parallel translation, among which Brislin's (1970) back translation is most commonly used to check for translation accuracy in surveys (Douglas and Craig, 2007). In this technique, a bilingual translator blindly translates a questionnaire from the original language to the target language; then another bilingual translator back-translates the instrument from the target language to the original language, and finally the two versions are compared for concept consistency.

In this study, back translation was the technique used. The questionnaire survey instrument was designed in English (Appendix 1), then translated into Chinese by the researcher. Following that, the translated version was sent to other researchers, who conduct empirical

studies in China, and blind translation was undertaken by them back into English. Finally, concept equivalence was achieved after cross-checking.

### **Step 9: Pretest questionnaire**

Churchill and Iacobucci (2002) have indicated that data should never be collected without an adequate pre-test. The survey was subsequently piloted by various researchers and practitioners. Before sending out the questionnaires, contacts were made to explain the nature of the research and invite participation.

After distributing the survey, 5 researchers and 10 practitioners returned the work. Meanwhile, feedback was collected from each respondent to reflect on feasibility of language and translation as to whether the questionnaire was easy to understand and answer. This process also helped to check content validity. Where necessary, questions were reworded to improve clarity. A major adaptation after piloting was the revision of using 5-point Likert scale instead of 7-point Likert scale, as originally designed. The participants commented that the questionnaire was too lengthy and sometimes it was confusing to distinguish the answers from one to another. Dawes (2007) collected data to compare the characteristics and scale reliability and validity when collecting questionnaire by 5-point, 7-point and 10-point formats. The study found that 'there was very little difference among the scale formats in terms of variation about the mean, skewness or kurtosis. (Dawes, 2007, p.61). Drawing on this, the answers were readjusted after the pilot study to a 5-point scale, which, in addition, reduced the length of the questionnaire and potentially increased response rate and objective answers (Churchill and Iacobucci, 2002).

### 3.4.2.3 Sampling design

*'Sampling is a major problem for any kind of research. We can't study every case of whatever we're interested in, nor should we want to. Every scientific enterprise tries to find out something that will apply to everything of a certain kind by studying a few examples, the results of the study being, as we say 'generalizable' to all members of that class of stuff. We need the sample to persuade people that we know something about the whole class.'* (Becker, 1998, in Silverman 2010, p.149)

There are different techniques for sampling, including random sampling, systematic sampling and nonprobability sampling (Creswell, 2014). In random sample, each individual has the same probability of being selected, which provides the ability to generalise the population. In a systematic sample, the researcher chooses a random start on a list and selects every X number of people in the list (Fowler, 2009). In nonprobability sample (or convenience sample), respondents are chosen based on their convenience and availability (Fowler, 2009). In nonprobability sample (or convenience sample), respondents are chosen based on their convenience and availability.

This study applied snowball sampling to collect data. The logistic underlying is that the boundary of a social network is unknown and difficult to define – where is the start and end of a guanxi network. In this regards, Wasserman and Faust, (1994) suggest applying snowball sampling. The snowball sampling outreach strategy of recruiting respondents by diffusing questionnaires to individuals' social networks, introduced from one person to their similar groups, started a process analogous to a snowball rolling downhill (Sadler *et al.*, 2010). Another reason of using snowball sampling is that the research topic is yet in exploratory

stage, thereby different views representing diverse backgrounds are valuable for providing comprehensive understandings of the influence of social networks on sustainable SCM. Besides, this technique is inherent with the benefits of being more efficient and less expensive in obtaining sufficient sample sizes, whereas the disadvantage of using snowball sampling strategies is of the non-probability method – respondents are not a random sample (Sadler et al., 2010).

However, one issues of using this method is that sample bias might occur when a specific group of individuals are over-representated with similar shared characteristics (Magnani *et al.*, 2005).

To tackle this issue, the researcher took the following measures:

- Disseminating the questionnaires to as many social networks as possible - many friends and social group members were invited to participate and circulate the work;
- Collaborative researchers suggested potential respondents to answer the questionnaire, while circulating to no more than five people in their social networks.

By so doing, the logic was to collect sufficient completed questionnaires from the most relevant people, while controlling the variety of characteristics in respondents.

#### **3.4.2.4 Nonresponse bias**

Non-response bias is also termed non-response error. It occurs when there is significant difference between respondents of a survey and non-respondents on the variables of interest (Dooley and Lindner, 2003; Coderre, St-Laurent and Mathieu, 2004). Referring to Dooley and Lindner (2003), the conclusions drawn in a study are invalid if non-response bias

occurs. To determine whether there is non-response bias, the responses of early respondents are compared to late respondents, where late respondents are used as a proxy for non-respondents (Armstrong and Overton, 1977).

#### **3.4.2.5 Common method bias**

Common method bias is also referred to as common method variance (Spector, 2006). It is the statistical variance caused by the method of measurement instead of the constructs the measure represents (Podsakoff *et al.*, 2003). According to Podsakoff and Organ (1986), the shared method variance can be caused by a respondent's consistency, motifs, transient mood states, illusory correlations, item similarity, and social desirability. Common method bias is thereby a serious problem in organizational and behavioural research (Podsakoff *et al.*, 2003). This has driven researchers to investigate how much method variance is presented in the data; the cause of such variance; and the strategies for controlling method variance (Williams, Hartman and Cavazotte, 2010).

Statistical techniques were used together with the above procedural remedies to confirm the control of common method bias. Several statistical techniques have been used by researchers, and one of the most widely is Harman's single factor test technique (Podsakoff *et al.*, 2003; Podsakoff, MacKenzie and Podsakoff, 2012), which was employed in the current study. Traditionally, the Harman's single-factor test is to conduct an exploratory factor analysis on all the study variables and to examine the unrotated solution to determine the number of factors accounting for variance in the variables. Thus, if common method bias exists, either one factor will emerge from the analysis or one factor will account for most of

the covariance among measures. Furthermore, confirmatory factor analysis will be used in the current study to confirm the Harman's single-factor test.

#### **3.4.2.6 Social disability bias**

According to Crowne and Marlowe (1964), social responsibility bias refer to 'the need for social approval and acceptance and the belief that it can be attained by means of culturally acceptable and appropriate behaviors' (p.109). It results from the tendency of some people to respond in a socially acceptable manner, regardless whether their true feelings are consistent with their responses. Social disability bias is an important factor to consider in survey as it might cause method variance and disturb the uncover for the true relationship between independent variables and dependent variables (Fiske, 1982). In the discussion of method bias, Podsakoff et al (2003) has summarized potential causes for common method bias, one of which is social desirability. In other word, satisfying statistical result of social disability bias is sufficient but not necessary to the fact of satisfying statistical results of common method bias. If the study has no significant common method bias in the statistical tests, the social desirability bias should not be a major concern for the model.

#### **3.4.2.7 Data analysis method: Structural equation modelling**

There are different statistical techniques of analysing data, such as simple and multiple regression, factor analysis, multivariate analysis of variance and other techniques which all provide researchers with powerful tools for addressing a broad range of managerial questions (Hair et al., 2010). However, they all share one common limitation in that they can only examine a single relationship at a time between dependent and independent variables.

In the current study, SEM was adopted for data analysis. SEM, sometimes also referred as latent variables analysis or covariance structured analysis, is 'a family of statistical models that seek to explain the relationships among multiple variables' (Hair et al., 2010,, p.634). The reason for choosing SEM as an analytical tool is that it enables the researcher to test the entire theory with consideration of all possible information; it allows estimation and measurement of a series of dependent relationships simultaneously (Hair et al., 2010; Ferrin, Dirks and Shah, 2006). The objective in using SEM is to determine whether a priori model is valid, rather than finding a suitable model (Gefen, Straub and Boudreau, 2000). It depicts all of the relationships among observed variables (manifest or measured variables, MV) and unobserved variables (underlying or latent variables, LV) that can be independent (exogenous) or dependent (endogenous) in nature. For example, if it is significant that guanxi networks increase supply chain capital, and increase of supply chain capital improves sustainable SCM implementation, then supply chain capital in this case is both a dependent and independent variable in the same model.

SEM includes both confirmatory factor analysis and path analysis (Haire et al., 2010; Shah and Goldstein, 2006). Confirmatory data analysis tests the model in a set of causal relationships with the results either accepted or rejected. It requires that LVs and their associated MVs are specified before data analysis. Path analysis models 'specify patterns of directional and non-directional relationships among MVs' (Shah and Goldstein, 2006, p.149). It offers an effective way of dealing with multicollinearity in the model (Bacon, Sauer and Young, 1995).

To complete a SEM analysis, referring to Figure 3.6, the first nine steps were concluded in the research design, reflecting considerations of important issues when conducting SEM, starting from the pre-analysis stage (Shah and Goldstein, 2006). After designing the questionnaire, data were collected in Step 10. This stage has also emphasised the requirement for adequacy of the sample size. In general, SEM requires a larger sample relative to other multivariate approaches. Maximum likelihood estimate (MLE) is the most common estimation procedure in SEM; studies suggest a sample size of 200 to provide a sound basis for estimation. However, when the sample size becomes larger (>400), it becomes sensitive and almost any difference will be detected, resulting in a relatively poor fit in goodness-of-fit measure. Therefore, it is suggested that sample sizes should be in the range of 100 to 400 (Hair et al., 2010).

Step 11 is to assess measurement model validity in terms of confirmatory factor analysis, to examine the goodness-of-fit and construct validity of the measurement model, then continues by specifying the structural model and testing the model validity and size of structural parameter estimates.

With the measurement model specified, the researcher comes to the most fundamental event in SEM testing: 'Is the measurement model valid?' (Hair et al., 2010, p.664) According to Hair et al. (2010), the validity of the measurement model depends on two conditions: acceptable goodness-of-fit levels for the measurement model; and proof of construct validity. The construct validity will be discussed in the next section, and assessment of the overall goodness-of-fit is explained in the following part (summarized in Figure 3.7):



**Goodness-of-fit (GOF)** indicates ‘how well the specified model reproduces the observed covariance matrix among the indicator items (i.e., the similarity of the observed and estimated covariance matrices)’ (Hair et al., 2010, p.664-665). GOF measures are classified into three groups: absolute fit measures, incremental fit measures and parsimony fit measures (Hair et al., 2010).

Figure 3.7 Summary of goodness-of-fit indices

Fit Index	Description	Acceptable fit
<b>Absolute fit measures</b>		
Chi-square ( $\chi^2$ )	Test of null hypothesis that the estimated variance-covariance matrix deviates from the sample. Significantly affected by sample size. The larger the sample, the more likely it is that the $p$ -value will imply a significant difference between model and data.	Non-significant with a $p$ -value of at least 0.05 ( $p > 0.05$ ).
Normed Fit Chi-square ( $\chi^2/df$ )	Chi-square statistics are only meaningful taking into account the degrees of freedom. It is also regarded as a measure of absolute fit and parsimony.	Values less than 2 and as high as 5 indicate a reasonable fit.
Root Mean Square Error of Approximation (RMSEA)	Representing how well the fitted model approximates per degree of freedom.	Values between 0.05 & 0.08 indicate adequate fit.
Goodness-of-Fit Index (GFI)	Representing a comparison of the square residuals for the degree of freedom.	Values > 0.95 indicate good fit; values between 0.90 & 0.95 indicate adequate fit.
Standardised root mean residual (SRMR)	Representing a standardised summary of the average covariance residuals. Covariance residuals are the difference between observed and model-implied covariances.	Values < 0.05 indicate good fit; values between 0.01 & 0.05 indicate adequate fit.
<b>Incremental fit measures</b>		
Buntler-Bonett Normed Fit Index (NFI)	Representing a comparative index between the proposed and more restricted, nested baseline model (null model) not adjusted for degree of freedom, thus the effects of sample size are strong.	Values > 0.95 indicate good fit; values between 0.90 & 0.95 indicate adequate fit.
Tucker-Lewis Index (TLI) - also known as Buntler-Bonett Non Normed Fit Index (NNFI)	Comparative index between proposed and null models adjusted for degrees of freedom. Can avoid extreme underestimation and overestimation and is robust against sample size. Highly recommended as fit index of choice.	Values > 0.95 indicate good fit; values between 0.90 & 0.95 indicate adequate fit.
Comparative Fit Index (CFI) - identical to Relative Non-centrality Index (RNI)	Comparative index between proposed null models adjusted for degrees of freedom. Interpreted similarly as NFI but may be less affected by sample size. Highly recommended as the index of choice.	Values > 0.95 indicate good fit; values between 0.90 & 0.95 indicate adequate fit.
<b>Parsimony fit measures</b>		
Adjusted Goodness-of-Fit Index (AGFI)	Goodness-of-fit adjusted for the degrees of freedom. Less often used due to not performing well in some applications.	Values > 0.95 indicate good fit; values between 0.90 & 0.95 indicate adequate fit.
Parsimony Normed Fit Index (PNFI)	This index takes into account both the model being evaluated and the baseline model.	Higher values indicate better fit.

Source: Kline (2005); Byrne (2010); Hair et al. (2010)

**Absolute fit indices** measure how well the model reproduces the observed data. They do not compare the GOF of a specified model to another model. Absolute fit measures include the Chi-square ( $X^2$ ) statistic, the goodness-of-fit index (GFI), the root mean square error of approximation (RMSEA) and the standardized root mean residual (SRMR).

**Incremental fit indices** assess how well the estimated model fits relative to some alternative baseline model (referred to as null model). These measures include indices of normed fit index (NFI), the Tucker-Lewis index (TLI), comparative fit index (CFI) and the relative non-centrality index (RNI).

**Parsimony fit indices** provide information about which model among a set of competing models is best, comparing its fit relative to its complexity. The most widely used measures include the adjusted goodness-of-fit index (AGFI) and the parsimony normed fit index (PNFI).

Debate arises on what constitutes an adequate/good fit. Hair et al. (2010, p.670) have suggested dealing with two main questions: 1). *What are the best fit indices to objectively reflect a model's fit?* 2). *What are objective cutoff values suggesting good model fit for a given fit index?* Apart from the  $X^2$  value, the use of three to four indices helps to provide adequate good fit evidence, and that at least, one absolute fit index and one incremental index should be reported. In this study, the researcher has considered GFI, RMSEA in absolute fit indices and CFI and TLI in incremental fit indices.

Continuing through to Step 12 is to specify the structural model through assigning relationships from one construct to another based on the conceptual model. The

measurement specifications should also be included in the model and the path diagram represents the measurement part and structural part of SEM in the model (Hair et al., 2010). At this stage, the model should be ready for path analysis and this could be tested for overall theory and hypothesised relationships.

The final step is to test the validity of the overall structural model apart from the corresponding hypothesized relationships. Before testing the structural relationships, the measurement model should be achieved with acceptable good fit (Hair et al., 2010). Moreover, individual parameter estimates representing each hypothesis should be examined for statistical significance and in the predicted direction (Hair et al., 2010).

#### **3.4.2.8 Validity and Reliability**

We used structural equation modelling to test a set of causal relationships simultaneously, as recommended by Hair et al. (2010). The validity and reliability of constructs were assessed to determine whether the measurement instrument was accurate and the model really measures what it aimed to measure (Mason, 2013). For assessing validity, researchers usually consider content validity and construct validity.

With regard to **content validity**, the measurement items were developed from different published empirical studies and expert judgement was applied to assess whether or not the scale items have covered the full content of constructs to measure the concept. In this case, homoscedasticity is excepted because the model was moderated with multiple groups.

**Construct validity** is assessed by examining convergent validity and divergent validity (discriminant validity) using confirmatory factor analysis (CFA, Hair et al., 2010). In this study, convergent validity was assessed with statistically significant factor loadings on each factor, together with the average variance extracted (AVE). A critical value of 0.5 in AVE or above indicates adequate convergent validity (Hair et al., 2010). A comparison between the square root of the AVE and the correlation estimate between constructs was run to measure divergent validity. Divergent validity is confirmed when the AVE of a construct is higher than the squared correlation between that construct and the others (Hair et al., 2010)

For measuring reliability, Cronbach's alpha is a traditional approach and values are considered acceptable if they are between 0.7 to 0.8 (Kline, 2000). However, a major criticism with coefficient alpha is regarded as the positive relationship with the number of scale items; that is, increasing the number of the scale items could drive higher value of Cronbach's alpha (Hair et al., 2010). Therefore, AVE and Composite Reliability that take into account the homogeneity and internal consistency of the measured construct (Koufteros, 1999) are adopted to overcome this issue. Values of 0.6 or above in Composite Reliability are usually acceptable (Bagozzi and Yi, 1988).

#### **3.4.2.9 Unidimensionality**

Unidimensionality refers to the measurement of one latent construct with a set of variables (Steenkamp and Baumgartner, 1998). A widely recognised method to assess unidimensionality is to conduct CFA and determine the overall model fit through goodness-of-fit indices, together with other diagnostic tools, including standardized residuals and modification indices (Koufteros, 1999).

### **3.4.2.10 Summary**

The above section has provided a detailed explanation of the methodological approach used in the first phase of data collection and analysis. The present study is positioned within the critical realism paradigm with a development mixed-method approach. Thus far, the study has investigated the causal relationship between social networks and sustainable SCM implementation, with proof from the measuring model and structural model. However, critical realism also offers the opportunity for investigating the underlying mechanism and stratification of the investigated topic. In the questionnaire design, demographic backgrounds were considered, including positioned industry and the reasons for adopting sustainable SCM if they have practised in the field. Therefore, the following section contains the case studies developed from the literature and the results of survey findings, to investigate the depth of the topic.

### **3.4.3 Choice of option III: Case studies**

According to Yin (2009, p.18), a case study is ‘an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evidenced.’ A case study is employed in the current study to answer the questions of ‘how’ and ‘why’. The development approach of mixed-method adopted reflects on 1) extending study from dyadic buyer-supplier relationships to supply chain networks; 2) exploring the underlying mechanism by not only considering social networks, but also institutional force and company strategies which are developed from literature and survey findings.

Meredith (1998) indicates the following strengths of case research:

- The natural setting and meaning of studied phenomenon, understanding and emerging relevant theory through observing actual practice;
- Rich information and complexity of phenomenon could be explored from the questions of why and how in case method;

Case method provides early, exploratory investigations when the variable are still unknown and/or the phenomena are not all understood.

Multiple case studies are employed in this stage after the questionnaire survey. A key advantage in using this approach is to investigate the research question with deep insights and to investigate unclear boundaries of the influence from social networks, institutional force and company strategies of implementing sustainable SCM. SCM and sustainable SCM are the applied fields- knowledge emerging in the process of case studies moving forward by a constant flow back and forth between theoretical and empirical applied (Gibbons *et al.*, 1994) to contest and develop the previous findings in survey questionnaires.

In addition, case study also provides opportunity to collect data from many different sources of evidence to develop converging lines of inquiry (Yin, 2009). In research design, the 'blueprint' for the research is to deal with four problems: *What question to study, what data are relevant, what data to collect, and how to analyse the results* (Philliber, 1980; Yin, 2009). (Philliber, 1980; Yin, 2009). This section will provide a roadmap to explaining the research design and data analysis approach in this study.

### **3.4.3.1 Research question**

The questions in this stage are to answer:

***RQ3: How do social networks drive implementation of sustainable SCM?***

***RQ4: How do institutional forces drive implementation of sustainable SCM?***

***RQ5: How do companies moderate the influence from social networks and institutional force?***

This is developed from the literature and survey findings that social networks between buyers and suppliers positively increase the implementation of sustainable SCM. Survey shows that the primary reason motivating or pushing most companies to implement environmental and social responsibilities is due to institutional forces, including national and international required standards and customer requirements. Apart from social network dissemination, proactive companies also adopt sustainability for gaining competitive advantage. Therefore, it is worth exploring how institutional forces and company strategies play a role in increasing sustainable SCM together with social network interactions and governance. In terms of research questions and research context, multiple-case studies develop the survey questionnaires twofold (Table 3.6):

- 1). Enrich and contest the survey findings of the model with discussions and comparisons from different companies, industries and supply chain network structures.
- 2). Explore the unclear boundaries between social networks, institutional forces and company strategies, to clarify how these internal and external factors drive implementation of sustainable SCM.

Table 3.6 Development of research questions

<b>Research questions</b>	<b>Body of knowledge</b>	<b>Nature of Investigation</b>	<b>Method</b>
1). How are flows of supply chain capital influenced in social networks?	<i>Guanxi</i> networks; Capital, flow of capital in SCM	The flow of supply chain capital in social networks to deal with partitioning issues	Systematic literature review; survey; case studies
2). What are the relationships between social networks and sustainable SCM implementations?	<i>Guanxi</i> network; Sustainable SCM implementation; Sustainable SCM performance	Unit of analysis: relational ties between buyers and suppliers	Survey; statistical technique; SEM
3). How do social networks drive implementation of sustainable SCM?	Flow of supply chain capital; network carrying institutional logics; network selection	Unit of analysis: supply chain networks	Case studies
4). How institutional forces drive implementation of sustainable SCM?	Institutional theory and relative isomorphism on sustainable SCM	Investigation of research topic from individual firm perspective, supply chain network and industrial development scopes	Case studies
5). How company moderates the influence from social networks and institutional force?	Company's sustainable development strategy under stakeholder pressure	The moderating impact of internal factor on external forces	Case studies

Source: Author

### 3.4.3.2 Case study design

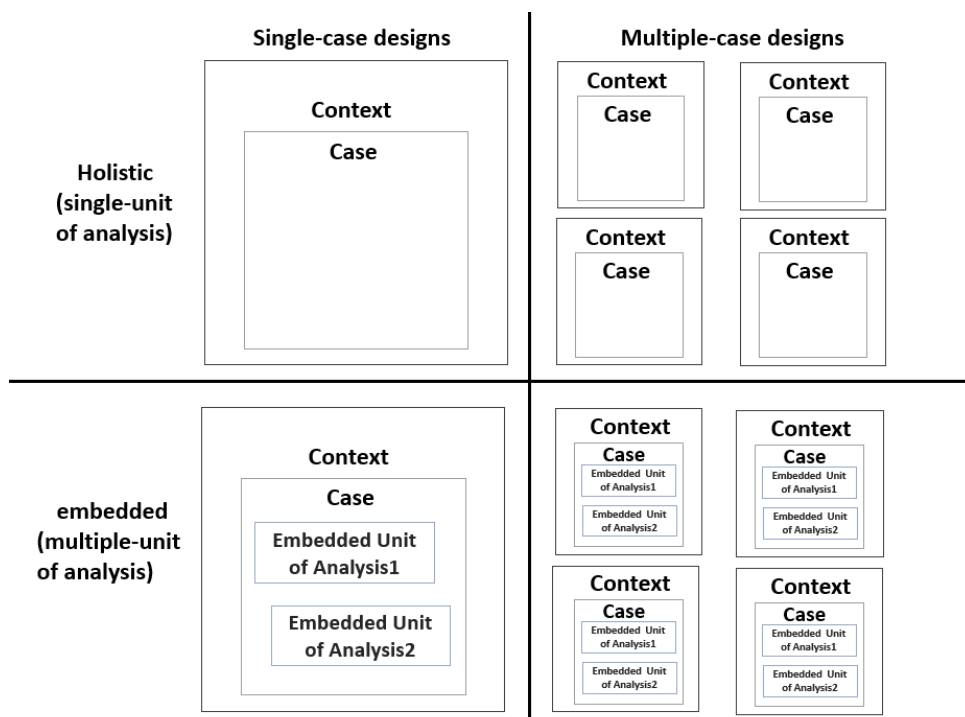
There are four types of designs for case studies: single case (holistic) design (Type 1), single-case (embedded) designs (Type 2), multiple-case (holistic) design (Type 3) and multiple-case (embedded) design (Type 4) (Figure 3.8), according to Yin (2009). Compared to single-case designs, multiple-case designs have distinct advantages and challenges. The evidence collected from multiple cases is considered more compelling, therefore, overall study is expected to be more robust (Herriott and Firestone, 1983). Selecting multiple cases also follows a 'replication' design (Yin, 2009, p.51) which, following the logic of selected cases,



must a) predict similar results (a literal replication) or b) predict contrasting results but for anticipatable reasons (a theoretical replication).(Herriott and Firestone, 1983).

Regarding the unit of analysis, this depends on the phenomenon being studied and the research questions being asked (Yin, 2009). More than one unit of analysis occurs when, within the case(s), attention is also given to a subunit or subunits.

Figure 3.8 Basic types of designs for case studies



Adapted from Yin (2009), p.46

In this study, the type of research design locates as Type 3 - single-unit (holistic) design. The underlying logic is that:

1). Theoretically, we argued that implementing sustainability in a company has not yet reached the 'real' sustainable SCM. In social network study, the range of stakeholders we consider exceed buyers and suppliers to also include competitors, government bodies, and

integrators (someone playing more than one role in the network). Previous studies mainly focus on firm and dyad level in discussing internal processes of purchasing function or direct supplier management in relation to sustainability (Miemczyk and Johnsen, 2012). Therefore, this study is designed to extend company sustainability profile to supply chain network level. 2). By adopting multiple-case design, the researcher intended to take advantage of obtaining compelling evidence and generate more robust arguments, as suggested by Herriot and Firestone (1983). Moreover, the rationale for multiple cases can be better justified with extensive resources.

#### **3.4.3.3 Case selection**

Stake (1995) indicates that case research is not sampling research but to select cases that are representative to maximise what one can learn about the phenomena under study. Cases should be chosen for theoretical reasons, not statistical convenience, because a key feature of qualitative sampling is the small scale of involvement, compared with quantitative research (Miles and Huberman, 1994). Selection of multiple-case sampling design adds confidence to drawing conclusions on the research topics by examining a range of similar and/or contrasting cases (Miles and Huberman, 1994). The principle of cases should be chosen to be replicated with previous cases or theoretical emergence to fill theoretical categories (Eisenhardt, 1989).

According to Miles and Huberman (1994), there are a range of sampling strategies in qualitative study (Table 3.7). Erickson (1986) suggests a general sampling strategy of 'funnelling sampling sequences, working from outside in to the core of a setting' (In: Miles and Huberman, 1994, p.28).

Table 3.7 Typology of sampling strategies in qualitative inquiry

Type of sampling	Purpose
Maximum variation	Documents diverse variations and identifies important common patterns
Homogenous	Focuses, reduces, simplifies, facilitates group interviewing
Critical case	Permits logical generalization and maximum application of information to other cases
Theory based	Finding examples of a theoretical construct and thereby elaborate and examine it
Confirming and disconfirming cases	Elaborating initial analysis, seeking exceptions, looking for variation
Snowball or chain	Identifies cases of interest from people who know people who know what cases are information-rich
Extreme or deviant case	Learning from highly unusual manifestations of the phenomenon of interest
Typical case	Highlights what is normal or average
Intensity	Information-rich cases that manifest the phenomenon intensely, but not extremely
Politically important cases	Attracts desired attention or avoids attracting undesired attention
Random purposeful	Adds credibility to sample when potential purposeful sample is too large
Stratified purposeful	Illustrates subgroups; facilitates comparisons
Criterion	All cases that meet some criterion; useful for quality assurance
Opportunistic	Following new leads; taking advantage of the unexpected
Combination or mixed	Triangulation, flexibility, meets multiple interests and needs
Convenience	Same time, money, and effort, but at the expense of information and credibility

Adapted from Miles and Huberman, 1994

In this study, adopting multiple cases design is in the logic of predicting contrasting results to confirm previous findings in the survey while exploring the similarities and differences of implementing sustainable SCM in comparative cases. After running the correlation test, there is a rather weak correlation in *guanxi* and industry ( $cor=0.09$ ). Therefore, industry is not a major factor in affecting the degree of personal ties between players. Neither industry mediates the impact of social networks on sustainable SCM implementation (Chapter 5); in

other words, the category of industry does not matter when discussing the influence of social networks on sustainable SCM implementation.

Under this circumstance, the selection of cases was designed for critical case, in order to generalise the logic and maximize application of information to other companies in the same industries. This study selects the automotive industry, food and beverage industries. Firstly, it reflects the call for using multi-industry samples in sustainable SCM study, while in current literature, there are relatively fewer studies on these industries, according to Carter and Easton (2011). Secondly, the findings from these three industries were expected to produce contradictory results. The automotive industry which is viewed as the largest manufacturing sector worldwide, has the enormous impact on economic, environmental and social activities in the global economics (Xia et al., 2015). However, the industry faces high profile environmental challenges, such as deteriorating air quality and global warming. Therefore, governmental globalization policies have forced firms to incorporate sustainability (Mathivathanan, Kannan and Haq, 2018). However, in food and beverage industries, there are two 'institutional barriers' of cost reduction and compliance with powerful stakeholders (Glover et al., 2013, p.108). Under this circumstance, sustainable SCM implementation in global food supply chains appears with inherent difficulties and risks (Roth et al, 2008). Therefore, by choosing the automotive, food, and beverage industries in this study, it is in the logic to unravel contrasting and contradicting findings from the cases.

Identification of specific cases and focus companies was a purposeful and opportunistic process. The collaboration with the gatekeeper in Xiamen (China) incorporates the opportunity to contact with the Vegetable Ltd and Beverage Ltd A, which both are the most

competitive players in the market. In particular, Vegetable Ltd possesses the largest market share in fresh cut vegetable in Xiamen; and Beverage Ltd A is one of the leading and most recognised brands in the Chinese beverage industry. For selecting an automotive company and its supply chain network, although there are various branches in China, including the traditional 'Big Four' domestic car manufacturers - SAIC Motor, Dongfeng, FAW and Chang'an, and several multinational manufacturers, realistic issues for case study were considered – accessibility and feasibility. Selecting the Automotive Ltd, firstly because the gatekeeper has good connection with the managers in the company who agreed to arrange for case study with their first tier and second tier suppliers. Secondly, it is a famous company supplying for big brands globally. Thirdly, the complexity of Ownership in this supply chain network potentially contain rich information for discovery and discussion.

Snowball sampling was also applied to identify other companies in the supply chain networks of Automotive Ltd, Vegetable Ltd and Beverage Ltd A. The gatekeeper contacted the managers in these three companies for case accessibility. Meanwhile, it was also suggested that they invite their suppliers and/or customers in their supply chain network to investigate the research topic in depth and hope for improved sustainable practices in their networks.

Snowballing technique was also applied in the selection of Beverage Ltd B. Even though the gatekeeper helped in contacting the focal companies and their suppliers, this study encountered difficulty in collecting empirical data from implementing SCM at supply chain network level, which is coherent with other network studies (Wichmann & Kaufmann, 2015). Followed the suggestion from Wasserman and Faust (1994), the researcher applied snowball

sampling and requested involved companies to identify their major customers and suppliers. By doing so, Beverage Ltd B was selected to complete a definition of 'supply chain network' in the beverage case. Further details can be found in Chapter 6. Ultimately, this study was fortunately able to identify three supply chain networks with 16 companies to participate in the case studies, which identified three supply chain network structures.

#### **3.4.3.4 Data collection**

Case study evidence can be collected from many sources and this section will discuss interview, documentation and observation, and explain the application of these to this study.

**Interview** is one of the most important sources of case research (Yin, 2009). Semi-structured interview is the primary method in this study. This form of interview guides conversations between interviewees and interviewer, encouraging participants to discuss their opinions and experiences rather than answering structured queries. To ensure replication, the interviewer usually uses a standardised protocol with a set of opening structured questions which will be delivered for all respondents. This provides some degree of freedom and flexibility to elaborate on the topics of interest with rich information and knowledge from interviewees.

Meanwhile, semi structured method offers scope for probing for novel and relevant information through prepared notes as prompts on the schedule. The probing questions allow follow-up leads that emerge during the interview. An important strength of using semi-structured interview is for the flexibility that interviewees will not be forced to answer

specific options but may be approaching toward a higher level of elaboration and emergence of the outlined questions (Bryman and Bell, 2007; Saunders, Lewis and Thornhill, 2008).

**Documentation** is the information taken from different forms objectively, according to Yin (2009). Consideration for documents could involve the following:

- Letters, memoranda, e-mail correspondence, and other personal documents, such as diaries, calendars, and notes;
- Agendas, announcements and minutes of meetings, and other written reports of events;
- Administrative documents – proposals, progress reports, and other internal records;
- Formal studies or evaluations of the same ‘case’ that you are studying; and
- News clippings and other articles appearing in the mass media or in community newspapers.

For case studies, the most important reason for using documents is to corroborate and augment evidence from other sources, which helps to verify information from the interviews and provide other details to corroborate knowledge from other sources. The critique of using documents concerns the bias of selected sources and authors should consider the validity of documents (Yin, 2009).

**Observations** are very difficult to distinguish in ethnography and participant observation (Bryman and Bell, 2003). This study applied direct observation method, assuming that relevant behaviours and environmental conditions can be available for observation. The range of sources include formal to casual data collection activities, such as observing

behaviours, listening to conversation between participants, and site and factory visits. Referring to Yin (2009), the strengths of using observation evidence are: that additional information about the topic being studied are provided and that events are covered in real time. The weakness is that it could be of high costs in terms of time and financial consumption.

**Application of this study** To prepare for the data collection, interview protocol was developed (Appendix 2) to standardize the interview and probing questions. However, other methods at that stage were kept open and flexible because of the difficulty of gaining access to companies and their supply chain networks. To be realistic, in the ethical form the researcher indicated other methods and documentations that might be involved if they were available. Then the protocol was translated into Chinese and cross-checked with other researchers to ensure the content validity.

As shown in Table 3.8, the major method used in this study was semi-structured interviews with each participant; documentation and observations were the supplementary information to enrich the information and knowledge of the cases.

Through coordination with the gatekeeper, the discussion began with the researcher briefly introducing the background and aims of the study, and then each participant continued with a presentation of their supply chain and sustainable development. The topic of presentation was given before the dates of interviews, and the observation of their presentations mainly benefited: 1) facilitating more details of the companies enabling the researcher to tailor the



opening section of the interviews, for ice-breaking and 2) customising the language for asking the questions to suit the background and interest of the companies.

Observations in the factory sites were very helpful and sometimes the researcher could obtain further information either to complement the interviews or sometimes, even, to contradict the information provided by their senior managers. Providing sustainable practices reports is not yet commonly adopted in China. Only a few large and well-known companies have reported their sustainability implementation. From this perspective, it may reflect awareness and knowledge about sustainability in industries needing to be further disseminated in China.

Table 3.8 Summary of case evidence methods

<b>Companies</b>	<b>Case evidence methods</b>
Beverage Ltd A	Semi-structured interview, observation of presentation
Sugar trader	Semi-structured interview, observation of presentation
Sugar Processor	Semi-structured interview, observation of presentation, <i>documentations of sustainable practices</i>
Beverage Packaging	Semi-structured interview, observation of presentation
Beverage Ltd B	Semi-structured interview, observation of presentation and factory, <i>documentations of sustainable practices</i>
Vegetable Ltd	Semi-structured interview, observation of presentation and factory
IT provider	Semi-structured interview
Vegetable trader	Semi-structured interview
Carton packaging	Semi-structured interview
Food Processor	Semi-structured interview, observation of factory
Restaurants Owner	Semi-structured interview, observation of restaurant
Automatic Ltd	Semi-structured interview, observation of presentation and factory, <i>documentations of sustainable practices</i>
Precision A	Semi-structured interview, observation of presentation

Precision B	Semi-structured interview, observation of presentation, documentary
Plating A	Semi-structured interview, observation of presentation and factory
Plating B	Semi-structured interview, observation of factory

Source: Author

### 3.4.3.5 Data analysis

‘Coding is one way of analysing qualitative data’ (Saldana, 2016, p.3). Data in qualitative research are coded, decoded and recoded between researchers and participants. It is a cyclical analytical process rather than linear. Coding methods are various, such as open coding, axial coding and selective coding, suggested by (Strauss and Corbin, 1990).

Selection of the appropriate coding methods is rationalized, which depends on the nature and goals of the study (Patton, 2002). Sometimes, people might feel one method alone will suffice, or that different mixed methods are needed to capture the complex process and phenomena in the data. In this study, attribute coding and simultaneous coding were used in the first phase to capture basic grammatical principles. ‘Attribute coding logs essential information about the data and demographic characteristics of the participants for future management and reference’ (Saldana, 2016, p.82). Information, such as roles of position and years in the company, have been coded to record the basic backgrounds of participants. Simultaneous coding has been applied when two or more than two different codes apply to a single qualitative datum, or overlapped occurrence of coding in sequential units of qualitative data.

When coding is content-based and conceptual context represents a topic of inquiry, it is called structured coding, which was applied in the second phase (Saldana, 2016). It is the primary approach in qualitative data analysis, focusing filters and reviewing the corpus to build a foundation for future coding cycles. Structural coding methods were fundamental in the coding of this study. Because the questions were designed by theory-led principles, in other words, codes were in clear structures and layout, coding information therefore, is selective coding rather than open coding, content-based rather than descriptive based. Sometimes, coded information overlapped when participants explained different structures and codes, such as stakeholder and social network involvement in supply chain activities.

Pattern coding and theoretical coding were applied in this study. Pattern codes are explanatory or inferential codes to identify a theme, configuration or explanation (Saldana, 2016). This method pulls together different pieces of information into more insightful findings and parsimonious units of analysis (Miles et al., 2014). This approach was important to determine various wordings which seem to be unconstructive but are, in fact very important. For example, reactive sustainability strategies could be indicated from statements that 'sustainability is to make sure we sustain our profits' and 'what we are doing now for our employees is more than government requirements and industrial tradition' from interviewees' elaboration. In addition, the questions were designed by theory-led principles (social networks theory and institutional theory) rather than grounded theory, and also based on the literature study, survey results and theoretical model building. Therefore, interviews and case studies are more explanatory than exploratory. In this case, theoretical coding approach was also applied.

The application of coding is that of analysing interviews, documentation and pictures from observations. The software this research used to analyse the data is Nvivo, to code and analyse the data. The results are presented in Chapter 7.

#### **3.4.3.6 Validity and reliability**

Unlike quantitative study, where certain indicators should be met to justify for validity and reliability of the findings, qualitative research has implicit rules of addressing validity and reliability issues. However, it is of importance to address how the study has met the standards of validity and reliability in order to ensure the quality of findings.

According to Silverman (2010), a certain degree of ‘methodological awareness’ can help researchers improve the validity of findings (p.276). In implementation, he introduced Alan Quirk’s discussion as suggestions:

- Having longitudinal design;
- Examining comprehensive instances rather than rushing to early conclusions;
- Triangulating different methods to address a topic;
- Using simple tabulations of the frequency of certain phenomena;
- Employing member validation to check the findings.

These doable checklists were adapted in the current research: firstly, by using multiple-case studies and collected data at the supply chain network level to help investigate the research topics from various perspectives and comprehensive evidence before drawing conclusions; secondly, by using and comparing quantitative and qualitative evidence, the researcher is

more confident in addressing the discussion of the study. Reflecting the suggestion of using simple tabulations, the processes of coding and analysing data were computerized in Nvivo to help reduce subjectivity to a certain level. Finally, the researcher discussed the findings with other professional experts, including the gatekeeper, and case studies participants to cross-check understanding and discuss the findings.

Regarding the reliability of qualitative research, Bryman has called for an approach of low-inference descriptors, which was originally claimed by Seale (1999). Low-inference descriptors involve 'recording observations in terms that are as concrete as possible, including verbatim accounts of what people say... rather than researchers' reconstructions of the general sense of what a person said' (Seale, 1999, p.148). Additionally, it is suggested that two independent transcriptions are performed (Silverman, 2010).

In the current research, all interviews, presentations from participants, and factory visits were recorded in Chinese, then transcriptions were sent to a third party that provides professional transcription in China. Subsequently, the transcriptions were checked across the recording files by the researcher before the manuscripts were translated to English by Google translation. It is difficult to remove personal bias in qualitative research as 'no act of observation can be free from the underlying assumptions that guide it' (Silverman, 2010, p.287). By reducing personal involvement in the transcription and translation processes to a minimum level, the researcher expects to improve reliability of the findings. Meanwhile, after being translated by Google translation, the researcher revised for grammar mistakes

and, largely, the flow of sentences/paragraphs, to reflect on the contexts and perceptions of the participants.

#### **3.4.3.7 Summary**

This section has explained the rationale in adopting case studies in the current research. In detail, it has referred back to the literature of the definition of case study and interpreted the logic and processes of how the case studies have been conducted in the research.

### **3.5 Limitations and strengths of the research design**

Seuring (2011) has thoroughly discussed how different research methods have contributed to theorizing sustainable SCM. The author calls for the application of mixed-method research in this field for presenting related variables and testing causal relationships, while not overlooking a richer description of phenomena and integration of issues raised by other researchers.

This study applied development mixed-method approaches because of the philosophical stance which drives the framing of research aims and research questions. Both qualitative and quantitative methods of empirical studies have specific limitations and a mixed-method approach appears to be a complementary way of avoiding weaknesses from both sides. However, it is indeed a difficult approach in SCM study (Golicic and Davis, 2012).

Limitations in the current study could be those of time consumption, cost, and high risk:

- Using questionnaire survey as the leading research method took considerable time and effort in the pre-work in terms of developing and justifying a conceptual model, questionnaire design and seeking accessibility.
- It was also high risk because the results of findings were completely dependent on the answers from participants.
- Another challenge in adopting such a mixed-method approach is the justification from the logic of inquiry in quantitative and qualitative mixes. Research should be well-prepared at each stage, with clear logic and structures, to chain each pearl as a necklace and answer the research questions properly with clear justification.

However, the strengths of using this research design are significant and irreplaceable. In SCM, Gammelgaard and Larson (2001) employ a development design to investigate skills and competencies for logistics managers by conducting a survey then following with case studies. Findings reveal interesting similarities and differences across the phases: However, the strengths of using this research design are significant and irreplaceable. In SCM, Gammelgaard and Larson (2001) employ a development design to investigate skills and competencies for logistics managers by conducting a survey then following with case studies. Findings reveal interesting similarities and differences across the phases:

- The mixed-method approach provides the opportunity to test the causal relationships (with questionnaire survey) and reveal stratified mechanisms between social networks and sustainable SCM implementation (with case studies).
- It also complements the limitations of quantitative research by providing the opportunity to investigate richer understanding of how and why social networks could generate such statistical power.

- Development approach opens the door to exploring unclear boundaries between internal and external factors influencing sustainable development in SCM. The sequence of using quantitative research before qualitative study offers the beauty of extending the discussions from dyadic relationships to the scope of supply chain networks. Such an approach enriches understanding of the influence of social networks on supply chain structure and network structure, and how these reflect on the implementation of sustainable SCM.

Therefore, the strengths of research design in the methodology of this study has contributed to sustainable SCM study.

### **3.6 Summary**

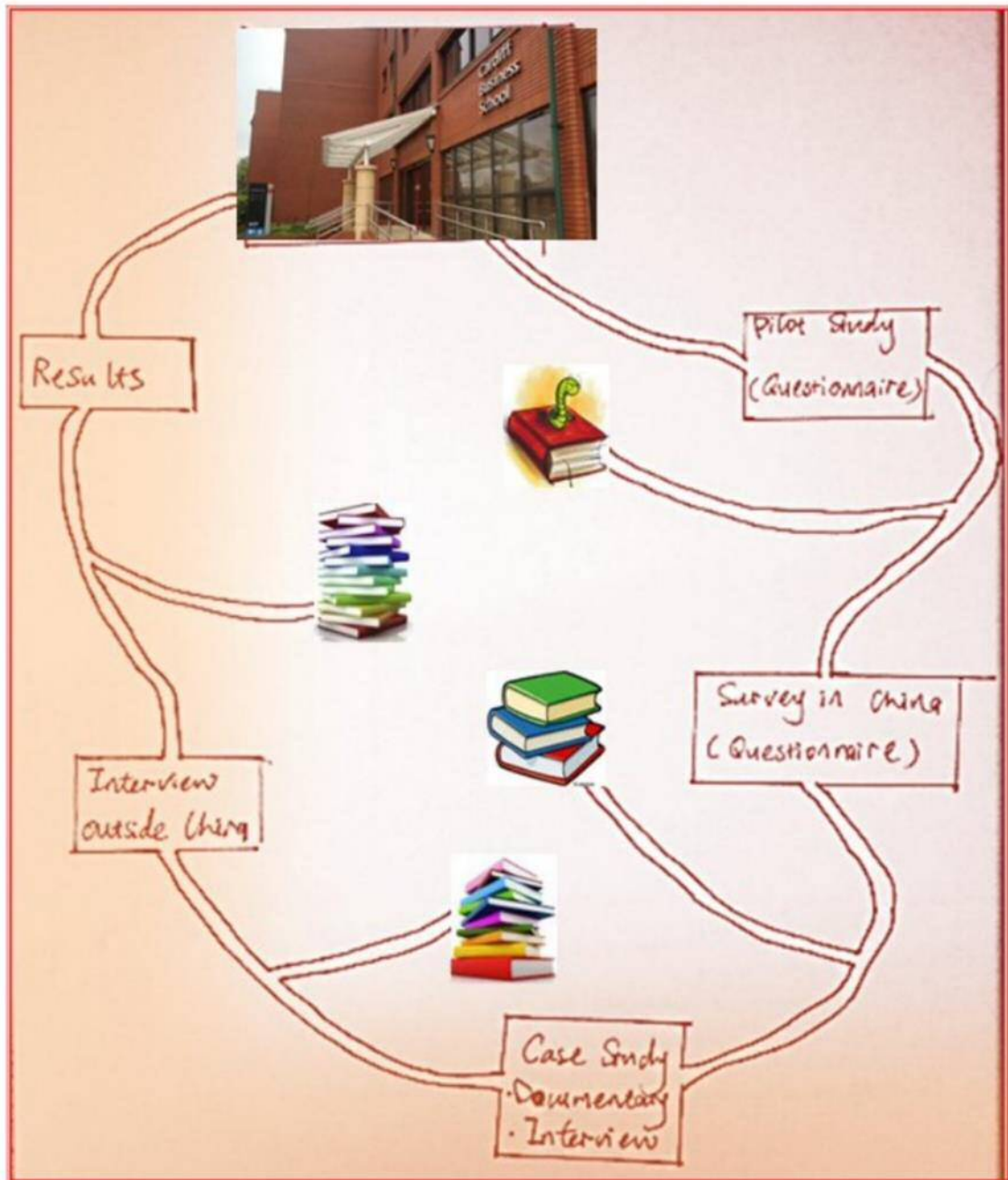
This chapter has provided a detailed explanation of the methodological approach used in the current study. The philosophical stance adopted is critical realism and, accordingly, research design includes a development, mixed-method approach which integrates quantitative and qualitative evidence to investigate the research topic. In coherence with the methodological approach, questionnaire survey and multiple case studies were adopted with comprehensive justification of logic of inquiry, research processes, data analysis, results validity and reliability. The following chapters (Chapters 5, 6, and 7) will present the results of findings from empirical studies.



## Self-reflection I

Methodology and research design for the PhD program in MSc Social Science Research Method in 2013-2014

### Methodology



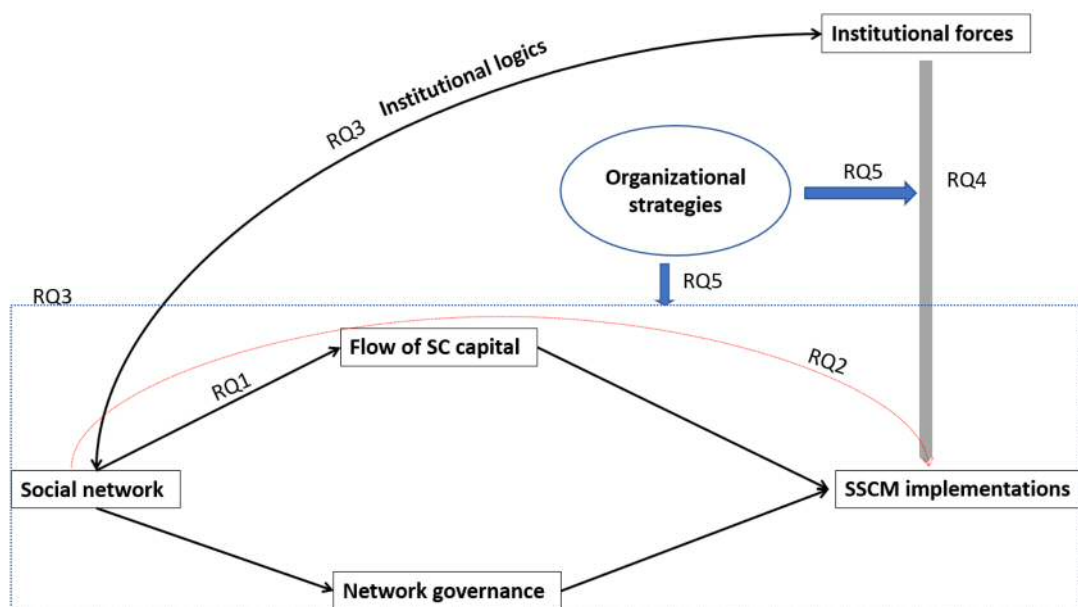
# Chapter 4 CONCEPTUAL MODEL BUILDING & DESCRIPTIVE ANALYSIS OF THE DATA

## 4.1 Introduction

This chapter aims to build the conceptual model for SEM testing and to summarize the basic statistics relating to the respondents' demographic profile. The Statistical Package for Social Science (SPSS) version 20 and R were used for the descriptive analysis of the data. Data preparation and screening is also carried out in this chapter before structural analysis of the model (Chapter 5).

The chapter is structured in the following sections. First, the conceptual model and hypotheses are proposed in the survey tests. Second, details of data collection are described; then, descriptive data of the sample are presented to understand the demography of the respondents. Finally, the data preparation and screening procedures are presented and discussed, including the detection of outliers and normality investigation.

## 4.2 Conceptual model and hypotheses building



As mentioned in the methodology chapter (Chapter 4), the purpose of adopting the survey is to build the relationship between social network and sustainable SCM. Therefore, reflecting the theoretical framework, this section is set to answer research questions RQ1 and RQ2 (Table 4.1). Consequently, the conceptual framework and hypotheses were developed accordingly.

Table 4.1 Research development I

RQs	Hypotheses	Examples of survey question	Locations
RQ1: How are flows of supply chain capital influenced in social networks?	H2: Relational <i>guanxi</i> between a buyer and a major supplier enhance effective flow of supply chain financial, human and social capital.	Good <i>guanxi</i> with partners leads to improving alliances and integration with supply chain partners	Chapter 2, Chapter 3, Chapter 5, Chapter 6, Chapter 7, Chapter 8
RQ2: What are the relationships between social networks, sustainable SCM implementations and sustainable SCM performance?	H1: <i>Guanxi</i> networks have a positive impact on sustainable SCM implementation.  H3A: Flow of supply chain capital positively impacts implementation of sustainable SCM.  <i>H3B: Effective flow of supply chain capital increases performance of sustainable SCM.</i>  <i>H4: Improved sustainable SCM implementation positively increases/ improves performance in sustainable SCM.</i>	Good <i>guanxi</i> with partners leads to increasing commitment to environmental SCM from managers;  Good <i>guanxi</i> with partners leads to ensuring our counterparts pay their workers a living wage;	Chapter 3, Chapter 5, Chapter 6, Chapter 8

Source: Author

#### **4.2.1 A relational view of *guanxi* in sustainable SCM**

In the literature review chapter (Chapter 3), the study has investigated the current research of sustainable SCM, constructs of *guanxi*, influence of *guanxi* networks in SCM, and social network theory and the study of *guanxi* in social networks. In the SCM literature, *guanxi* has been studied in terms of its contribution to various aspects. For example, Cai and Yang (2014) argued that there is a U-shaped relationship between *guanxi* and information and skills acquisition. In strong ties where *guanxi* is prevalent, interpersonal communication and exchange are critical for maintaining relational ties, as well as for business transactions. Information and skill acquisition are transferred largely through interpersonal discussions. In weak ties, actors tend to avoid irrelevant discussions, which reduces the noise of acquiring overloaded information, but blocks the flow of exchanging reciprocity and loses the chance to obtain and share useful information and skills. Jia and Jia and Zsidisin (2014) also proposed that by following the rule of *renqing* and *xinren*, Chinese buyers and suppliers highlight trust at personal and social network levels for managing supply relational risk. In addition, *guanxi* impacts on effective supply chain relationships and drives economic performance improvement, including a reduction in transaction costs (Kong, 2011), increased market performance (Luo, Shenkar and Nyaw, 2002; Li and Sheng, 2011) and financial profitability (Abramson and Ai, 1997; Tian, Song and Tian, 2012). Little is known about the role of *guanxi*, from a social network view, in sustainable SCM implementation with consideration of all dimensions, although some researchers have explored the impact of *guanxi* on social and environmental responsibilities. Thus, the present study aims to fill the research gap on the impact of *guanxi* networks on sustainable SCM implementation; hypotheses are proposed that:

***H<sub>1A</sub>: Guanxi networks have a positive impact on sustainable SCM implementation.***

***H<sub>1B</sub>: Guanxi networks have a positive impact on sustainable SCM performance.***

#### **4.2.2 Flow of supply chain capital**

Chapter 2 has systematically reviewed the influence of the flow of supply chain capital in social networks and has built the theoretical framework from a social network perspective. This section, based on the theoretical framework, attempts to operationalise each form of capital according to results from the systematic literature review and quantify the relationships between social networks and flow of supply chain capital.

Max Webber is acknowledged for the argument of inter-subjectivity orientation which highlights how social actors 'orient their course of action to the action of others' (Boden, 1994, p.27). Equally, for sustainable practices, the compliance of organizations with corporate codes of conduct are oriented by social adaptation as a flow, rather than to any fixed, centralised operation. Unarguably, human acts are transformed into social facts (Weber, 1964) and no single organization is operated without human involvement. Thus, to some extent 'organizations are operating in an interpersonal mode virtually all the time' (Boden, 1994, p.29). Any supply chain comprises various organizations, regardless of their roles and positions in the value chain, either as customer or supplier. Therefore, we can argue that supply chain activities are transformed by human actions and flow of social adaptation.

SCM researchers tend to examine network relationships between buyer and suppliers, relational ties and performance (Wichmann and Kaufmann); for example, Zhou et al. (2014) investigated the strength of relational ties between buyer and supplier and the impact of

acquisition of knowledge. Extension of the current literature, according to (Burt, 1992), encompasses the spread of a social network generating essential capital, including financial capital (e.g. cash, investments, and lines of credit), human capital (i.e. a combination of natural abilities and required skills), and social capital (i.e. through friends and general contacts to receive opportunities to use financial and human capital). Diffusion and acquisition of knowledge is regarded as the flow of human capital in supply chain, whereas, *guanxi* networks between buyers and major suppliers theoretically integrate financial and social capital as well.

*Guanxi* networks are often claimed to generate social capital to cope with relational risks (Jia and Zsidisin, 2014) and improve the relationship quality between buyers and suppliers, between firms and employees, and among employees, so as to reduce conflict (Chen et al., 2011) and increase collaborative behaviour (Cheng, 2011). Depending on the level of *guanxi* and individuals' social position, strong ties enhance social capital flow within players with a high degree of psychological commitment, featuring exchange of *ganqing* (emotional closeness), *renqing* (reciprocity) and *xinren* (trust). Therefore, *guanxi* networks are claimed to serve as managerial ties (Kong, 2011) to reduce opportunistic behaviour diversification from suppliers (Yen and Barnes, 2011), consequently, building collaboration relationships and increasing long-term strategic planning (Cai et al., 2010).

*Guanxi* networks are significant in enhancing financial capital flow. Transaction costs can be reduced by having a more balanced distribution of power between customers and suppliers (Cui et al., 2013; Nie et al., 2011; Yang and Wang, 2011). High-quality production and superior services are provided from suppliers to customers (Chen and Wu, 2011; Luo, Huang

and Wang, 2012) stemming from the expectation of achieving mutual benefits. Trustworthy information and opportunities are shared and diffused among *guanxi* players to obtain further business opportunities (Cai and Yang, 2014). Furthermore, high-quality production and superior services are ensured from employees and suppliers (Chen and Wu, 2011), stemming from the expectation of obtaining mutual help when needed.

When people embrace similarities and expertise, *guanxi* members tend to share professional knowledge and expertise when working on similar duties (Hom and Xiao, 2011). This leads to improvement in human capital through effective diffusion of knowledge; thus, to advance, information, concepts, and feasible skills are shared and promoted to drive long-term mutual benefits for network members. Increased improvement in human capital flow results in more efficient use of natural resources capital. Therefore:

***H<sub>2</sub>: Relational guanxi between a buyer and a major supplier enhances efficient flow of supply chain financial, human and social capital.***

The importance of building capital has been highlighted in economic growth and sustainable development contexts (Victor, 1991; Rennings and Wiggering, 1997; Reynolds, Farley and Huber, 2010). From an economics perspective, sustainability is the maintenance or increase in the total stock of various types of capital for future generations, to increase the structure of capabilities for an individual or society to adapt to a variety of external constraints (Lehtonen, 2004). Here, we also argue that effective enhancement of supply chain capital flow can increase and improve the capabilities organisations have when implementing sustainable SCM. Rydin and Holman (2004) have explained how social capital can contribute to sustainable practices by considering the beneficial effects of common norms, trusts and

reciprocation. He argues that the use of social capital is for dealing with 'collective action problems' (p.127) in achieving sustainable practices and reducing transactions costs. In buyer and supplier relationships, social capital is necessary to assure long-term collaboration for the adoption of sustainable practices (Cheng, 2011; Luo *et al.*, 2015b).

In social networks, financial capital flow is significant in ensuring efficient cash flow and effective SCM activities, including procurement (Sternquist and Wang, 2010), production (Wong, 2010), logistics and transportation (Li and Lin, 2006), to support investment in sustainable practices. In addition, Busse *et al.* (2016) Busse *et al.* (2016) have identified three clusters of remedies that buyers can employ to make suppliers more sustainable, including establishment of effective joint communication, promotion of interactive organisational culture, and fostering cross-contextual understanding. In this study, we argue that these clusters of remedies are embedded in social capital and based on the expectation of effective flow of financial capital in supply chains. In business environments, building and extending social networks are costly in terms of time and effort. The underlying motivation is economic and benefit driven, which reflects the argument that economic action is embedded in social networks (Granovetter, 1992). Therefore, sustaining *guanxi* networks with buyers/suppliers to obtain financial flow, the counterparts intentionally do what is expected in environmental and social practices, such as cooperation between buyer and supplier in dealing with sustainable issues, auditing and working together to improve sustainable practices in the supply chain.

High stock of human capital can transform manufacturing inputs into products and services with the efficient use of natural resources. Researchers, such as Russell and Hoag (2004),



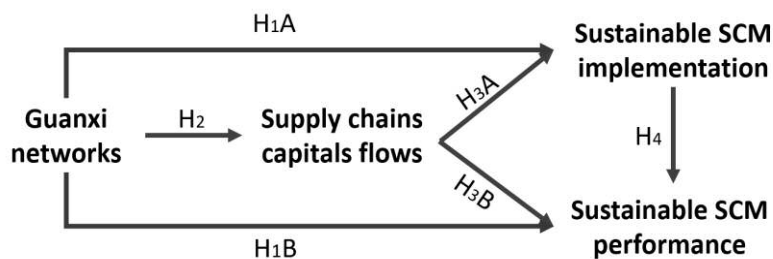
Cantor *et al.*, (2013), Cheng (2011), have indicated the significance of facilitating advanced information and knowledge between both individual and organizational relationships to achieve sustainable practice. Discussions have covered the impact of guanxi networks on human capital in supply chains and the role of information technology and professional knowledge as a communication process relying on human interactions and network diffusions (Russell and Hoag, 2004). Based on these justifications, hypotheses are proposed that (Figure 4.1):

***H<sub>3A</sub>: Flow of supply chain capital positively impacts on implementation of sustainable SCM.***

***H<sub>3B</sub>: Effective flow of supply chain capital increases performance of sustainable SCM.***

***H<sub>4</sub>: Improved sustainable SCM implementation positively increases/improves performance in sustainable SCM.***

Figure 4.1 Conceptual framework



Source: Author

#### 4.2.3 Control variables

Since it is assumed that large organizations could obtain extra resources and capital for investing in sustainable SCM, demographic information, including firm size, was set as one of the control variables, represented as question indicating the number of full-time

employees (Zhu and Sarkis 2004). Additionally, research interests also arise to investigate whether different respondents' position (e.g. entrepreneur and senior manager) and firm Ownership might affect the model result, since a previous study interpreted the use of *guanxi* as a managerial tool in different Ownerships (e.g. Xin and Pearce, 1996). Therefore, the variables of respondents' position and firm type were included as control variables.

### **4.3 Data collection**

The survey was administrated online to collect data in this study because this provides a greater opportunity to distribute questionnaires to otherwise difficult-to-reach populations (Aust et al., 2012; Reips & Buffardi, 2012). Therefore, it was essential to clarify the population of this study in order to obtain the most relevant data. To do so, in the invitation letter attached as the introduction page in the online survey, it was clearly stated that 'If you work in a company involving buying and/or selling, and you acknowledge supply chain related activities in your company, including procurement, production, logistics, information sharing and supplier/customer management, risk management, knowledge transfer and sharing, can you please fill this questionnaire?'

The revised survey was then published online ([www.lediaochao.com](http://www.lediaochao.com)). The barcode of the website for the survey was then copied and sent to practitioners by snowball sampling method. Wasserman and Faust (1994) suggest to apply snowball sampling when the network boundary is unknown. Wasserman and Faust (1994) suggest to apply snowball sampling when the network boundary is unknown. Although it is not the purpose of this study to identify network structure, this approach encouraged us to diffuse the survey to an unreachable sample by taking advantage of social network power. The distribution of the

survey began with academic researchers and company consultants who posted the barcode in their professional networks (weChat), MBA courses (where students are managers in companies) and/or consultant programs where they delivered consultancy to companies. The sample groups were also asked to send the barcode to other relevant practitioners in their connections. The questionnaires were answered anonymously for ethical concerns; therefore, as analysed by Wichmann *et al.* (2016)Wichmann *et al.* (2016), due to the complexity of the nature of the network, in particular, it was challenging to collect connected data from each single dyadic tie and identify the dyadic relationships between buyers and suppliers. As a solution, the questionnaire includes a question on whether the respondent is a buyer or a supplier, to compare and contrast the moderating effects.

#### **4.4 Descriptive analysis**

##### **4.4.1 Response Rate and Non-response bias**

In total, 2,565 people clicked on the survey front page after two rounds of reminders were sent. Of those, 590 completed the whole survey, giving a 23.0% response rate. After checking the quality and validity of each response, including serving IP, usage of time to finish and sequence of responding answers, the number of usable completed questionnaires was 476, a response rate of 18.6%.

To test the non-response bias, the first 10 percent of returned questionnaires (1:50) were considered as early respondents and the final 10% of returned questionnaires were considered late respondents (426:476). Independent sample t-tests were run in R to determine whether significant differences existed between the two groups of variables. The results showed that there were no significant differences in most of the response patterns

of early and late respondents (Table 4.2), suggesting that non-response bias is not a problem in the present study.

Table 4.2 Non-response bias tests

social networks-supply chain capitals									
	F1	F2	F3	F4	F5	F6	F7		
p-value	0.43	0.51	0.67	0.59	0.07	0.08	0.06		
	S1	S2	S3	S4	S5	S6			
p-value	0.44	0.18	0.19	0.17	0.73	0.3			
	H1	H2	H3	H4	H5				
p-value	0.14	0.31	0.38	0.54	0.67				
social networks- sustainable SCM									
	Env1	Env2	Env3	Env4	Env5	Env6	Env7		
p-value	0.1	0.37	0.61	0.8	0.61	0.87	0.39		
	Soc1	Soc2	Soc3	Soc4	Soc5	Soc6	Soc7	Soc8	Soc9
p-value	0.76	0.81	0.54	0.83	0.61	0.44	0.99	0.16	0.54
social networks-SSCP									
	EcoP1	EcoP2	EcoP3	EcoP4	EcoP5	EcoP6	EcoP7	EcoP8	
p-value	0.21	0.17	0.65	0.53	0.43	0.27	0.31	0.33	
	EnvP1	EnvP2	EnvP3	EnvP4	EnvP5	EnvP6	EnvP7	EnvP8	EnvP9
p-value	0.59	0.53	0.49	0.49	0.44	0.68	0.64	0.87	0.61
	SocP1	SocP2	SocP3	SocP4	SocP5	SocP6	SocP7	SocP8	SocP9
p-value	0.31	0.96	0.62	0.08	0.31	0.07	0.85	0.29	0.61

Source: Author

#### 4.4.2 Overall demographic profile of the sample

The demographic profile of the survey respondents is summarized in Table 4.3. Of the total respondents, approximately 80% identified themselves as company managers (Junior manager, middle manager and senior manager), whereas only 9.2% of the sample represented general staff. The number of representatives from buyer or supplier companies appeared with similar distribution, with 52.1% versus 47.9%. Private and nationally owned

companies were mainly distributed with 72% of total. In other words, 28% of the respondents worked in non-Chinese companies. In terms of industry, this sample shows a wide variety of industrial sectors. Over 22% of the respondents were in the manufacturing sector, including electronic manufacturing (50.5%), food manufacturing (18.3%), apparel manufacturing (19%), and automatic manufacturing (16.5%). Service sector includes banking and finance (12.2%), logistics providers (5%), software and IT companies (2.7%). High representation of manufacturing and service sector in the sample could significantly influence the statistical results.

Table 4.3 Overall demographic profile of the sample

Demographic Variables	Research Sample(n=476)	
	Frequency	Percentage (%)
<b>Positions</b>		
Entrepreneur/Executive	11	2.3%
General Managers	37	7.7%
Director/Senior Managers	132	27.7%
Middle Managers	157	33.0%
Junior Managers	95	20.0%
Operating staff	44	9.2%
<b>Buyer/Supplier</b>		
Buyer	248	52.1%
Supplier	228	47.9%
<b>Firm types (Ownership)</b>		
Privately owned	196	41.2%
Nationally Owned	146	30.7%
Foreign	78	16.4%
Joint venture	29	6.1
Multinational companies	27	5.6%
<b>Industries</b>		
Manufacturing	109	22.8%
Service	96	20.1%
Retail trade	47	9.8%
Construction	44	9.2
Whole sale	44	9.2%
Other	148	31.2%

Source: Author

#### **4.4.3. Descriptive analysis of the responses to the questionnaire items**

This section focuses on how the respondents answered the survey questions relating to the construct of the research model (supply chain capital, sustainable SCM implementation, sustainable SCM performance). Table 4.4 presents the questionnaire items in terms of all the measures of the study and their mean and standard deviation (SD). Responses to all the items were on a five-point Likert scale in which 1 = 'Strongly disagree' and 5 = 'Strongly agree'.

Table 4.4 Questionnaire items and descriptive statistics

<b>Construct</b>	<b>Items</b>	<b>Description</b>	<b>Mean</b>	<b>SD</b>
<b>Supply chain capital</b>				
Financial capital	F1	Improving quality of sourcing network	3.567	0.771
	F2	Sharing forecasting information with supply chain partners	3.626	0.686
	F3	Improving strategic procurement	3.515	0.733
	F4	Sharing production information between the company and its major supplier/buyer	3.506	0.736
	F5	Improving product quality	3.471	0.757
	F6	Reducing average investment in purchased parts inventory	3.248	0.834
	F7	Increasing new business opportunities through the social networks	3.305	0.814
Human capital	H1	Reducing lead time	3.429	0.79
	H2	Improving delivery reliability	3.338	0.816
	H3	Technical support to improve supply chain practicing processes (e.g. production, delivery, inventory)	3.452	0.748
	H4	Knowledge sharing about customers	3.359	0.767
	H5	Enhancing logistics management capability	3.447	0.739
Social capital	S1	Increasing new business opportunities through the social network	3.382	0.771
	S2	Reducing demand and supply uncertainty	3.643	0.679
	S3	Committing to close buyer-supplier relationships	3.634	0.708
	S4	An expectation of long-term buyer-supplier relationships	3.63	0.724
	S5	Proprietary information being provided if it can help the other party	3.42	0.745
	S6	Reducing the power asymmetry between buyer and supplier	3.561	0.716
<b>Sustainable SCM</b>				
Environmental practices	Env1	Increasing commitment to environmental SCM from managers	3.567	0.771
	Env2	Providing design specification from buyers to suppliers that includes environmental requirements for purchased item	3.626	0.686
	Env3	Increasing cooperation between buyers and suppliers to meet environmental objectives	3.515	0.733
	Env4	Providing environmental audit for the internal management of buyers or suppliers	3.506	0.736
	Env5	Working together to upgrade technology to deal with environmental issues	3.471	0.757
	Env6	Cooperating to imply and enforce the formal environmental policymaking system	3.248	0.834
	Env7	Requiring ISO14000 certification for buyers or suppliers	3.305	0.814
Social practices	Soc1	Encouraging a better work/life balance across the supply with counterparts	3.429	0.79
	Soc2	Introducing employee health and safety compliance and auditing systems with counterparts	3.338	0.816
	Soc3	Helping counterpart company to obtain health & security certificate	3.452	0.748



	Soc4	Increasing transparency within the <i>guanxi</i> network in supply chain practices	3.359	0.767
	Soc5	Ensuring our counterparts do not use child labour or forced labour	3.447	0.739
	Soc6	Ensuring our counterparts pay their worker a living wage	3.382	0.771
	Soc7	Ensuring our counterparts have regulated over-time wage	3.643	0.679
	Soc8	Ensuring our counterparts do not discriminate against its own workers	3.634	0.708
	Soc9	Ensuring that our counterparts provide a healthy and safe working environment for their employees	3.63	0.724
<b>Sustainable SCM Performance</b>				
Economic performance	Ecop1	Supply chain total costs	3.443	0.657
	Ecop2	Investment for helping major supplier/customers to implement SSCM	3.458	0.606
	Ecop3	Operational costs	3.41	0.627
	Ecop4	Training costs	3.328	0.64
	Ecop5	Costs for purchasing environmentally friendly materials	3.349	0.646
	Ecop6	Costs of maintaining good <i>guanxi</i>	3.565	0.65
	Ecop7	Profits	3.42	0.612
	Ecop8	Market share	3.414	0.651
Environmental performance	Envp1	Air emissions	3.191	0.622
	Envp2	Waste water	3.202	0.559
	Envp3	Solid wastes	3.197	0.597
	Envp4	Consumption of natural resources	3.185	0.598
	Envp5	Consumption of hazardous/harmful/toxic materials	3.204	0.568
	Envp6	Flexibility to react to national and international environmental requirements	3.214	0.612
	Envp7	Flexibility to react to counterpart's environmental requirements	3.296	0.597
	Envp8	Frequency of environmental accidents	3.277	0.583
	Envp9	Air emissions	3.246	0.580
Social performance	Socp1	Health risks for consumers	3.321	0.584
	Socp2	Health and safety hazards for employees	3.315	0.603
	Socp3	Monitoring safety in your counterpart's operation suppliers' operation	3.307	0.604
	Socp4	Unethical activities within the supply chain, such as using child labour	3.229	0.739
	Socp5	Level of equality and fairness throughout the supply chain	3.319	0.692
	Socp6	Level of volunteers at local charities	3.284	0.589
	Socp7	Counterpart's knowledge and skills of SSCM	3.414	0.632
	Socp8	Gift giving, bribery between company representatives and partner companies	3.17	0.761

Table 4.4 shows that respondents have moderately high levels of flow of supply chain capital (i.e. financial, human and social capital), typical in social capital where the average mean value is approximately 3.6, above the medium value of 3. This indicates more than an average number of respondents agreed with the positive influence of *guanxi* networks in increasing the flow of financial, human and social capital in supply chains. Small values of standard deviation show small variation in the respondents' answers to these questions; in other words, respondents held similar viewpoints to the answers. Similar findings were given by the respondents to the questions representing environmental and social responsibilities, apart from the question of Env6, given a mean value less than 3.3. Finally, the findings in Table 5.4 show that the means of all the items measuring economic, environmental and social performance in SCM were above the midpoint of the scale (i.e. 3). This indicates that, on average, the respondents admitted the significant influence of *guanxi* networks. The findings also show that the means of the values in economic performance were higher than environmental and social performances.

#### **4.5 Data preparation and screening**

It is crucial to undertake the processes of data preparation and screening when applying SEM for reducing bias and non-significance in the results (Kline, 2005; Hair et al., 2010). There are different factors to consider, including missing data, outliers, and normality.

Due to the fact that the online system (<http://www.lediaocha.com>) only allows a survey to be submitted when it is completed, missing data is, therefore, not an issue to manage in this study.

**Outliers** can result from several reasons, such as errors in data collection or entry, errors in sampling, motivated misreporting and respondent intention. According to Garson (2012), outliers could be univariate or multivariate. *Univariate outliers* are data points with extreme values regarding a single variable. In this study, the variables were measured by using a five-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. Therefore, the answers of 'strongly agree' and 'strongly disagree', even though they might cause extreme points of scale, are not large concerns in this study. Multivariate outliers are data points with extreme values regarding multiple variables (Garson, 2013).

In this study, the Mahalanobis  $D^2$  was measured in AMOS and a number of extreme observations were found. However, according to Stoimenova, Mateev and Dobrova (2006), observations with  $D^2$  probabilities of 0.001 are not necessarily outliers, which can feature in the data distribution, and Hair et al. (2010) argued that even deleting outliers might improve the multivariate analysis but increase the risk of limiting generalizability. Therefore, the researcher decided not to delete the outliers as the presence of a few outliers in a large sample is not a major concern, as suggested by Kline (2005).

**Normality** refers to the extent to which the distribution of the sample data corresponds to the normal distribution (Hair et al., 2010). Screening the data for univariate normality is a common, while important, approach to help inform whether multivariate normality might be a problem (Weston *et al.*, 2008; Hair et al., 2010). If univariate normality is achieved, then multivariate normality can be assumed (Jayaram and Baker, 2008; Weston et al., 2008).

Normality can be measured by checking with skewness and kurtosis of the variables. *Skewness* is the degree of symmetry of a distribution around the mean. In a positively skewed distribution, the long tail of the distribution is toward the right, or vice versa. *Kurtosis* is reflected BY the flatness or peakedness of a distribution compared to the normal distribution (Hair et al., 2010). A positive kurtosis explains that the distribution is more peaked than the normal distribution, or vice versa.

Table 4.5 Normality of the data

		Item	Skewnes	Kurtosi			Items	Skewnes	Kurtosi
		s	s	s			s	s	s
<b>Supply chain capital</b>	<b>Financial capital</b>	F1	-.898	.991	<b>Sustainable SCM performance</b>	<b>Economic performance</b>	Ecop 1	-.614	.929
		F2	-.719	.494			Ecop 2	-.2116	.344
		F3	-.874	.626			Ecop 3	-.275	.239
		F4	-.853	.614			Ecop 4	-.229	1.396
		F5	-.532	-.050			Ecop 5	-.254	.872
		F6	-.500	-.091			Ecop 6	-.125	.433
		F7	-.914	1.298			Ecop 7	-.102	.365
	<b>Human capital</b>	H1	-.751	.510			Ecop 8	-.228	1.059
		H2	-.677	.113		<b>Environmental performance</b>	Envp 1	-.172	2.021
		H3	-.498	-.004			Envp 2	.635	1.642
		H4	-.723	.495			Envp 3	.548	2.149
		H5	-.563	.056			Envp 4	.436	1.889
	<b>Social capital</b>	S1	-.744	.766			Envp 5	.472	1.228
		S2	-.703	.495			Envp 6	.263	1.804
		S3	-.914	1.154	Envp 7		.403	.664	
S4		-.778	1.131						
<b>Sustainable SCM</b>	<b>Environmental practices</b>	S5	-.1.066	1.630					
		S6	-.538	-.081					
		Env1	-.697	.059					
		Env2	-.505	.082					
		Env3	-.384	-.047					
		Env4	-.283	-.306					
	<b>Social practices</b>	Env5	-.418	.205					
		Env6	-.519	.023					
		Env7	-.350	-0.48					
		Soc1	-.503	.202					
	Soc2	-.474	.073						
	Soc3	-.428	.064						
	Soc4	-.302	.102						
	Soc5	-.116	-.357						

Soc6	-.1.35	-.441
Soc7	-.133	-.388
Soc8	-.209	-.284
Soc9	-.297	-.211

Social performance	Envp	.520	.865
	8		
	Envp	.445	1.370
	9		
	Socp	.111	1.066
	1		
	Socp	.300	.852
	2		
	Socp	.091	.198
	3		
	Socp	-.203	1.612
	4		
	Socp	-.211	.872
	5		
Socp	.260	.982	
6			
Socp	.124	.134	
7			
Socp	.324	.831	
8			
Socp	-.197	.574	
9			

Source: Author

According to Curran, West and Finch (1996), skewness values of less than 2 and kurtosis values of less than 7 indicate that there are no serious violations of the normality. According to Curran, West and Finch (1996), skewness values of less than 2 and kurtosis values of less than 7 indicate that there are no serious violations of the normality. Table 4.5 shows the skewness and kurtosis for the measured items. The results show that all the items in the current study do not have extreme skewness or kurtosis values where all the values for skewness are less than 1, and kurtosis values of less than 3. Furthermore, referring to Hair et al. (2010) and De Vaus (2002), the negative effects of non-normality decrease when data were measured in large sample sizes, in that, with example sizes exceeding 200 (476 in this study), significant departures from normality might have

limited impact on results (De Vaus, 2002; Hair et al., 2010). Therefore, no further treatments of the data were considered.

#### **4.6 Summary**

The first part of this chapter has clarified the conceptual model and hypotheses to be examined in the first part of the empirical study of this work, to develop the discussion of 'what is the relationship between social networks and sustainable SCM implementation' with statistical evidence. There followed a descriptive analysis of the sample and data to provide a general picture of the demographic information and results of answers to the questions. This then provides support for elaborating on discussion of the results analysis. The final section of this chapter has screened data in preparation for the structural model tests.

## **Chapter 5 STRUCTURAL EQUATION MODEL**

### **5.1 Introduction**

This section aims to analyse the conceptual framework with SEM analytical tool. It includes two main parts: evaluating the measurement model and assessing the hypothesized relationships in path analysis. The results were analysed by using AMOS 23 software program with maximum likelihood estimation.

The chapter is organized into five sections: first, confirmatory factor analysis is evaluated; this is followed by evaluation for the validity and reliability of the model. Second, the hypotheses regarding direct relationships are estimated for discussion of the causal effects. In the third section, the results of testing the effects of control variables on positions, firm size and Ownership of firms are presented in the structural model. Fourth, the mediating roles of supply chain capital and sustainable SCM implementation are discussed and evaluated. Following that, the moderating effects of whether firms have previously implemented sustainable SCM and the roles of being a buyer or a supplier have been tested to explore the model further.

### **5.2 Confirmatory factor analysis**

This section is undertaken to evaluate the measurement model by employing confirmatory factor analysis (CFA) to assess the validity, reliability and unidimensionality of the measures. Unlike exploratory factor analysis, researchers using CFA are recommended to have some knowledge of the underlying latent variable structure, and

relationships between the observed measures and underlying factors should be designed by theoretical led and empirical research guidance (Byrne, 2010). To summarize, CFA is a statistical procedure used when researchers have a well-developed theory underlying the measurement model.

When reporting the goodness of fit of a measurement model, Hair et al. (2010) suggested including one absolute fit index and one incremental index, apart from the Chi-square value and the degree of freedom (Chapter 4). In this study, the normed Chi-square ( $\chi^2/df$ ), GFI and RMSEA were reported as absolute fit indices, and the CFI and TLI were reported as incremental fit indices.

The evaluation of the measurement model was conducted in two stages to include assessments of CFA for both individual construct (first order CFA) and the overall measurement model (second order CFA).

### **5.2.1 CFA results for individual constructs**

In this section, results for the CFAs of individual constructs – *guanxi*, supply chain capital, sustainable SCM, and sustainable SCM performance - are discussed and presented. These results will then be used and supported as the basis for constructing the overall measurement model.



### 5.1.1.1 CFA results for *guanxi* between buyer and supplier

A number of scholars claim the benefits deriving from building *guanxi* is trust cultivation between players (Chua and Wellman, 2015; Luo et al., 2015;). However, there is a lack of knowledge for the mechanisms of determining network effectiveness and the relationship between *guanxi* and trust. Therefore, understanding the constructs of *guanxi* networks is important. In this study, the construct items measuring *guanxi* questions were a number of questions included in the online questionnaire, recommended by design according to the published study from Yen et al. (2012), to measure the latent variable of *guanxi* based on *ganqing* (emotional affection), *renqing* (reciprocity) and *xinren* (trust). However, statistical validity of the measurement of *guanxi* (AVE=0.436) was not shown when these three constructs were all included as manifest variables in the model (Table 5.1). There is a significant covariance between *xinren* and *ganqing*, representing M.I.= 40.376 which directly drove the GFI value down to 0.898.

Table 5.1 Including Xinren as a latent variable in the model

	CR	AVE	MSV	MaxR(H)	SSCP	<i>Guanxi</i>	SCcapitals	SSC
<b>SSCP</b>	0.839	0.635	0.315	0.843	<b>0.797</b>			
<b><i>Guanxi</i></b>	0.787	0.436	0.220	0.910	0.360	<b>0.660</b>		
<b>SCcapitals</b>	0.924	0.801	0.506	0.960	0.500	0.469	<b>0.895</b>	
<b>SSC</b>	0.863	0.762	0.506	0.990	0.561	0.357	0.711	<b>0.873</b>

Source: Author

Based on evidence generated from this study, the researcher then argues that *xinren* could not exist independently without *xanqing* or *renqing*, in other words, there is a substantial overlap between *xinren* and *ganqing*, and/or between *xinren* and *renqing*.

The researcher engaged in detailed dialogue on this specific result through in-depth discussions with other professional researchers conducting empirical studies in China. These discussions confirmed similarly inferred results as in this study that trust is embedded in either emotional affections (*ganqing*) or/and obligated reciprocity (*renqing*). Individuals would commit to another individual (emotionally or behaviourally) only when trust is established to some degree. Equally, without exchanging *renqing* or *ganqing*, it is difficult for people to decide whether or not they should take the risk of trusting their counterparts. As a result, the measurement of *guanxi* includes *ganqing* and *renqing* which were measured and the results are shown as Table 5.2.

Table 5.2 CFA results for *guanxi*

Construct	Parcels	Std.Factor Loading	T-value	Cronbach's alpha	Composite reliability	AVE
GX	GQ4	0.68	12.393			
	GQ3	0.67	----	0.797	0.803	0.508
	RQ1	0.83	13.607			
	RQ4	0.59	11.876			
X <sup>2</sup> /df=2.110 GFI=.908 CFI=.944 TLI=.936 RMSEA=.048 PCLOSE=.694						

Source: Author

The fit indices indicate that the measurement model has achieved a fairly good fit with the data (X<sup>2</sup>/df=2.110 GFI=.908 CFI=.944 TLI=.936 RMSEA=.048 PCLOSE=.694). All the parcels have statistically significant relationships with their factors ( $p < 0.001$ ). Although RQ4 has shown a low loading factor for 0.59, the validity of the measurement for *guanxi* has achieved 0.508 ( $> 0.5$ ). The *t*-values are substantive and statistically significant and reliability was achieved with the composite reliability 0.8 ( $> 0.7$ ).

### 5.1.1.2 CFA results for supply chain capital

Supply chain capital was measured by two levels of factor loading. A second-order measurement model of supply chain capital was constituted by three manifest variables: financial capital, social capital and human capital. The result is given in Table 5.3.

Table 5.3 CFA results for supply chain capital.

Construct	First order factors	Std.Factor Loading	T-value			
SCcapital	F6	0.81	16.629			
	F5	0.78	---			
	S4	0.72	12.675			
	S6	0.69	---			
	H1	0.77	---			
	H2	0.8	17.005			
	H3	0.72	15.169			
Construct	Second order factors	Std.Factor Loading	T-value	Cronbach's alpha	Composite reliability	AVE
	Financial	0.92	11.336			
	Social	0.84	---	0.869	0.924	0.801
	Human	0.92	11.302			
X <sup>2</sup> /df=2.110 GFI=.908 CFI=.944 TLI=.936 RMSEA=.048 PCLOSE=.694						

Source: Author

The second-order factor model of supply chain capital was compared with the first-order factor model where seven items were reflective of one latent variable (i.e. supply chain capital). The result shows that the CFA results in second-order model provided a better fit to the data, compared with the first-order model. Consequently, the second-order factor model was used in analysis of the study. Furthermore, the loadings of the three

first-order factors to the second-order factor are very strong, ranging from 0.84 to 0.92 and the t-value are substantive and statistically significant. This indicates, therefore, a very strong relationship between the three first-order factors and the second-order factor, which shows the convergent validity of the postulated second-order model (Koufteros et al., 2009).

#### **5.1.1.3 CFA results for sustainable SCM implementation**

Sustainable SCM implementation was also measured by two levels of factor (Table 5.4). The second-order factors were measured by environmental practices and social practices. Results show good fit of model, with standard factors loading for first order factors all higher than 0.7. Additionally, the convergent validity reliability was high with the AVE 0.863 and composite reliability 0.903. Composite reliability achieved value of 0.762 (>0.6), confirming the homogeneity and internal consistency of the measured construct (Koufteros, 1999).

Table 5.4 CFA results for sustainable SCM implementation

Source: Author

<b>Construct</b>	<b>First order factors</b>	<b>Std.Factor Loading</b>	<b>T-value</b>			
Env	Env3	0.76	---			
	Env4	0.86	18.687			
	Env5	0.82	17.949			
Soc	Soc6	0.92	25.879			
	Soc8	0.88	---			
	Soc4	0.92	13.875			
	Soc5	0.83	22.424			
<b>Construct</b>	<b>Second order factors</b>	<b>Std.Factor Loading</b>	<b>T-value</b>	<b>Cronbach's alpha</b>	<b>Composite reliability</b>	<b>AVE</b>
SSCM	Env	0.99	12.244			
	Soc	0.74	---	0.903	0.762	0.863

#### 5.1.1.4 CFA results for sustainable SCM performance

Similarly, the CFA results for sustainable performance were consistent with two levels of factor loadings (Table 5.5). Standard factors loading values for the first-order factors were substantial. Although Env1 has a loading value of 0.59, t-values for all items were statistically significant and the AVE indicated a modest value of 0.636. Second-order factor was consistent with economic performance, environmental performance, and social performance in supply chains. Furthermore, the factors loading for second order appear to be stronger than the first order, indicating the convergent validity of the constructs and there is a strong relationship between these three dimensions and sustainable SCM performance.

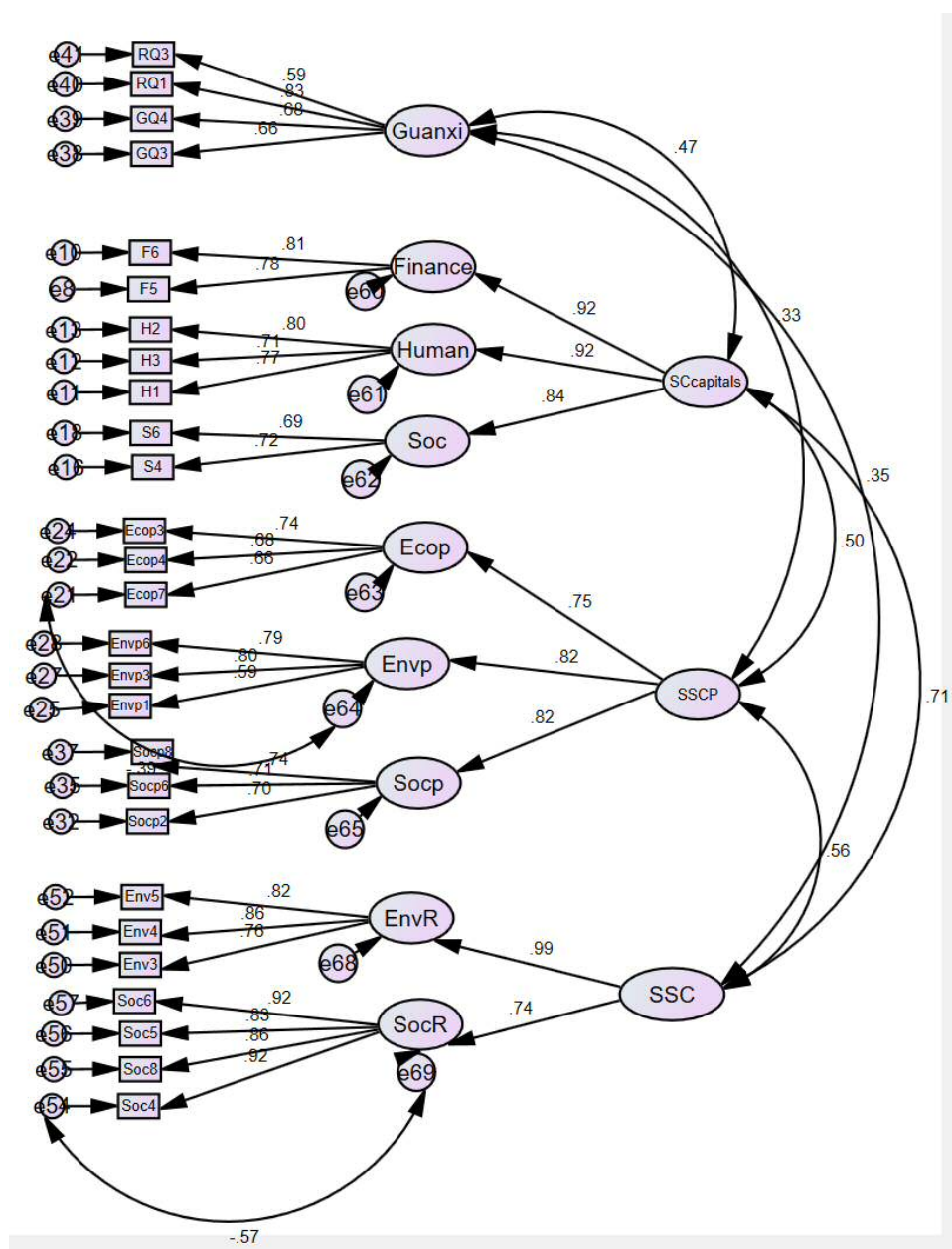
Table 5.5 CFA results for sustainable SCM performance

Construct	First order factors	Std.Factor Loading	T-value			
Ecop	Ecop3	0.74	---			
	Ecop4	0.68	12.313			
	Ecop7	0.66	11.668			
Envp	Envp1	0.59	---			
	Envp3	0.8	12.052			
	Envp6	0.79	11.988			
Socp	Socp2	0.7	12.983			
	Socp6	0.71	13.154			
	Socp8	0.74	---			
Construct	Second order factors	Std.Factor Loading	T-value	Cronbach's alpha	Composite reliability	AVE
SSCP	Ecop	0.75	---			
	Envp	0.82	8.429	0.797	0.84	0.636
	Socp	0.82	9.389			
X <sup>2</sup> /df=2.110 GFI=.908 CFI=.944 TLI=.936 RMSEA=.048 PCLOSE=.694						

### 5.2.2 CFA results for the overall measurement model

The above results of the CFAs of individual constructs were used to justify the construct of the overall measurement model. Superficially, the indicators were retained from the individual constructs CFAs in terms of *guanxi*, supply chain capital, sustainable SCM, sustainable SCM performance. Figure 5.1 shows the overall factors loading for each construct.

Figure 5.1 CFA results for overall model



Source: Author

Overall, all factor loadings in the model were very strong, which means that the measured constructs were explained well by the research questions. Referring to Table 6.5, convergent validity was achieved, since the AVE values of all measured constructs were

over 0.5. Divergent validity was achieved because each MSV value is smaller than the related AVE value, and the same can be said for ASV value shown in Table 5.6.

After running the reliability test in SPSS, the result shows alpha values ranged from 0.797 to 0.903 (Table 6.1 to Table 6.4), indicating that the items measured in the model are highly reliable. However, a major criticism with coefficient alpha concerns the positive relationship with the number of scale items; that is, increasing the number of the scale items could drive higher value of Cronbach's alpha (Hair et al., 2010). Therefore, AVE and Composite Reliability, which take into account the homogeneity and internal consistency of the measured construct (Koufteros, 1999) are adopted to overcome this issue. Values of 0.6 or above in Composite Reliability are usually acceptable (Bagozzi and Yi, 1988). Composite Reliability values calculated for each of the constructs were from 0.8 to 0.9. The conclusion drawn was that the measured model achieved sufficient reliability. (Bagozzi and Yi, 1988). Composite Reliability values calculated for each of the constructs were from 0.8 to 0.9. The conclusion drawn was that the measured model achieved sufficient reliability.

Unidimensionality for the overall model was determined by the goodness-of-fit indices. The fit indices indicate that the measurement model achieved a good fit with the data ( $\chi^2/df=2.045$  GFI=.912 CFI=.946 TLI=.947 RMSEA=.047 PCLOSE=.831).



Table 5.6 Validity and reliability results

	<b>CR</b>	<b>AVE</b>	<b>MSV</b>	<b>MaxR(H)</b>	<b>SSCP</b>	<i>Guanxi</i>	<b>SCcapital</b>	<b>SSC</b>
<b>SSCP</b>	0.840	0.636	0.315	0.844	<b>0.798</b>			
<i>Guanxi</i>	0.803	0.508	0.212	0.909	0.341	<b>0.712</b>		
<b>SCcapital</b>	0.924	0.801	0.506	0.960	0.499	0.460	<b>0.895</b>	
<b>SSC</b>	0.863	0.762	0.506	0.990	0.561	0.348	0.711	<b>0.873</b>

Source: Author

### 5.2.3 Common method bias

Since the focus of this research is on the impact of interpersonal relationships with buyers/suppliers on sustainable SCM implementations and performance, the unit of analysis is individual relational ties. Although no attempt was made to collect cross-validated data, often questionnaires were collected from the same companies, which could be identified from the same IP address shown in the full version of the report provided from the website server. Hence, the data gathered during surveys were not reliant solely on a single response from each of the participating companies and common method bias was controlled.

Furthermore, Harman's single factor test was also run in SPSS to statistically test whether common method bias exists, as suggested by Podsakoff and Organ (1986). As a result, 31.472% (<50%) of variance was reported in the extraction sums of squared loadings, concluding that although there is considerable variance explained by a single factor, it is not a major cause of common method bias.

This study also followed the procedure suggested by Paulraj et al. (2008). With this approach, two different latent-variable models were tested, including a measurement

model containing only the traits (multiple factors) and another measurement model containing an additional method factor with the traits (Podsakoff et al., 2003). The factor loadings were similar between the two models, and the t-values remained significant. Furthermore, the results indicated that the method factor marginally improved the model fit (GFI by 0.026, CFI by 0.027, and NFI by 0,019), accounting for 10.9% of the total variance.

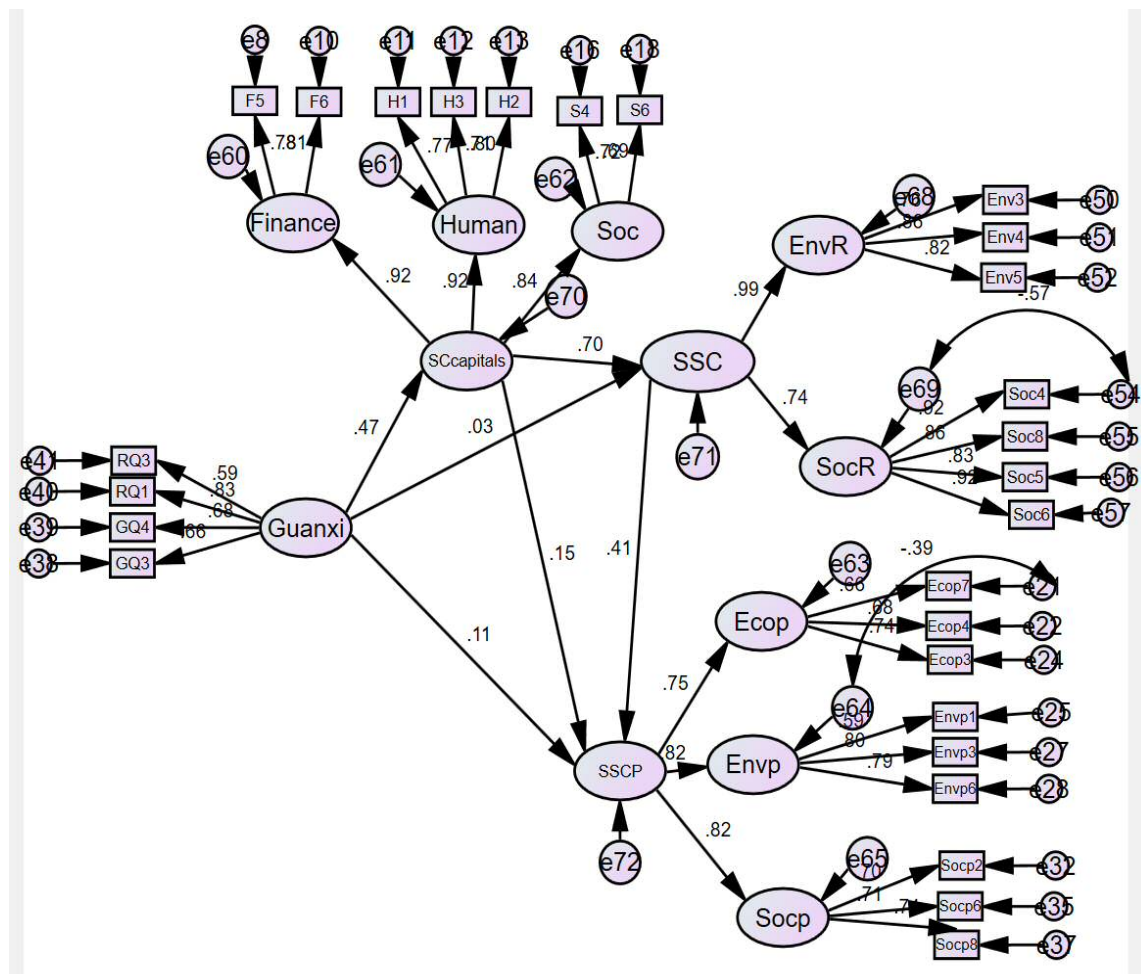
To further diagnose the common method bias, this study employed the marker-variable method to further assess the potential common-method bias (Podsakoff et al., 2003; Lindell & Whitney, 2001). A marker variable is suggested as a variable that is theoretically unrelated to at least one variable in the model, and in this study, the types of sustainability practices were selected like this one. After computing the test in AMOS, the common-method bias decreased to 2.2%. Considering these different tests, it can be concluded that the results of this study were not inflated due to the existence of common-method variance in the data. Therefore, social disability bias is not considered to trigger the results findings in the model either.

### **5.3 Structural model**

In the study, the proposed model constitutes four latent constructs, of which one is exogenous (*guanxi*) variables and the rest are endogenous variables (i.e. supply chain capital, sustainable SCM and sustainable SCM performance). Figure 5.2 presents the structural equation model, the proposed relationships among the constructs. The goodness of fit of our model is R-square =629.989 with a degree of freedom=308,

RMSEA=0.047, PCLOSE=0.831, NFI=0.901, IFI=0.947, TLI=0.939, CFI=0.946, GFI=0.912, AGFI=0.892 and PGFI=0.743. These indices show a good model fit, better than the commonly acceptable goodness of fit recommended by Hu and Bentler (1999) and Shah and Goldstein (2006, p. 105).

Figure 5.2 Structural equation model of the study



Source: Author

The results obtained from testing the model hypotheses are shown in Table 5.7. Hypothesis 1 investigated the relationship among *guanxi*, sustainable SCM and sustainable SCM performance. It was hypothesized to be a positive relationship, while

the results demonstrated that neither the causal relationships from *guanxi* to sustainable SCM nor to sustainable SCM performance is significant with p-value larger than 0.05.

Hypothesis 2 attempted to examine the relationship between *guanxi* and supply chain capital flow and results show a strong statistical finding. This then supports the finding for hypothesis 3a that in *guanxi* networks, the flow of supply chain capital positively influences the implementation of sustainable SCM. However, hypothesis 3b is not supported, which investigated the impact of flow of supply chain capital on sustainable SCM performance. Hypothesis 4 investigated the relationship between sustainable SCM and sustainable SCM performance, and the result is significantly positive in the proposed model.

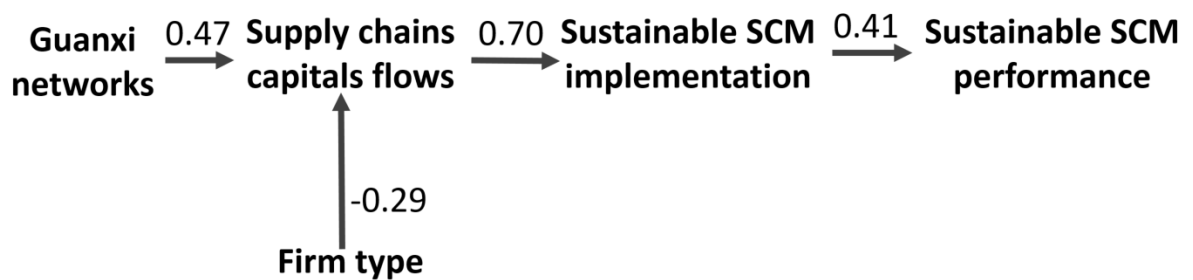
Table 5.7 SEM results

Hypothesis	Hypothesized relationship	Unstandardized coefficient	Standardized coefficient	t-value	p-value	Results
H <sub>1</sub> A	<i>Guanxi</i> - SSCM	0.03	0.03	1.477	.140	<b>Not Supported</b>
H <sub>1</sub> B	<i>Guanxi</i> -SSCP	0.07	0.11	1.84	0.07	<b>Not Supported</b>
H <sub>2</sub>	<i>Guanxi</i> -SC capital flow	0.35	0.47	7.08	0.00	Supported
H <sub>3</sub> A	<i>Guanxi</i> -SC capital flow-SSCM	0.94	0.70	8.47	0.00	Supported
H <sub>3</sub> B	<i>Guanxi</i> -SC capital flow-SSCP	0.12	0.15	1.67	0.09	<b>Not Supported</b>
H <sub>4</sub>	<i>Guanxi</i> -SC capital flow-SSCM-SSCP	0.25	0.41	4.67	0.00	Supported

## 5.4 Control variables

After running the tests, the positions of respondents working in companies and firm size of companies did not confound the relationships we specified in the model. However, Ownership of firm (represented as 'firm type' in the designed question) where respondents work does confound the increased flow of supply chain capital in *guanxi* networks between buyers and suppliers. A negative relationship in this case indicates that *guanxi* networks tend to show a more significant impact on capital flow in domestic companies than in joint venture and foreign-owned companies (see constructs of questionnaire). This result shows findings consistent with the current literature (Xin and Pearce, 1996). Therefore, the refined model derived from the statistical analysis, run with data gathered during the survey, is presented as Figure 5.3.

Figure 5.3 Estimated structural equation model



## 5.5 Mediating effects

As Figure 27 depicts, supply chain capital flow mediates the impact of *guanxi* networks on sustainable SCM implementation; together with sustainable SCM implementation, they also mediate the influence of *guanxi* networks on sustainable SCM performance.

Therefore, the subsequent analysis aims to determine whether they are partially mediating or fully mediating in the results.

Setting Bootstrap in AMOS has directed us to the comparison of models with or without mediators. As Table 5.8 shows, the ‘supply chain capital’ construct is a full mediator in the effect of *guanxi* on sustainable SCM implementation, with a two-tailed significant test. Similarly, the ‘supply chain capital’ and ‘sustainable SCM implementation’ constructs have a net mediation effect on *guanxi* networks on sustainable SCM performance. This specific result was confirmed with the two-tailed significant indirect effect test.

Table 5.8 comparisons of two models

Relationship	Direct without Mediator	Direct with Mediator	Indirect Effect	Moderating observation
<i>Guanxi</i> SCcapital SSC	0.344(0.00, significant)	.026(.612, Nsignificant)	.001	Full mediation
<i>Guanxi</i> SC capital SSC SSCP	.315(0.00, Significant)	.578(0.066, Nsignificant)	.001	Full mediation

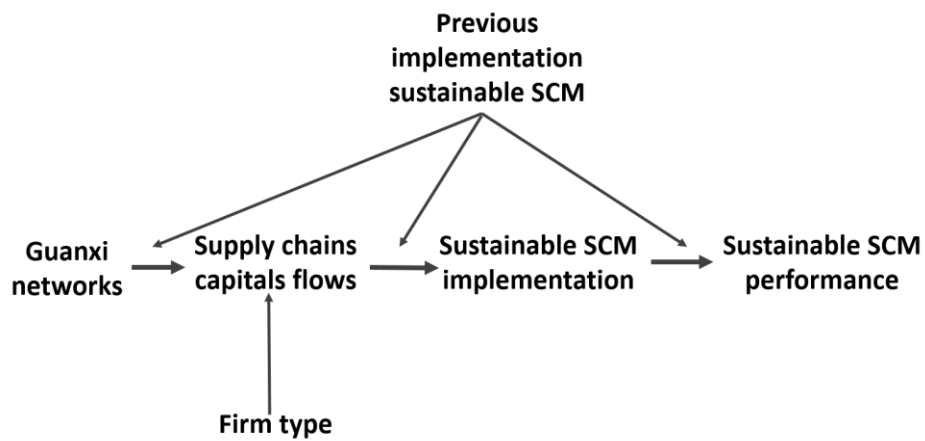
## 5.6 Moderating effects

Moderator in this study is to consider whether firms’ previous investment and implementation in sustainable SCM practices impact on the tested model, as the literature indicates different levels of organisational capital and capabilities in implementing sustainable SCM (Gavronski et al., 2011).

The assumption is that having previous experience of implementation in sustainable SCM might (or might not) positively affect the model result, as firms have previously developed a certain level of social networks and supply chain capital in their practice. Thus, the moderating effect was tested by divided the sample into two groups of 'previously implementing sustainable SCM' (answering 'Yes') and 'previously not implementing sustainable SCM' (answering 'No'), and were tested in AMOS. This specific test shows that the relationship between previous sustainable SCM implementations and supply chain capital flow is valid with p-value= 0.053. To further statistically confirm the result, the function of 'critical ratios for differences' has been applied to compare the results of two models (with 'no' or 'yes' to having previously implemented sustainable SCM). The result obtained from this test is given a valid p-value =0.006 (Table 5.9). Therefore, we adopted the factor of whether a firm has (or has not) previous implemented sustainable SCM as a moderator impacting the model, particularly in the relationship between *guanxi* networks between buyer and supplier and supply chain capital flow (Figure 5.4).

Research interest was also tested to investigate whether the role of being buyer or supplier moderated the relationships in the model. However, p-values were not significant; therefore, critical ratios test was not taken for further investigation.

Figure 5.4 Moderating constructs



Source: Author

Table 5.9 Moderating results

			no		yes		
			Estimate	P	Estimate	P	z-score
SC capital	<---	<i>Guanxi</i>	0.134	0.359	0.135	0.474	<b>0.006</b>
SC capital	<---	firmtype	0.051	0.577	0.048	0.636	-0.019
SC capital	<---	sscm	0.100	1.000	0.100	0.551	0.000
SSC	<---	SCcapital	0.130	0.657	0.171	0.638	0.087
SSCP	<---	SSC	0.106	0.818	0.114	0.757	<b>0.013</b>
Finance	<---	SCcapital	0.144	0.636	0.159	0.631	<b>0.035</b>
Human	<---	SCcapital	0.144	0.634	0.160	0.629	<b>0.036</b>
Envp	<---	SSCP	0.109	0.863	0.108	0.877	-0.001
Socp	<---	SSCP	0.108	0.863	0.109	0.877	0.001
EnvR	<---	SSC	0.170	0.814	0.235	0.741	0.064
F6	<---	Finance	0.220	0.740	0.264	0.716	0.045
H3	<---	Human	0.205	0.339	0.244	0.286	0.125
H2	<---	Human	0.234	0.338	0.276	0.283	0.118
S4	<---	Soc	0.199	0.410	0.199	0.468	-0.002
Ecop7	<---	Ecop	0.167	0.161	0.164	0.337	-0.015
Ecop4	<---	Ecop	0.189	0.159	0.162	0.337	-0.123
Envp3	<---	Envp	0.142	0.529	0.165	0.610	0.058
Envp6	<---	Envp	0.154	0.528	0.155	0.610	0.002
Socp2	<---	Socp	0.150	0.599	0.169	0.606	0.044
Socp6	<---	Socp	0.156	0.598	0.166	0.606	0.022
GQ4	<---	<i>Guanxi</i>	0.250	0.052	0.201	0.263	-0.225



RQ1	<---	<i>Guanxi</i>	0.287	0.045	0.241	0.249	-0.180
RQ3	<---	<i>Guanxi</i>	0.225	0.059	0.183	0.270	-0.206
Soc5	<---	SocR	0.444	0.000	0.517	0.000	0.769
Soc6	<---	SocR	0.476	0.000	0.514	0.000	0.397
Env5	<---	EnvR	0.223	0.266	0.309	0.104	0.314
Env4	<---	EnvR	0.240	0.264	0.308	0.104	0.237
Soc4	<---	SocR	0.266	0.417	0.301	0.305	0.080
Notes: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10							

Source: Author

## 5.7 Discussion

Recent research into sustainable SCM has shed light on drivers, enablers, sustainability assessment and performance measurements (Gimenz and Tachizawa, 2012; Varsei et al., 2014), while areas still not fully addressed such as ‘how upstream members are going to benefit through green initiatives of focal companies’ (Gunasekaran, Subramanian and Rahman, 2015, p.1). Collaboration between upstream and downstream supply chain members appears to attract a considerable degree of attention, but how could the buyer and the supplier mitigate the barriers related to the power imbalance and work together in the long run? As such, investigating social network and relational ties is important to understand how players work together to enhance the flow of supply chain capital in network interactions and diffusion. As a result, implementation of sustainable SCM could be increased and collaborated. Hence, this study has focused on examining the causal tripartite relationships between *guanxi* networks and sustainable supply chain implementation and performance. The study has considered two specific mediators in testing these relationships: namely, enhancement of flow of supply chain capital and sustainable SCM implementation. The main findings of this study are discussed as follows.

First, several scholars claim the benefit deriving from building *guanxi* is trust cultivation between players (Chua and Wellman, 2015; Luo et al., 2015;). However, there is a lack of knowledge regarding the mechanisms of determining network effectiveness and the relationship between *guanxi* and trust. Therefore, understanding the constructs of *guanxi* networks is important. In this study, the construct items measuring *guanxi* questions were a number of questions included in the online questionnaire, recommended by design according to the published study by Yen et al. (2012), to measure the latent variable of *guanxi* based on *Ganqing* (emotional affection), *renqing* (reciprocity) and *Xinren* (trust). However, statistical validity of the measurement of *guanxi* (AVE=0.436) was not shown when these three constructs were all included as manifest variables in the model. There is a significant covariance between *Xinren* and *Ganqing*, representing M.I.=40.376 which directly drove the GFI value down to 0.898. Consequently, this study proposes that trust is a central value of *guanxi* networks, which embedded in *Ganqing* or *renqing* in network interactions.

To answer the RQ2, this study empirically confirms the statement addressed by Victor (1991) that the flow of capital significantly supports increasingly sustainable SCM implementation. In the literature, it is argued that *guanxi* networks enhance economic benefits (Yen et al., 2007; Lu et al., 2009). Certainly, the experience of implementing sustainable SCM requires sufficient financial capital. However, implementing sustainability also requires advanced technologies and human capital to effectively assess the impact on natural environment and resources, human health, and social communities (Pimentel, Gonzalez and Barbosa, 2016). *Guanxi* networks embedded human capital and increase the flow of human capital for knowledge exchange and skill

acquisitions between buyer and supplier, as a result, companies increase environmental and social sustainability implementation and performance.

In more details, environmental responsibility implementation has been given greater emphasis by most of the survey respondents, which is consistent with current research in sustainable SCM that green and environmental SCM is yet the focus in the field (Beske-Janssen, Johnson and Schaltegger, 2015). Buyer and supplier make clear specification for environmental audits. Rather than relying on power enforcement and compliance, players tend to cooperate and upgrade technology in dealing with environmental issues and committing to their environmental objectives. Due to the importance of maintaining good social relations with employees, suppliers and communities, companies commit to social sustainability for improving employee benefits (including paying workers a living wage and regulating over-time wage), providing a healthy and safe working environment, and regulating recruitment policies with no child labour or forced labour. Sustainability is a consistent process. Therefore, social capital integration can assure long-term orientation in relationships among buyers and suppliers and intensifies supplier-buyer cooperation and technology upgrades required to meet environmental and social objectives.

Regarding to social sustainability, the study found that good *guanxi* networks formed by individuals working for buyers and suppliers can lead to companies allowing for improvement in employee benefits, including paying workers a living wage and regulating over-time wage, providing a healthy and safe working environment, and regulating recruitment policies with no child labour or forced labour. Due to the hierarchy feature

of *guanxi* networks, social capital integration can assure long-term orientation in relationships among buyers and suppliers and intensifies supplier-buyer collaboration to meet environmental and social objectives.

It shows a positive relation between *guanxi* networks and performance of sustainable SCM (with mean=3.2 to 3.6, standard deviation= 0.59 to 0.65), mediated by flow of supply chain capital and sustainable SCM implementation. Aligned with current literature that sustainable SCM practice increase the performance in environmental and social sustainability in supply chains (Kenneth et al., 2012). The study found that sustainable SCM implementation essentially improves the efficiency and effectiveness of operations, reducing operational and training costs to increase economic performance. The result is correlated with literature from Zhu and Sarkis (2004). It also confirms that positive actions in environmental sustainability improved environmental performance, such as reducing consumption of hazardous and toxic materials, reducing water waste and avoiding environmental accidents with fines. In order to improve social performance, good *guanxi* networks with stakeholders motivate companies to reduce health and safety hazards in the workplace and promote volunteers at local charities and ethical governance practices in supply chains (Herndon, 2008; Wang and Woods, 2013).

Surprisingly, the survey shows there is no significant statistical impact of relationships between *guanxi* networks on either sustainable SCM implementation or sustainable SCM performance. This finding contradicts previous empirical research which indicates that *guanxi* has a significantly either positive or negative relationship to green supply chain collaboration (Luo et al., 2015). A higher level of *guanxi* among supply networks enhances

various supply chain capital flow and encourages collaboration, which could lead to other performance functions of SCM, such as transaction cost efficiency (Wilkinson, Thomas and Hawes, 2009), but not necessarily for investment in environmental and social responsibilities implementation. Surprisingly, the survey shows there is no significant statistical impact of relationships between *guanxi* networks on either sustainable SCM implementation or sustainable SCM performance. This finding contradicts previous empirical research which indicates that *guanxi* has a significantly either positive or negative relationship to green supply chain collaboration (Luo et al., 2015). A higher level of *guanxi* among supply networks enhances various supply chain capital flow and encourages collaboration, which could lead to other performance functions of SCM, such as transaction cost efficiency (Wilkinson, Thomas and Hawes, 2009), but not necessarily for investment in environmental and social responsibilities implementation.

Other interesting insights that derived from this study include the tests for moderating effect and the control variable. For companies that have previously implemented environmental and/or social responsibility practices, *guanxi* networks show a stronger statistical influence on the flow of supply chain capital, particularly in financial and human capital flow. Likewise, it drives better sustainable SCM performance in a more effective manner. This finding is linked to the importance of resources and knowledge for ensuring capital and capacities of sustainability practices (Gavronski *et al.*, 2011). Making effective access to resources available and facilitating knowledge generation can lead to more effective sustainable SCM business models, especially for domestic companies which tend to emphasise social networks and capital flow when they form and consolidate constructed networks.

In addition, previous studies have investigated the driving factors of sustainable SCM, as discussed (Chapter 2); therefore, in this section, not only has research examined the moderating role of 'previous experience of implementing sustainable SCM' in the associated relationships, but it initially explored the reasons driving firms to implement environmental and social responsibilities. Results shew that the most important reasons for implementing sustainable SCM, ranked by frequency of responses are: gaining competitive advantage (n=332), international regulations (n=203), customer requirements (n=184) and national regulations (n=138). Although the influence of social networks is essential, relatively fewer people responded to the direct influence from social network (n=49). In addition, some companies thought it is the right thing to do so from a morality perspective (n=58). Motivated by the diverse answers, this study then probed further to investigate the roles of institutional forces, company strategies regarding to stakeholder requirements, and social networks and their impact on sustainable SCM implementation.

## **5.8 Summary**

This chapter has run the statistical tests in AMOS to examine the validity and reliability of the measurement model from CFA and to test the proposed hypotheses in SEM. Overall, the model has achieved anticipated statistical results and causal relationships between social networks and sustainable SCM have been identified.

To better understand the model, a series of statistical tests, including control variables, mediating and moderating effects, were also run. To investigate the research topic in depth and develop survey findings, the next chapter will continue with discussions from in-depth case studies.

## Chapter 6 CASE STUDIES

### 6.1 Introduction

This chapter analyses the case studies results in order to answer research questions 3, 4, and 5 in depth (Table 6.1). Institutional forces were reflected from the survey questionnaire – a certain number of respondents indicated that their motivations for implementing sustainable practices were because of national and international requirements. Also considered is the moderating effect of company strategy, based on stakeholder expectations, which was also reflected in the survey answer.

This chapter is structured as follows: the first section comprises case descriptions to present the demographic and sampling information of participants. Continuing from that is the discussion of how sustainable SCM was implemented and what was the institutional logic of sustainable practices in the cases. The research then reveals how social networks, institutional forces and company strategies drive implementation of sustainable SCM to answer the research questions.

Table 6.1 Research development II

RQs	Examples of case study question	Locations
RQ3: How do social networks drive implementation of sustainable SCM?	To what extent do your social networks drive successful sustainable SCM implementations?	Chapter 3, Chapter 7, Chapter 8
RQ 4: How do institutional forces drive implementation of sustainable SCM?	What driving factors do you think encourage your company to adopt sustainable SCM? -State regulations, industrial self-regulation	Chapter 3, Chapter 7, Chapter 8
RQ5: How does company strategy moderate the influence of social networks and institutional forces?	What driving factors do you think encourage your company to adopt sustainable SCM? - Proactive measures	Chapter 3, Chapter 7, Chapter 8



## **6.2 Case description**

### **6.2.1 Demographic and sampling information**

The demographic and sampling information is summarized in Table 6.2. Sixteen companies were involved in the interviews, among which, most were domestic companies, apart from Beverage Ltd B and Precision A which were joint ventures, and Automotive Ltd which was a foreign-owned company. Companies had broad coverage in terms of sectors, including beverage, soft drink, sugar, packaging, fresh vegetable, IT, and automotive.

The field research processes were organised as follows: participants gave a brief presentation (approximately 20 to 30 minutes) regarding their company information and operation & SCM. Sustainability practices were not particularly emphasised for presentation preparation as the researcher expected to observe awareness and reactions about sustainable SCM from company managers during interviews. Following the presentation, interviews were conducted straight afterwards. For companies assigning two managers to participate in the fieldwork, joint interviews were delivered. The duration of each interview lasted from 45 minutes to 2 hours, which depended completely on the participants as to how much information they wished to share. After the interviews, the researcher was invited to a factory site visit by Beverage Ltd B, Automotive Ltd, Plating A and Food Ltd.

Table 6.2 Demography & Sampling & data collections information

Companies	Industries	Ownerships	Firm sizes	Interviewees positions	Case evidence methods	Length of interview	Position in the network
Beverage Ltd A	Beverage	Domestic	Large	Procurement M, Operation M, IT M	Semi-structured interview, observation of presentation	45minutes	Focal company
Sugar trader	Sugar	Domestic	SME	CEO	Semi-structured interview, observation of presentation	30minutes	1 <sup>st</sup> tier supplier
Sugar Processor	Sugar	Domestic	SME	Operation M	Semi-structured interview, observation of presentation, documentations of sustainable practices	30minutes	1 <sup>st</sup> tier supplier
Beverage Packaging	Packaging	Domestic	SME	Operation M, Procurement M	Semi-structured interview, observation of presentation	30minutes	1 <sup>st</sup> tier supplier
Beverage Ltd B	Beverage	Joint venture (USA+HK)	Large	Procurement M, Quality control M	Semi-structured interview, observation of presentation and factory, documentations of sustainable practices	45minutes	Competitor
Vegetable Ltd	Fresh vegetable	Domestic	SME	CEO & General M	Semi-structured interview, observation of presentation and factory	1.30h	Focal company
IT provider	IT	Domestic	SME	CEO	Semi-structured interview	45minutes	1 <sup>st</sup> tier supplier
Vegetable trader	Fresh vegetable	Domestic	SME	Entrepreneur	Semi-structured interview	45minutes	1 <sup>st</sup> tier supplier
Carton packaging	Packaging	Domestic	SME	Procurement M	Semi-structured interview	45minutes	1 <sup>st</sup> tier supplier
Food Processor	Food processing	Domestic	SME	COO	Semi-structured interview, observation of factory	1h	1 <sup>st</sup> tier customer

Restaurants Owner	Catering	Domestic	SME	COO	Semi-structured observation of restaurant	interview, 30minutes	1 <sup>st</sup> tier & 2 <sup>nd</sup> tier customer
Automatic Ltd	Automotive manufacturing	Foreign owned	Large	Quality control M Procurement M	Semi-structured observation of presentation and factory, documentations of sustainable practices	interview, 1.30h	Focal company
Precision A	Precision technology	Joint venture (Taiwan & Chinese)	Large	Procurement M	Semi-structured observation of presentation	interview, 50 minutes	1 <sup>st</sup> tier supplier
Precision B	Precision technology	Domestic	SME	Vice president, Quality control M	Semi-structured observation of presentation, documentary	interview, 50 minutes	2 <sup>nd</sup> tier supplier
Plating A	Plating technology	Domestic	SME	Quality control vice M	Semi-structured observation of presentation and factory	interview, 1h	1 <sup>st</sup> tier supplier
Plating B	Plating technology	Domestic	SME	General M & quality control M	Semi-structured observation of factory	interview, 1.45h	2 <sup>nd</sup> tier supplier

Source: Author

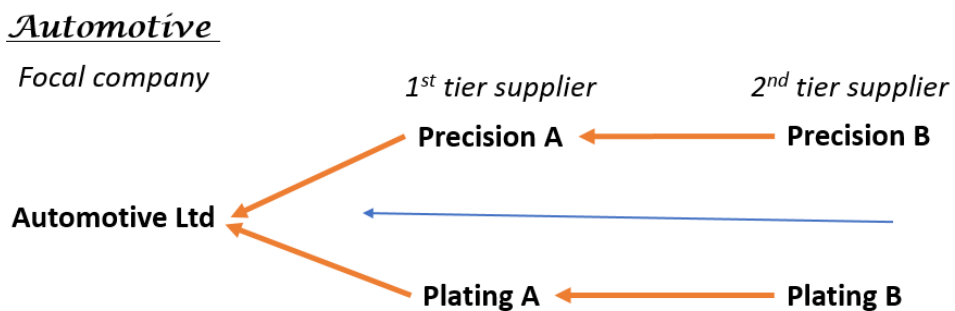
(Note: M is short for manager)

Data were collected, transcribed and translated and then analysed in Nvivo 11. Within case and cross-case analysis, statistical techniques were used to analyse data and present results. Further details will be presented in the following sections.

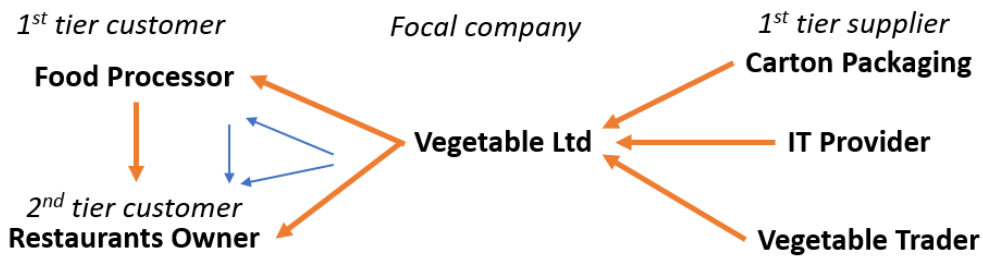
### 6.2.2 Cases for supply chain network

The 16 companies were constructed into three supply chain networks, namely automotive network, beverage network and food network, as shown in Figure 6.1. Referring to the literature review in Chapter 2, the case for automotive network has formed a sequential supply chain network. The food supply chain network had a reciprocal interdependent structure with Vegetable Ltd, Food Processor and Restaurants Owner. The beverage case appeared to be a pooled network structure when Beverage Ltd A and Beverage Ltd B compete with one another while sharing the same suppliers of Sugar Trader and Sugar Processor.

Figure 6.1 The structures of supply chain networks for the cases.



## Food



## Beverage

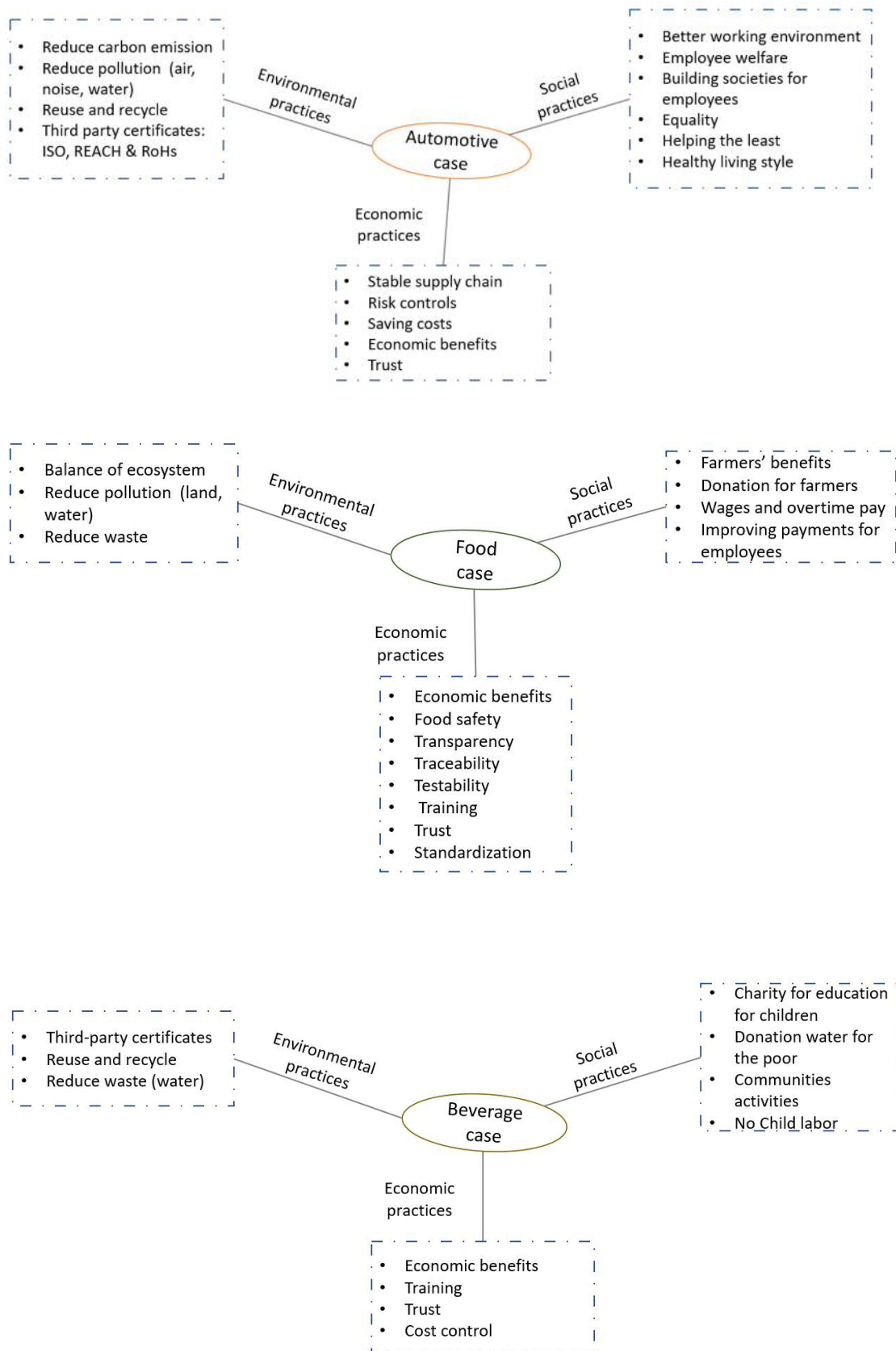


Source: Author

### 6.3 Sustainable SCM implementations

This section aims at presenting the details of economic, environmental, and social practices that each case has implemented in practice. The current study discovers that different industries could place specific emphasis on sustainable practices according to the nature of the industry as well the stage of development in their supply chain and supply chain networks. Figure 6.2 shows the similarities and differences of focus in the three cases.

Figure 6.2 Sustainable practices in the three cases



Source: Author

Regarding similarities (Table 6.3) in the **economic dimension**, practitioners were particularly motivated to save costs and drive economic benefits when considering sustainable practices and the impact of social networks, which is consistent with existing studies (e.g. Park and Luo, 2001; Chen et al., 2011; Hwang, 2011). Food supply chain in the current stage particularly emphasises the 'Six Ts' – traceability, transparency, testability, time, trust and training (Roth et al. 2008) to ensure food quality and safety. It was claimed that sustainability practices in food supply chain need to be government-led, which, according to the interviewees, requires more development.

Table 6.3 Sustainable SCM implementation in the three cases

		<b>Automotive</b>	<b>Food</b>	<b>Beverage</b>
<b>S S C M</b>	<b>Economic</b>	<p>‘Sustainability practice in automotive industry is industry-led ... customers and suppliers have a long-term collaboration ... continuous improvement is a task for our supplier management to decrease cost for the entire supply chains’ (<u>Automotive Ltd</u>); ‘saving the waste of resources’ (<u>Precision B</u>); ‘Economic benefit is the principle’ (<u>Automotive Ltd</u>); ‘I met a lot of difficulties. I sent them out in our Webchat group (social network App). He (the supplier) worked very hard to solve the problems’ (<u>Precision B</u>); ‘for some relatively inexperienced staff, we will organise technical training’ (<u>Plating A</u>); ‘we know each other long term, we are trustworthy’ (<u>Plating A</u>);</p>	<p>‘Cost control is very important for sustainability practice’ (<u>Food Processor</u>); ‘For customers, the requirements of food (quality) is getting higher and higher’ (<u>Restaurant Owner</u>); ‘Food safety is the principal issue for sustainability practice’ (<u>Food Processor</u>); ‘Many problems should be government-led, including the standardisation and sourcing of products’ (<u>Vegetable Ltd</u>); ‘for the standardisation of the production of meat, like our pickled, the treatment is standardised, same as the packaging and taste. Then we upgrade these approaches to our stores and entire supply chain’ (<u>Vegetable Ltd</u>); ‘Now on the farm, there is a monitoring process to detect the natural environment, including the atmosphere, soil, water, and all other aspects’ (IT Provider)</p>	<p>‘Only sustain economic benefits, then we can sustain environmental and social sustainability’ (<u>Sugar Trader</u>); ‘staff training such as the introduction of the efficiency of commission’ (<u>Sugar Trader</u>); ‘We spend ¥30,000 annually for staff training activities’ (<u>Sugar Processor</u>);</p>



	<p><b>Environmental</b></p> <p>'like our large OEM in Germany, we do not plan to produce fuel vehicles after 2020' (<u>Automotive Ltd</u>); 'the carbon emissions is the final design of the vehicle .... to meet customer's quality and technical requirements' (<u>Automotive Ltd</u>); 'saving the process of spraying for colours' (<u>Precision A</u>); 'reduce energy consumption' (<u>Plating A</u>); 'last year we installed LED lights, to reduce 30% - 50% electricity usage' (<u>Automotive Ltd</u>); 'ISO certification' (<u>Automotive Ltd</u>); 'we have recycled more than 100kg annually' (<u>Plating A</u>); 'we have two product lines. The use of plastic can be recycled and closed-roop; stamping recycle is opened-roop' (<u>Precision B</u>); 'We have passed investigation of cleaning production for the second year' (<u>Plating A</u>); 'reduce noise and water pollution' (<u>Plating B</u>); 'RoHS and REACH standard' (<u>Automotive Ltd, Precision A, Plating A</u>)</p>	<p>'reduce carbon emissions' (<u>Food Processor</u>); 'the printing ink should be environmental non-toxic for packaging' (<u>Carton Package</u>); 'This vegetable washing machine can reduce labour costs, and the unnecessary waste of water' (<u>Vegetable Ltd</u>); 'We reuse the returning car because returning with empty car is wasteful (reverse logistics)' (<u>Food Processor</u>); 'we share resources and vehicles' (<u>Food Processor</u>); 'food waste is used as fertilizer for tree or feeding animals' (<u>Vegetable Ltd</u>);</p>	<p>'we use electric cars to reduce emissions, as we are more likely to use new energy technology car' (<u>Sugar Trader</u>); 'we then introduce a synchronised car GPS system to inform the drivers their serve time.... To save social resources and reduce harm for environment' (<u>Sugar Trader</u>); 'Our annual goal in environmental protection is to reduce 3% carbon emission in 2017' (<u>Beverage Ltd B</u>); 'we can use newly developed products in our product lines or use our newly developed products to replay traditional consuming resources' (<u>Beverage Ltd A</u>); 'reduce the use of some of the equipment in the warehouse to save electricity' (<u>Sugar Trader</u>); 'Earth Hour' (<u>Beverage Ltd B</u>); 'paperless working' (<u>Beverage Ltd B</u>); 'reduce 1.5% in water consumption since 2013' (<u>Beverage Ltd B</u>); 'ISO certification' (<u>Carton Package; Beverage Ltd B</u>); 'We buy raw materials throughout the world and consider whether it is recyclable' (<u>Beverage Ltd A</u>); 'In 2011 the company 100% recycled</p>
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			<p>waste in production and sold to recycling company' (<u>Sugar Processor</u>); 'we are <i>clean production</i> enterprise ' (<u>Sugar Processor</u>)</p>
<p><b>Social</b></p>	<p>'we have <i>annual bonuses</i> for employees' (<u>Automotive Ltd</u>); 'employees have a shared coffee room' (<u>Automotive Ltd</u>); 'we spend nearly 1-2% of annual profit to <i>provide good working environment</i>'(<u>Automotive Ltd</u>); 'we <i>buy each employee commercial insurance, the company insured, regardless of their qualification levels</i>'(<u>Automotive Ltd</u>); 'We have considered <i>welfare for employees and their families</i> on occasion of giving birth, death and accidents'(<u>Precision B</u>); 'for staff left behind, the company may give them <i>six months to improve their PIP</i>'(<u>Automotive Ltd</u>); 'we <i>raise money</i> when employees or their family members get sick' (<u>Precision B</u>); 'prohibit the employment of <i>child labour</i>'(<u>Automotive Ltd</u>); 'paying for <i>overtime work</i>'(<u>Plating A</u>); 'non-dangerous goods (for</p>	<p>'the Chinese New Year we send out <i>annual reward</i>'(<u>Vegetable Ltd</u>); 'I communicate with employees and <i>care for their personal needs</i>' (<u>Food Processor</u>); 'I introduced a <i>training institute</i> to Xiamen and hold training lessons for my employees'(<u>Restaurant Owner</u>); '<i>occupational health screening</i> is provided before enrolment' (<u>Food Processor</u>); '<i>buying social security insurance</i> for them (employees) after enrolment' (<u>Food Processor</u>); '<i>having birthday cakes</i> for their birthday' (<u>Food Processor</u>); 'We provide food, <i>five meals in a day</i>' (<u>Vegetable Ltd</u>); 'The <i>minimum insured price</i> is the cost of my land with the cost of pesticides, half kilogram of vegetables sales three cents, I gave them (farmers) the minimum capital preservation' (<u>Vegetable Trader</u>).</p>	<p>'promoting <i>healthy living style</i>' (<u>Beverage Ltd B</u>); 'organised 150 running events in 30 cities in China' (<u>Beverage Ltd B</u>); '<i>no used of labour younger than 18 years old</i>' (<u>Beverage Ltd A</u>); 'pay stipend for <i>over-time working</i>'(<u>Beverage Ltd B</u>); '<i>Usage of mask and ear plugs in the production lines</i>' (<u>Sugar Processor</u>); 'We helped <i>42000 farmers</i>' (<u>Beverage Ltd B</u>); 'we have <i>annual trips</i> for all employees' (<u>Beverage Ltd B</u>).</p>

customers), we are using *RoHS and REACH*'(Precision A); 'we require employees *to wear gloves* when moving material in the works'(Plating B); 'we spend 100 million RNB each year for *employee associations*, such as yoga, swimming, badminton, and so on' (Precision A)

Source: Author

In respect of implementing environmental practices, this is enforced more through national and international regulations. Waste reduction reflects concern for environmental impact and resources scarcity, while on the other hand, it is regarded as saving costs in the supply chain. For example, Vegetable Ltd is currently using washing machines to integrate the process of washing vegetables for their whole supply chain. According to the Vegetable Ltd, '... these vegetable washing machines, on the one hand I use the equipment to reduce labour, but also reduce the unnecessary waste of water.'

In the three pillars of sustainable practices, case studies typically show a heterogeneity in implementing social practices. An underlying reason could be that social practices are closely linked with stakeholders and communities for which companies are responsible. In the automotive case, 'the industry has particularly extensive supply chain characteristics that cannot be easily changed ... a stable supplier, can not only reduce partial cost, but the entire supply chain management costs will decline', according to the manager from Plating A. Therefore, social practices in this case were mainly carried out to satisfy employees and suppliers. Most of the companies, in particular the Automotive case, provide a good working environment for employees with substantial financial investment. Employees' welfare is applied from various perspectives: organising annual trips for all staff; rewarding bonuses at the end of year. Companies also emphasise equality in terms of recruitment and promotion. The strategies for employee promotion are tailored for individual talents: promotion in production line as senior engineer or in managerial line as manager. The policy of no child labour (younger than 18 years old) is broadly applied for all companies in Automotive and Beverage cases. Companies have invested in building different societies for their employees. For performance appraisal,

firms not only reward for good performance, but also provide training programs to help employees to improve when they are doing less well. The same policy applies for the suppliers; 'helping your friend is helping yourself' seems an achievable philosophy in the work place.

In terms of social practices in the food supply chain, actors expressed the intention of taking care of their employees and end suppliers – farmers. This represents the morality of taking care of disadvantaged groups in supply chain networks. In the case of farmers, the Vegetable Trader has guaranteed minimum payment with no exception to ensure benefits in the event of natural disaster and fluctuating demand. In the beverage case, Beverage Ltd B and its related suppliers have led the action in taking responsibility for communities and societies. For companies that are well established in sustainable practices, such as Beverage Ltd B and Sugar Processor, they have exerted considerable effort in assuming responsibility for society and community, such as generously donating to the poor and promoting a healthy lifestyle by organising different events and interaction with people in the country.

Not confined only to social practices, but in economic practices also, different cases have displayed a variety of concerns. Companies in the food industry have particularly referred back to the 'Six Ts' – transparency, testability, traceability, trust and training. Food safety is a specific concern, in terms of government regulations and customer expectations. Therefore, actors endeavour to improve quality by controlling the sourcing and standardisation of procedures in production and delivery. Training and trust appear to

be commonly important in different sectors – to improve the working capability of the workforce and to build trust with upstream and downstream players.

Overall, it appears that environmental practices in the food and beverage cases were not constrained to the same extent as in the automotive industry. In respect of environmental responsibility, most players in the automotive case monitor and measure their carbon emission from partial components or finished products; to reduce air, noise and water pollution; to reduce waste of natural resources by integrating manufacturing procedures; to reuse and recycle raw materials; and to use third-party certification to indicate their standards of environmental practice. For the food industry, the balance of the eco-system is considered. Integrating data from farm to fork and transferring and tracing information in the value chain improves consumer confidence on the part of customers, while helping players to keep track of the condition of the eco-system. For companies in the beverage case, ‘playing safe’ seems to be the rule of survival through following regulations and providing third-party certification.

#### **6.4 Institutional logics of sustainable SCM**

As discussed in Chapter 2, social network is the carrier of institutional logic. Therefore, this section reveals the institutional logic of sustainable SCM in the current study in order to better understand the contents of network interaction and diffusion.

This section revealed institutional logic in implementing sustainable SCM in many Chinese firms. Sustainable practice is mainly driven by resource allocation, ‘if the

company faces resource allocation problems, then there is no way to be sustainable, and it is difficult to talk about sustainable practices', interviewees from the Automotive Ltd said. Customer requirement is another common reason. 'Sustainable development is more of interest-driven, such as customer requirements. Otherwise, it is difficult to apply spontaneously in the supply chain', claimed by the managers in Automotive Ltd. Similar statements were addressed by the Precision B and Beverage Packaging that 'This (sustainable practice) is dependent on our customers and the circumstances, because we need to consider the costs'.

Furthermore, economic benefit is the principle of implementing environmental and social practices. In a supply chain context, sustainable practice requires coordination and collaboration from upstream and downstream actors. Related to economic benefits, companies placed emphasis on establishing and maintaining a leading position in the market. Companies invest in R & D and innovation production to sustain marketing competitive advantages. Many participants, such as Sugar Processor, Precision A and Plating B, cooperate with proactive customers and suppliers to improve company capabilities in innovation, production and operation and satisfy stakeholder's expectations better.

Social justice from society and media is another institutional logic of enforcing large companies to implement sustainable practices. According to the Beverage Ltd B, gaining a good reputation is important for business pursuit. 'It is part of our company strategy setting (to implement sustainable SCM), to sustain our competitive advantage and industrial influence', said the participants from the Beverage Ltd B. Finally, the regulatory

factor was addressed. In particular, for companies – Automotive Ltd, Precision A, and Beverage Packing - conducting international business, not only national regulation, but also international legitimacy and standards, was of concern.

Apart from listing institutional logic, an exceptional case occurred when the interviewees in the food supply chain explained that implementing sustainable practices in their supply chain is because of business ethics. 'It is of concern because sustainable practices, particularly food safety and sufficient supply, is related to our generation, and even our next generations', said by the Vegetable Ltd.

### **6.5 RQ3: The influences of social networks on sustainable SCM (firm level)**

The survey indicated positive results for the impact of *guanxi* networks on supply chain capital and sustainable SCM implementation and an increase in sustainable SCM performance. This section explores these findings in depth.

#### **6.5.1 Social network ties formulated in the case studies**

In this study, social network ties are built and maintained with communities, friends and schoolmates, customers, employees, and suppliers, with an order ranging from the least to the most mentioned in the data.

**Friends and schoolmates.** Having similar backgrounds and sharing identities has shaped opinions within social networks (Nohria, 1992). In turn, positioned in the same social networks, individuals approach homogeneity in their personal values and perceptions.



The manager from the Precision B company explained that the engineering school he graduated from has held high prestige for over a century. Therefore, people graduating from this school are considered to have a 'rising start' for good reputation. Due to a similar educational background and professional knowledge, they have built a Webchat group and often communicate with group members. Technical supports were often provided from the schoolmates.

The question asked whether schoolmates are close as friends after graduation. The answer was positive. The respondents explained that because of similar professionalism and working status, often they meet together and have become good friends. Through communication, actors acknowledge each other better with higher levels of psychological commitment, according to the Plating B, Precision A and companies in food supply chain.

**Customers.** As the sample of interviewees consisted mainly of procurement managers and quality control managers, personal interaction with customers was less emphasised. Nevertheless, the findings indicate that managers tend to build and maintain diverse types of social connections with their customers, including sending messages and greetings on holidays, organizing sports (e.g. basketball premium league) and dining together. This occurs for three underlying reasons (Table 6.4). First, social networks contain 'lots of different types of exchanges' according to the participant from the Sugar Trader. Managers from Beverage Ltd A explained that 'there is mainly industrial information, such as new policies from the Central Bank or the State-owned banks ... new information could be helpful for product development'. Therefore, social networks of different kinds possibly embed valuable information and opportunities. Another reason

is that through communication, players can explore each other's interests in terms of products and company development strategy. This becomes a SCM strategy for the Sugar Processor to maintain long-term relationships with their major customers (over 15 years of relationships with both Beverage Ltd A and Beverage Ltd B). Having good social networks with customers also stabilises supply chain relationships. Referring to the participants from the Carton packaging, social networks have enhanced cooperation between the company and its main customers for over a decade. Such good relationships drive competitiveness for both sides of the players.

Table 6.4 Underlying reasons for building social networks with customers

	<b>Information &amp; opportunities</b>	<b>Long-term strategy relationship</b>	<b>Increase co</b>
<b>Companies</b>	<p>'There is much industrial information, such as new policies from the Central Bank ... New information could be helpful for product development (Beverage Ltd A); 'Last year, I joined a 5s class ..., I also shared with them (actors in his networks) ... actually it can improve the level of our entire industry' (Restaurant Owner).</p>	<p>'We 100% cooperate with the Vegetable Ltd' (Vegetable Trader); 'We have cooperated with some of the suppliers and customers for several years' (Plating A); 'We have stable supply relationship with suppliers and customers for over a decade, which reveals some good relationship (Carton Packaging).</p>	<p>'Yes, the stable proc mainly lies in the tr A); 'Each year our co gathering parties, s come, including our and customers, ... I h so I shared with my need to specify requirement in the Ltd); '(Cooperation improve the com customers' (Carton F</p>

**Employees.** In alignment with the literature, evidence in this study shows that many firms intentionally maintain social activities and build social networks with employees and among employees to improve teamworking, productivity and organisational loyalty. For Vegetable Ltd, they regarded employees as the 'wealth of the enterprise'; thereby, the company provides five meals per day and 'increasing the employees' income is also the goal of our business', the participants stated.

Another approach to build and maintain good social relationships with employees was via organising activities to enrich their social lives and communication; examples such as annual trips, corporate interaction (e.g. basketball matches, badminton matches weekly or monthly) were mentioned generally and in specific companies, including in Carbon Packaging, Food Processor, Vegetable Ltd and Restaurants Owner. For example, in Precision A, there are more than 30 societies in the company, within which, there are badminton matches twice a week. By doing so, not only were companies taking social responsibility for securing employees' substance, but also increasing interaction and emotional connections among staff.

Additionally, maintaining long-term personal ties with employees seemed to be influenced by the features of the industry. For Plating B, maintaining strong social ties with employees is more important than being with customers. This is because the entrance level to the market is so high in the gold-plated sector that the company has a strong position against other competitors; however, they certainly value their employees in terms of internal cohesion and avoiding switching costs from employees. According to the Plating B 'they are like family together, most of them have been working here for

over 15 years ... The technicians know very well the specific technique as well as workload. Flexible working hour is applied in our company as they always accomplish their jobs professionally ... Senor technicians also train junior staff in precise production skills as a member of family.'

**Suppliers.** Social networks with suppliers were distinctly highlighted in the study (Table 6.5). Being acquaintances or friends with suppliers is common. Social ties have been created through sending greetings cards and messages at festivals, organising amateur activities between managers of the companies (between Automotive Ltd and Precision A), hosting supplier conferences, or, for the Vegetable Trader, maintaining personal networks with farmers. 'There is no standard concept [of social networks] but by communicating frequently, information and ideas can be exchanged', said by the Food Processor.

Table 6.5 Building social networks with suppliers

Companies	Length/level of relationship	Activities with suppliers	Value of suppliers
Beverage Ltd A	Over 10 years, fairly familiar	site visits, Webchat, greeting cards	N/A
Sugar trader	Familiar with each other	N/A	N/A
Sugar Processor	N/A	Communications and exploring each other's interests	N/A
Beverage Ltd B	More than 10 years	Supplier annual conference	Supplier central
Vegetable Ltd	Over 20 years	Parties, drinking tea together, site visits	Partners, mutual development
Vegetable trader	Several years	Communication with farmers	N/A

Carton packaging	More than 1- years	N/A	Shared social interests, long- term relationship
Food Processor	Near 10 years	Share factory with the Vegetable Ltd	Strategic partner
Restaurants Owner	Near 10 years	Drinking tea together, sharing books and knowledge	Strategic partner, friends
Automatic Ltd	Near 10 years	Site visits, supplier conference, sport matches	Strategic partner
Precision B	N/A	N/A	Extending supply network
Plating A	Acquaintances, very familiar with each other	Sending greeting cards or the like, dinner with suppliers	Mutual development
Plating B	Over 10 years	site visits	Trust like friends

Source: Author

In the observation, players generally highlighted the necessity of social networks with various stakeholders, internally and externally. For example, Vegetable Ltd was an exception in regarding their employees, suppliers and customers as friends. Each year, the company organises three parties to maintain internal and external connections with upstream and downstream. Under this phenomenon, a substantial concern with building social networks is as an ethical business. In this study, the researcher explored the topic and found that bribery and corruption are serious concerns for unethical business practices. As mentioned by the manager in Automotive Ltd, receiving money exceeding 500 RMB (approximately 50 GBP) is bribery. Therefore, gifting behaviour was very cautious to avoid involving bribery or corruption. The new way of building and maintaining social networks, claimed as 'healthy approaches' by the Precision A, is that companies do not receive money or gifts as favour exchanges; rather, communication

and building relationship could lie in activities such as doing exercises or organising matches, as discussed above.

## **6.5.2 The influence of social network ties**

### **6.5.2.1 Carrier of institutional logic in social networks**

Findings in the current study reflect the literature in Chapter 2 that institutional forces have proposed public institutional logic for environmental and social responsibilities, in addition to economic accountability. The logic is carried and diffused by social networks through the mechanism of socialisation, social identification, cultural preference and social learning.

**Socialisation** is the process of identifying with others in an institution and obtaining a 'new' social identity as an 'insider' of the institution and the social network. Sustainable practice is of significance while being difficult to fulfil. The interviewees in food supply chain emphasised that one individual or one company could not produce 'real' sustainable SCM, as it is supposed to be the responsibility of the whole industry with government support. At the micro level, a company cannot perform sustainable SCM alone either and 'We cannot do it alone. We have to gather a group of people with similar values and faith to achieve the same in sustainable practices', according the Restaurants Owner.

**Social identification** In the observation, there are two approaches to identifying the organisational status of committing to sustainable practices in social networks:

formalising and regularising practices by obtaining specific certification (such as ISO 14001, ISO 9001, RoHs and REACH compliance) and building a brand image of actively implementing environmental and social practices. According to interviewees in the Plating B, the market entrance level in gold-plating sector is very high. Certainly, many of their competitors are operating a 'black market' where there is a lack of assurance for employees' working environment, healthcare and hazard protection; nor could they identify their original sourcing as they are mainly 'underground'. The company's social identification and reputation in the network affects business development. Another perspective is in terms of the management of brand image. This is particularly emphasised in the Beverage Ltd B company. It was explained by the participants that 'the community will develop towards a common value of environmental and social responsibilities, especially in the wake of efforts made by large enterprises and NGOs. Once we do not perform well, it will be [revealed in] public ... we also have to be very careful in selecting our partners because it [the brand image] links with the whole supply chain'.

**Cultural preference** Respondents indicated that their preference is to select partners who share similar values of implementing environmental and social responsibilities, to create closer links of mutual benefit in the long term. 'Today I'm here, it means that our vision is similar towards the investigation of sustainability', said the Food Processor; equally, it was highlighted that building a culture of sustainable practices 'means to be a long-term process', as responded by the manager in Sugar Processor. However, sustainable value will be increasingly popular in social networks, 'a good drive will lead a



guide. You show everyone the correct direction, there will be more people doing it', stated by the Precision B company.

**Social learning:** It was expressed that 'I think having social network activities is a kind of learning. Learning is to influence others and their own cognition ... because the more you communicate and experience, the greater your absorption ... behaviour will be affected by that', as stated by the managers in Precision A.

#### **6.5.2.2 Influence of supply chain capital**

In structural equation modelling, strong statistical results have been given to indicate the significantly positive relationships between *guanxi* networks and supply chain capital. Further details of how social networks increase the flow of this capital have been investigated and presented in Table 6.6 to explore how these findings link with sustainable SCM.

Table 6.6 Findings of drive to sustainable SCM implementation from supply chain capital

SC capital	Findings	Supply chain activities	Sustainable SCM
<b>Financial capital</b>	<p>'I'm even trying to help him with forecasting ... I will store that much of goods in advance according to the previous data analysis, and ultimately to be placed on the logistics business ... According to their real-time needs to the delivery, to control the cost to a minimum' (Sugar Trader).</p> <p>'must communicate and negotiate with the farmers ... In case the price will be too high ...' (Vegetable Trader).</p> <p>'The land is rented and divided to them [the farmers], because they are afraid that no one will buy their vegetables [if they are now working with me]' (Vegetable Trader).</p> <p>'As long as they plant the vegetables, I will buy them, at least I have a reserve price to them' (Vegetable Trader).</p> <p>'We do communicate, we hope to access more resources' (Beverage Ltd A)</p> <p>'... financial support, including payment that can be paid in advance [to the suppliers]' (Vegetable Ltd).</p>	<p>Cost Reduce, food waste control</p> <p>Price negotiation</p> <p>Reserve price for farmers with no condition</p> <p>Resource accessibility</p> <p>Financial support</p>	<p>Economic Responsibility, Environmental Responsibility</p> <p>Economic Responsibility</p> <p>Social Responsibility</p> <p>Economic Responsibility</p> <p>Economic Responsibility</p>
<b>Social capital</b>	<p>'... just like talking about the spirit of contract ... I have told them that if I know about it [farmers selling the vegetables to other traders], next time I will not buy your goods if they grow badly. If you want a long-term cooperation, you are not allowed to sell to others' (Vegetable Trader).</p> <p>'Once cooperation with the suppliers, as long as their performance is in good condition, then our relationship will develop, which will continue to develop good cooperation as an integration' (Precision A).</p>	<p>Long-term collaboration</p> <p>Long-term cooperation &amp; integration</p>	<p>Economic Responsibility</p> <p>Economic Responsibility</p>

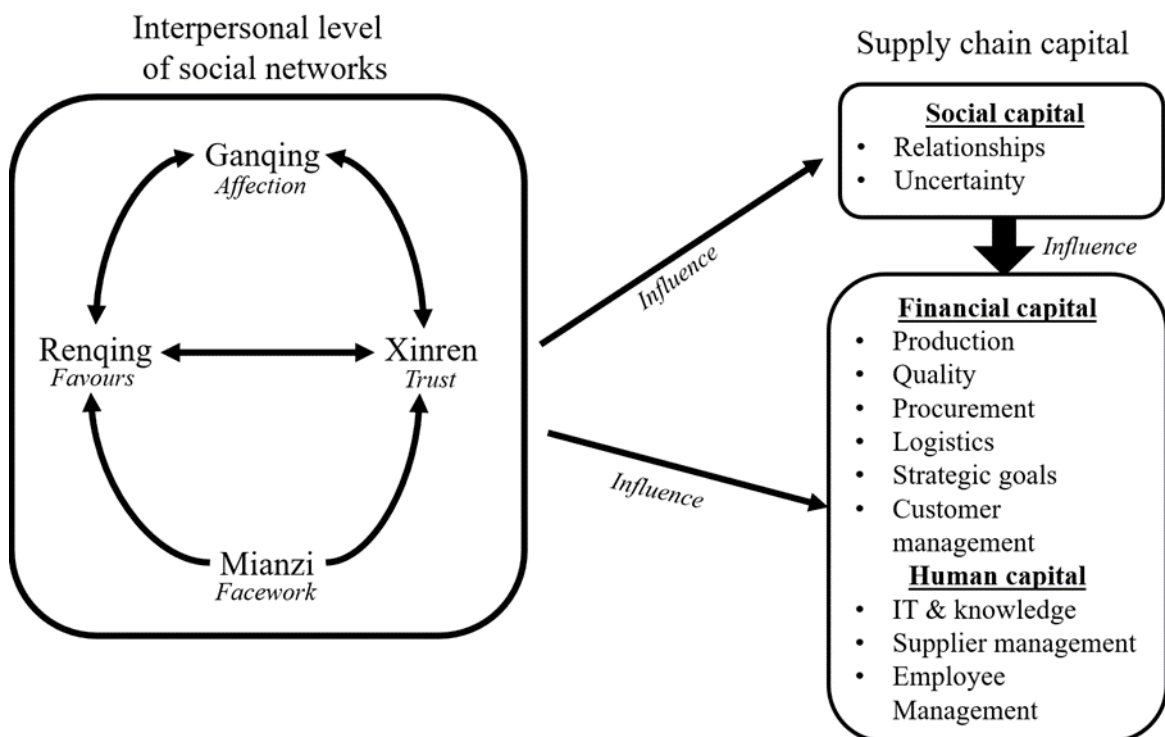
	<p>'... often through introduction from friends, and friends' friends, we then continue to find better options [for the raw materials] ... very often it is not realistic to get all the information on the Internet' (Plating A).</p> <p>'Through organization of tourism we can enhance the relationship between employees, and this then reflects on teamwork outputs' (Plating A).</p> <p>' ... travelling together maybe could boost their teamwork spirit and cohesion (Plating B).</p> <p>'The enterprise itself, it must be beneficial, community welfare is to keep people happy. Keeping people happy is sustainable, because people are the largest capital enterprise' (Precision A).</p> <p>'Yes, in fact, we have been thinking to establish a Fresh Food Association to connect our resources in the networks; for example, a large quantity may boost standardised cultivation, including enlarging the scale for agricultural transport' (Vegetable Ltd).</p>	<p>Resource accessibility</p> <p>Teamworking outputs</p> <p>Community welfare</p> <p>Industrial standardization &amp; Economic of scale</p>	<p>Economic Responsibility</p> <p>Economic Responsibility</p> <p>Social Responsibility</p> <p>Economic Responsibility</p>
<b>Human capital</b>	<p>'Partners are very important ... we have lots of different mutual exchanges in this industry and learn from each other ...' (Restaurant Owner)</p> <p>' ... these are mainly for industry information, such as new policies from the central bank or the state-owned banks - their views of new information which could be helpful for product development' (Beverage Ltd A)</p> <p>' ... working together with people in the network to save the waste of resources' (Food Trader).</p> <p>'These are certainly associated. Because we know each other for long time, we all know the whole process and consequences; for example, delivery delays or no improvement of quality in the production. We all understand the problem as we do for a long time, probably we know the causes of the problems, [work] targeted to improve will be easier' (Precision B)</p>	<p>Exchanging behaviour &amp; learning</p> <p>New product development</p> <p>Reduce waste of resources</p> <p>Performance improvement</p>	<p>Economic Responsibility</p> <p>Economic Responsibility</p> <p>Environmental Responsibility</p> <p>Economic Responsibility</p>

<p>‘Yes, as the exchange of this information and let each other’s cooperation is relatively smooth, such as customers understand that our production cycle ...’ (Beverage Packaging).</p>	<p>Cooperation with customers</p>	<p>Economic Responsibility</p>
<p>‘Last year, I also joined a 5s class. ... After knowing this thing, I also share good books I’ve read. In fact, it can improve the level of our entire industry ... to improve food safety’ (Restaurant Owner)</p>	<p>Food safety</p>	<p>Economic &amp; Social Responsibility</p>
<p>‘This will certainly, they are willing to share with us new knowledge and we can improve together [for sustainable practices]’ (Beverage Ltd A).</p>	<p>Knowledge information sharing</p>	<p>&amp; Sustainable practices</p>
<p>‘we exchange information such as transportation, cold chain transport for distinct species ...’ (Food Processor)</p>	<p></p>	<p></p>
<p>‘Staff know each other well. And if, for example, a newcomer is not clear with the whole situation, the cadre will teach them directly’ (Plating B)</p>	<p>Technical learning/teaching</p>	<p>Economic Responsibility</p>

Source: Author

The findings in the systematic literature review in Chapter 2, Figure 2.5 (see below) have addressed how social networks drive development of social capital, which influences the cultivation of financial and human capital. Literature has also illustrated that social networks influence the flows of financial capital and human capital. However, case studies in this research provide supporting evidence and show a fair justification that ‘mostly social networks do not directly link with financial benefits’ (from the interviewees); rather, it helps to secure long-term relationship (social capital), which then drives development of financial capital and disseminates human capital (e.g. important information) for the network members.

**Figure 2.5** Influence of supply chain capital flow in guanxi networks



### **Social capital:**

With regard to social capital, internally, building social networks among staff increases relational bonds and interactions in the company, which drives teamwork and cooperation in the workplace. With suppliers, social networks and interpersonal interactions are substituted by formal contract and monitoring, to enhance cooperation and integration. This falls into a circular path where social networks increase the flow of social capital between players to improve performance measurement in SCM; in turn, the positive results of supply chain interaction will then develop and enhance relational ties and personal commitments.

**Influence on sustainable SCM implementation:** The increase of social capital in social networks has not only improved implementation of economic responsibilities in SCM (Table 7.3), but also practices social responsibilities. Companies have committed to their social responsibility by delivering community welfare. Building good social networks with the community includes funding community events, donations to relieve poverty and natural disaster, and speaking for employees as representatives in a trade union. Occasionally, managers communicate with their suppliers for sustainable practices; however, this was expected to be a long-term mission in achieving sustainable SCM.

### **Financial capital:**

In social networks, the flow of financial capital between players includes cost control, price negotiation and payment, and resource accessibility.

**Cost control:** *Guanxi* networks have been argued to reduce transaction costs, production costs (Lu, 2011) and even reduce bullwhip effect (Cao et al., 2014) in improving business performance and economic benefits. Integration between the Food Processor and Restaurants Owner is an example illustrating the positive influence of social networks. Food Processor claimed to improve inventory control for the Restaurant Owner by forecasting their demand and supply of real-time needs for delivery. In this case, both players benefit from storing and replenishing a enough food for customers while controlling costs for inventory, logistics, and production.

Meanwhile, this process explicitly reduces food waste by avoiding overproduction or overstorage of amounts of food. In the automotive and beverage sectors, inventory costs and transactional costs were reduced by embedding personal ties with suppliers. From both interviews with managers in Beverage A and Precision A, it was mentioned that there is a weekly forecasting time-series with suppliers, for storing the major portfolio of products. The price and demands are stable; however, for 'emergency situation', when they need urgent solutions for replenishment, their suppliers will do what they can to help them out just by making a phone call.

**Price negotiation and financial support** for payment are broadly reflected in the studies of *guanxi* networks and SCM (Chen and Wu, 2011; Sternquist and Chen, 2006). Building on personal networks, a slight difference in terms of price for a specific product line seems acceptable for managers, either from companies as a supplier or a customer. The majority is in favour of sustaining long-term collaboration and stabilising the operational environment. For example, in casual conversation with the manager from Plating A, he

explained that in the beginning it is very difficult to find the right suppliers because of the precise technique required as well as stable operational capacities that suppliers should facilitate. Therefore, in cooperation with Plating B company, they have built a good corporate relationship and personal relationship for better communication and exchange of ideas because of the switching cost.

**Resource accessibility:** Social capital also creates opportunities for accessing resources from an extension of social networks. For the most part, people are willing to introduce their network players to one another when this is not against interests, resulting in obtaining a broader scale of resources in the social network.

**Influence on sustainable SCM implementation:** The arguments for increasing financial capital improves implementation of environmental and social responsibilities. Unfortunately, from the empirical evidence, few companies have performed sustainable practices spontaneously without enforcement. The focus of these case studies, in terms of implementing sustainable responsibilities in SCM, is directed on the Vegetable Trader who is working closely with farmers. In terms of personal profile, he is not as educated as other players (middle school degree); however, he embraces the ethical spirit when conducting business with farmers. The business model between him and the farmers is similar to agricultural contract work in that he divided the size of the land and assigned plant species according to the farmers' preference. There is an 'invisible rule' between himself and the farmers that 'I will buy all the vegetables with no condition, as long as you do not sell the products to others without any agreement.' This rule, on the one hand, assures a basic income for farmers, regardless of any external circumstances; on the



other hand, it mitigates supply uncertainty for the trader. It was complained that last year Xiamen city suffered two serious typhoons and most agricultural products were damaged. There was a shortage of supply as agricultural products are needed daily. Although the central government provides compensation for such issues, farmers are at the bottom level of players in the institutional environment so that no farmer has received a single penny within their networks. Therefore, the trader paid from his own pocket with a minimum price per kilogram of vegetables for the farmers.

Sustainable practices are very challenging in reality, especially when people in agriculture, such as farmers, are fighting against hunger and poverty. In this case, greater concern and responsibility are called for from different roles of stakeholders, including government, professional experts and customers.

**Human capital:**

In human capital, the factors of sharing information and knowledge were the most mentioned when asked about the impact of social networks on sustainable practices in SCM. More specifically, in social networks, the flow of human capital is enhanced by exchanging information such as transportation (techniques) for distinct species in cold chain, mutual exchange in industry and learning from each other, as well as gaining new policy information for product development. Internally, between employees, such as the company Plating B, staff know each other well after building personal ties, and they solve problems in production by helping their friends.

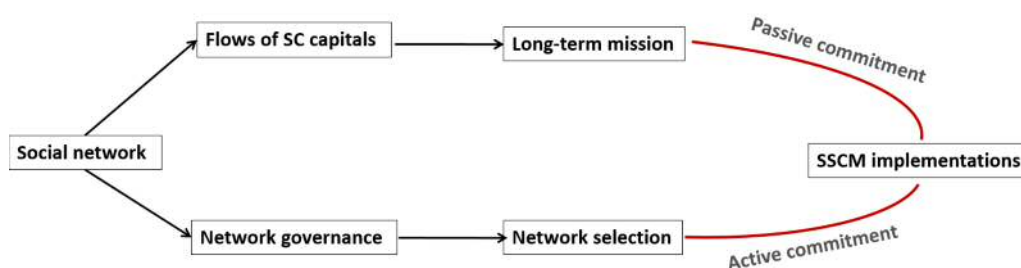
**Influence on sustainable SCM implementation:** As shown in Table 6.6, companies at the current stage are mainly concerned with economic responsibility in sustainable practices, while seeking to improve environmental and social practices when the economic benefits are fulfilled. Environmental responsibility has been reflected when they work together to reduce waste, such as reducing water consumption in the vegetable companies by integrating the washing process with the washing machine in Vegetable Ltd. In the food industry, food safety and security are not only critical for sustaining economic responsibility, they are essentially linked with human health and social security. Therefore, the Restaurants Owner imitates their competitor McDonald, applying the concept of 5s in his restaurants and transferring this knowledge to his partners. The improvement of food safety is a substantial process in implementing social responsibility. 'Being the first Chinese brand that can open their kitchen to the public', is the mission for the company. As to the importance of sustainable practices, players are willing to share new knowledge with their partners and expect to improve together.

To summarise, social networks increase the flow of financial, social and human capital in supply chains; in the context of sustainable SCM, the answers most frequently arising were to share information and knowledge for implementing environmental and social responsibilities. Economic drive is the priority in these cases; however, to increase economic benefits, companies often have to integrate with their network players to reduce resources consumption and waste, inventing new products to be better equipped to meet environmental and social requirements.

### 6.5.2.3 Network selections for sustainable SCM implementations

The network of governance carries with it adaptation, coordination, and safeguarding exchanges for special problems. The governance mechanism in social networks is not conveyed through authority, bureaucratic rules, standardisation or legal resources, but through selection, persistence, and a structural set of autonomous firms engaged in creating products or services. It is believed that in the same networks, people tend to embrace similarities in terms of personal values and professional background, as discussed. A different perception was held in the study regarding the influence of social networks on sustainable SCM implementation. On one side, the idea that reaching homogeneity of organisational behaviour towards sustainable SCM is a long-term mission and progress, as explained in the previous section, is argued to be 'passive commitment' to sustainable SCM implementation (Figure 6.3). On the other side, people argue that in network selection, it is the mechanism of actively selecting players who embrace similar values of sustainable practices and expecting players to act sustainably in their interaction. This is called 'active commitment' in this study.

Figure 6.3 Mechanisms of passive and active communication to sustainable SCM implementation



Source: Author

In the case studies, many of the companies in the automotive industry appeared with active commitment. Precision A, Precision B and Plating A companies replied with positive answers for network selection with their partners. According to the manager from Plating A, they will work with suppliers having the same value of environmental and social responsibilities to match their corporate value. They believe that only when creating a macro culture for sustainable practices can they continue to operate and achieve their goals, in adherence, for example, with human and social power. Respondents from Precision A also explained the importance of social learning and, in active social networks, the players can understand and consider sustainable practices with more depth.

In the food and beverage industries, only companies setting a proactive strategy towards sustainable SCM considered sustainable practices to be an additional factor in their network selection. For Beverage B, it was mainly thinking for building brand image, 'we do everything to raise public attention'. Another perspective of selecting partners embracing similar values is explained by the Vegetable Trader for the purpose of long-term communication and cooperation. The switching cost for the farmers is quite low; in other words, they can terminate the business if they have a better option, such as other traders allowing them to use as much insecticide as they wish to increase fertilisation with total cover (the circulation of using insecticides is required to be 28 days by the trader).

Company strategies moderate the influence of social networks on sustainable SCM in accordance with the two different mechanisms of governance. In terms of passively

committed actors, they believe that sustainable SCM implementation should be market-oriented and diverse, according to the manager from the Sugar Trader. Not every company has, in fact, encountered the same situation and each business management is an individual case rather than commonly applicable.

For actively committed actors, company strategy moderates the effects, particularly in the food industry where only proactive companies consider the values of sustainable practices as an important factor in their network selection. This might be because of the current stage of the industry which is evolving and immaturely developed in terms of regulation legitimacy in industrial standards.

## **6.6 Understanding RQ3 from network perspectives (network level)**

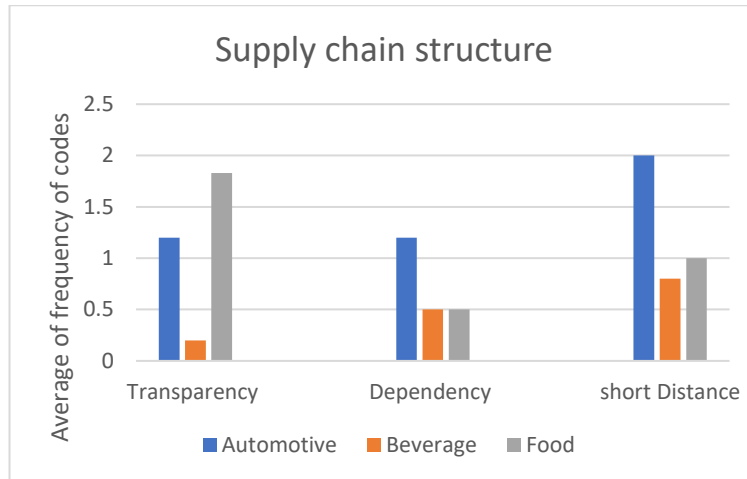
In organisational study, if it is believed that firms are likely to have different ambitions and objectives, the friction among interaction could be critical. In the current study, the researcher set out to investigate supply chain structure and network structure and the impacts of relational mechanism, in the form of social networks, to bring discussion further and deeper in sustainable SCM implementation.

### **6.6.1 Automotive supply chain networks**

In this study, the automotive industry has shown a sequential interdependency network structure under which transparency, dependency and distance between supply chain

players are reflected in supply chain structure (Figure 6.4). Furthermore, the impacts on sustainable SCM will be explored.

Figure 6.4 Supply chain structures for the cases



Source: Author

**Supply chain transparency** increases when dependency level is high among players. In automotive networks, players work together in high supply chain transparency through vertical collaboration. In the automotive case, the number of average frequency in terms of mentions in the interviews and secondary data is summarised in Table 6.7. According to Automotive Ltd, in the early stage, professional experts of various areas, such as raw materials and welding, come from suppliers and work together on new production innovation. Many products are designed by integrating with suppliers and then the company ultimately assembles the final items. ‘So the success of the projects is ensured by close relationships with suppliers’, the interviewees from the Automotive Ltd said. Responding to partnership and network relationships, Precision A actively reacts to

customer needs by continuously developing new products through active collaboration with their downstream suppliers.

**Supply chain dependency** in social networks influences daily business practices. In these cases, interdependent level is driven by mutually vertical integration, concentration and personal commitment. Customers have coercive powers to promote compliance with environmental and social responsibilities in their first-tier suppliers with a noticeable grading system (0 score means the suppliers just meet the sustainable requirements, while negative score means that suppliers will be downgraded in the supplier selection system, as opposed to a positive score that indicates upgrade to another level in the system); equally, vertical integration is highly emphasised among the focal companies and their suppliers. Automotive Ltd depends on its suppliers for resources and innovation capabilities, especially in R&D investment, for reduction in transaction costs. According to Precision A, 'suppliers have their expertise, and the focal companies are professional in focusing on brand management and operations management'. Similarly, Plating A explained that, because the entrance level is very high in the plating sector, this leads to difficulty in finding the right suppliers. For suppliers, working closely with customers is promising for stabilising supply chain development and sustaining marketing competitiveness. A 'long-term strategic partnership' was claimed by Precision A to maintain their customers, as was also the case for Precision B, Plating A and Plating B.

Due to the high degree of integration, interactions are concentrated among major players, which includes both formal and interpersonal formats, such as supplier conferences,

seminars and supplier dinners, or drinking tea and having free-style conversations during afternoons. Social network activities could be arranged in different formats, while it helps to reach the same mission of enhancing personal commitments and long-term orientation.

Such intertwined dependency between customers and suppliers has, in turn, strengthened bonding in social ties. Many interviewees stated that collaboration between companies and their major customers and suppliers have existed for over a decade and that they have become acquainted with each other increasingly well during that period. This reflects on the hierarchical nature of social network cultivation.

**Distance** among supply chain partners increases information asymmetry and coordination efforts in the sequential supply chain network structure in this study. Geographical closeness facilitates opportunities to increase interaction between buyer and supplier for supply chain effectiveness and efficiency. Company Automotive Ltd has switched the integration of technology to their suppliers; therefore, the success of projects is guaranteed by close relationships with suppliers. In this case, the company prefers to use local suppliers for efficient communication, saving transaction costs and reducing opportunistic behaviours from suppliers. A relatively high standard of technical requirement is another reason to choose a geographically close supplier. The manager in Precision B continues to increase the level of standards for the suppliers, analysing data and solving problems together to improve suppliers' capability to some extent. Similarly, the respondent in Plating A explained that, having known the suppliers for a long time (the earliest he has been in contact with a supplier is since 1995), he knows the



competency and capability of the suppliers better, and even the personalities of the managers in the supply firms. Such information and cooperation are seen to be essential for SCM and business success.

In addition, suppliers are endeavouring to be close to their customers. The setting up of the firm Precision A came about because the region in Xiamen is integrated for precision companies in China. Eventually, the company shows significant success in their supply chain strategy and extends their business by building links with various customers in the neighbourhood.

Cultural distance is another dimension influencing the outputs of building personal and company connections. Cultural distance reflects on the backgrounds of the societies where the firms are based. The manager in Precision A told a story about her boss, who is from Taiwan and became acquainted with other Taiwanese managers by playing golf and badminton together. This opened the door for business development. In similar cultures and background, it is easier to build personal relationships and trustworthiness which could possibly change the operational and supply chain strategies.

**Influence on sustainable SCM implementation** has been promoted in such supply chain structures in the automotive industry. For companies employing accommodative strategy in sustainable practices, sequential dependency network structure ensures the corporate code of conduct could be delivered from upstream to downstream. High degrees of dependency, transparency and close distance between buyers and suppliers accumulate personal commitments, information and knowledge flow within the supply

chain for better implementation of environmental and social responsibilities. For a proactive company, it provides more opportunities for efficient communication and collaboration. For example, by working with a supplier, Precision A introduced spray-free painting to Automotive Ltd. It is environmentally friendly and helps to protect human health during production. 'It's all about being responsible for the partner's continuous development', explained the manager in Precision A. The role of social networks in these processes, as explained, is 'because things are carried out by people, if there is no personal interaction, then he may be unfamiliar with the whole team, which could hinder efficient communication for the implementation', according to the manager in Plating A.

Table 6.7 Sustainable SCM implementation in supply chain and network structure of automotive case

Cases (Supply chain Networks)	Supply chain structure					
	Dependency		Distance		Transparency	
Automotive (Sequential)	<i>Average frequency of mention</i>	1.8	<i>Average frequency of mention</i>	2.2	<i>Average frequency of mention</i>	1.4
	<i>Example</i>		<i>Example</i>		<i>Example</i>	
	<p>'They [the suppliers] do not have the mechanism to sufficiently use their producing capabilities [if the order fluctuates]. So, they need stability, for example, every day or at least I guarantee a certain period of continuous order so that the product line can be stable' (Precision B).</p>		<p>'Customers are mainly geographically near ... Besides, the person in charge of A company (customer) is also a Taiwanese, which is more convenient for communication' (Precision A).</p>		<p>'There are some positive effects [social networks]. Because things are carried out by the people, if there is no (personal) interaction for the implementation, they may be unfamiliar with the whole team, and some communication will be disturbed.... So, communication still has a great relationship with sustainable practices' (Plating A).</p>	

### 6.6.2 Food supply chain networks

The food supply chain network appeared with a reciprocal interdependence structure where there is high integration among Vegetable Ltd, Food Processor and the Restaurants Owner. Under this structure, the players mutually depend on the choices and actions made by each other, including environmental and social responsibilities.

The feature of **supply chain transparency** in this case was high (Figure 7.4). In the food case, the number of average frequency in terms of mentions in the interviews and secondary data was summarised in Table 6.8. Vegetable Ltd is the central player in the network to collaborate with the Vegetable Processor, Restaurants Owner, the Vegetable Trader and IT Provider by sharing market information, government policy and transportation techniques. By working with Food Processor and Restaurants Owner, the Vegetable Ltd was endeavouring to achieve standardisation throughout the whole supply chain. For example, they quantify the products in terms of shape, size and weight when shipping to the Food Processor and Restaurants Owner upstream. Meanwhile, they also quantify the vegetables in packaging from Vegetable Trader downstream. Due to the reciprocal network structure, where mutual adjustment and transparency among players implies joint problem solving and decision making, sustainable SCM implementation was efficiently driven with information sharing and collaboration.

To reduce food waste during transportation, Vegetable Ltd shares information and techniques with the Vegetable Trader and Carbon Packaging. Instead of washing vegetables before shipping, they required vegetables to be packed directly after being

picked up from the farm, with a specific pattern to reduce shipping costs and waste. Then the vegetables were washed in Vegetable Ltd to reduce consumption of water.

Furthermore, the Vegetable Ltd aims to integrate network resources by sharing the company's strategy and development plan with their customers and suppliers. Vegetable Ltd and IT Provider have co-funded a program to achieve transparency and traceability of their products from farm to folk. The iCloud data is shared across the network to improve product quality and supply chain performance. For the Food Processor, helping customers in forecasting demands and inventory according to previous data analysis thoroughly reflects their supply chain transparency.

Under these circumstances, a high level of supply chain **dependency** might be expected. However, the case tells a different story in which dependency in food supply chain network is relatively low. Although players collaborate closely together with high transparency and close organisational proximity, companies do not count heavily on an agent. The Vegetable Ltd is particularly interested in building reputation and influencing power in the food industry, such as establishing a Food Industry Association in Xiamen. This is coherent with social network extension and pursuit of a centralised position in social networks. Meanwhile, for Food Processor and Restaurants Owner, it appears that their businesses are mainly resource dependent downstream but market driven by the end customers. For food trader and farmers, the switching cost in the vegetable industry is rather low in China. Due to diverse features and business plans, the dependency in this case is low.

Having **close cultural distance** is the initial motivation for working together among actors. Cultural distance in this case is not only national culture, as discussed by Awaysheh and Klassen (2010), but also includes organisational culture. Being close in organisational culture is a substantial factor for companies to work together for a long time. Initially, the Restaurants Owner and Food Processor were looking for a supply company that shares a similar vision – the capability of providing consistently high quality and standardised products. The Vegetable Ltd were recommended in the open-air market and, coincidentally, the funder for Vegetable Ltd was on the spot. ‘This is fate’, they suggested.

Sharing similar culture is the foundation of strategic partner selection; consequently, actors collaborate in the social network and approach homogeneity in organisational vision. According to the respondent from the Food Processor, ‘we cooperate with Vegetable Ltd with 100 per cent effort’. Sharing similar vision and close organisational culture stimulates deep understanding and collaboration between players, such as knowledge and technology flow under reciprocal expectations. Vegetable Ltd, for their part, are very proud to ‘let the customers know about our sourcing and collaboration with our suppliers. We [with customers and the farming plant] share the same vision to establish standardisation for the industry and we invest together for agricultural projects/companies’.

Table 6.8 Sustainable SCM implementation in supply chain and network structure of food case

Cases (Supply chain Networks)	Supply chain structure					
	Dependency		Distance		Transparency	
Food (reciprocal)	<i>Average frequency of mention</i>	0.5	<i>Average frequency of mention</i>	1	<i>Average frequency of mention</i>	1.8
	<i>Example</i>		<i>Example</i>		<i>Example</i>	
	‘Partners are very important for mutual exchange and learning. In this industry, we have lots of different types of exchange, like me and IT Service, we hold mutual shares’ (Vegetable Ltd).		‘We invested for Vegetable Ltd to build a small experimental kitchen, to quantify all of our materials’ (Food Processor).		‘This management [the traceability technique] needs to have statistics, big data, we are doing this now, including orders, inventory management.’ (IT Provider).	

### 6.6.3 Beverage supply chain networks

The beverage supply chain network appeared to be in a pooled structure where organisational behaviours are well managed by standardised rules and shared mechanism to orchestrate transactions. As a result, the economic approach of compatibility between products and components is achieved through a standardized platform, which may reflect as low transparency and dependency in the network (Figure 7.4).

Supply chain **dependency** has decreased because of low integration and transparency from the whole supply chain network, while the level of interdependent players relying on one another is also caused by the degree of resource dependency. In the beverage case, number of average frequency in terms of mentions in the interviews and secondary data was summarised in Table 6.9. For domestic companies, such as Beverage Packaging and Sugar Trader, their business is resource driven – Beverage Packaging relies on raw material companies, such as iron; Sugar Trader relies on sugar manufacturers. Therefore, power is on the supplier side and their supply chain reflects as a downstream dependency. A similar case is the firm of Plating B. Under these circumstances, according to participants from Beverage Packaging, companies do not have the power to influence or require their suppliers to commit to environmental and social responsibilities.

Supply chain **transparency** in this case was relatively lower than the automotive and food supply chain networks. Beverage Ltd A and Beverage Ltd B are competitors in the market; therefore, they do not have direct interaction between actors. Social network is

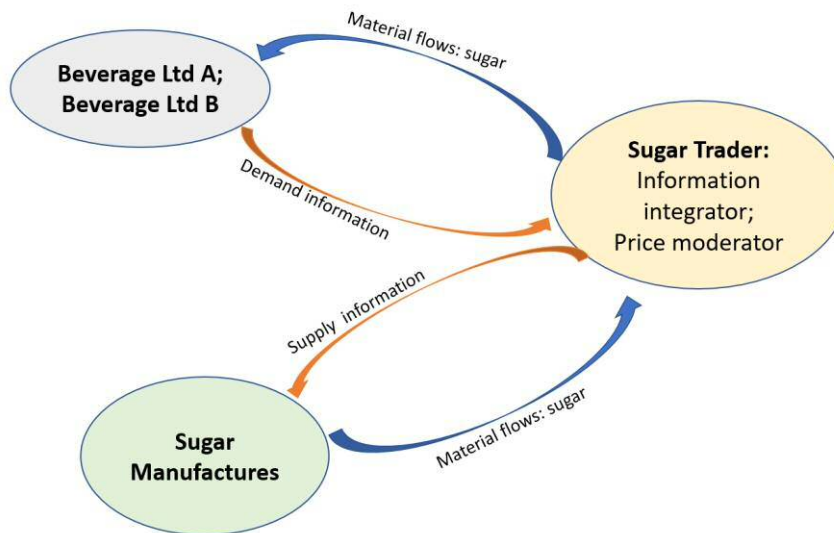


important to the way of building weak social ties for information and knowledge flow – ‘for example, we learn sustainable practice strategies from large enterprises in our industry’, the manager in Beverage Ltd A said. In contrast to Beverage Ltd A and Beverage Ltd B, Sugar Trader endeavoured to increase transparency in their SCM by acting as integrator in accumulating comprehensive information and moderating resources allocation between buyers and suppliers.

Due to the nature of the industry – sugar sector faces a cycle of three-year harvest and three-year lying fallow – it is challenging to maintain a stable and reliable supply chain due to the nature of the industry. Therefore, managing inventory while maintaining price stability is very important. To tackle this issue, Sugar Trader has invented a program for sharing supply and demand information with their customers (e.g. Beverage Ltd A and Beverage Ltd B) and their suppliers (i.e. sugar manufacturers). Referring to Figure 6.5, on the one hand, the Sugar Trader plays the role of price moderator by assuring stable flow of materials (sugar) from the sugar manufacturers to their customers; on the other hand, the company acts as an information integrator, collecting and supplying information from manufacturers and market demand data from customers. By taking advantage of transparent information, the Sugar Trader invented a computer program (that acts like ERP) to help their suppliers and customers in managing inventory control. In harvest years, the inventory level for each player is slightly higher than the actual demand; therefore, the focus is to mitigate price drop due to oversupply; whereas, in the fallow period, surplus storage inventory from previous years can help to avoid shortage of supply and price rise. For the computer program, the data needs to be updated once in three years, based on previous sales. Transparency between players assures efficient

flow of materials, availability, accuracy, and accessibility to improve supply chain consistency and stability.

Figure 6.5 The integrator and moderator role of Sugar Trader



Source: Author

Regarding supply chain **distance**, the strategy for Sugar Processor is quite similar to Precision A in setting a manufacturing plant to be closed with their major customers – Beverage A and Beverage B. Although the focal companies, such as Beverage Ltd A and Beverage Ltd B, have used monitoring and auditing systems for quality control, geographical closeness reduces transaction costs for operations and enables managers to communicate efficiently and improve performance as strategic partners. Such strategy has enabled the company to secure their business development for over a decade.

Table 6.9 Sustainable SCM implementation in supply chain and network structure of food case

Cases (Supply chain Networks)	Supply chain structure					
	Dependency		Distance		Transparency	
Beverage (Pooled)	<i>Average frequency of mention</i>	0.8	<i>Average frequency of mention</i>	1	<i>Average frequency of mention</i>	0.2
	<i>Example</i>		<i>Example</i>		<i>Example</i>	
	‘Yes, we have relatively strong dependence. It can even be said to be industrial monopoly’ (Beverage Packaging).		‘We moved the company from Guangzhou to Xiamen in 2006 ... we are a production-oriented enterprise and long-term stability ... is overall in the same category as the successful buyers’ (Beverage Processor).		‘I set up a warehouse from the distribution because I wanted to minimize the loss. (My system can indicate that) their maximum inventory level, with cooperation with suppliers, this is the reliable strategy to do it [stabilise supply chain demand and supply]’ (Beverage Trader).	

## **6.7 RQ4 & RQ5: The influence of institutional forces and company strategy**

This section presents and compares institutional forces in detail for each case, as well as the moderation of company strategy – defensive, accommodative, and proactive.

Observations from the interviews showed that institutional regulation, particularly coercive isomorphism, is the major factor driving organisations to implement environmental and social responsibilities. All firms stated that they follow the China Environmental Protection Law and Law of The People’s Republic of China on Employment Contracts in their operation. By complying with and responding to pressure exerted by government and regulators, together with customer compliance, organisations enhance the likelihood of their strategic survival and sustain potential business contracts with customers. Furthermore, they are also secured against the severe consequences of environmental and social misconduct, such as penalties, protests, suspensions and sanctions (Varsei et al., 2014; Peters et al., 2011). This finding coordinates with existing literature that a significant body of research indicates government regulation and legislation as a major driver for sustainable effort (Beamon, 1999; Green et al., 1996; Zhu et al., 2005; Walker et al., 2008). Institutional pressures – coercive, mimetic and normative isomorphism will be discussed in each case, reflecting on the existing literature; meanwhile, novel observation is additionally gathered from empirical evidence, summarised in Table 6.10.

Table 6.10 Summary of institutional pressures in each case

	<b>Coercive</b>	<b>Mimetic</b>	<b>Normative</b>
<b>Literature</b>	International & national standards; third party certificates	Enterprise imitate the actions of successful competitors	Social obligation to comply SSCM
<b>Automotive</b>	International & industrial standards; regulation; customers' requirements	N/A	Personal regulation; R&D development
<b>Food</b>	Regulation; industrial standards; international standards; customers' requirements	Competitors initiatives	R&D development
<b>Beverage</b>	Regulation; International standards; customers' requirements	Competitors initiatives (Beverage Ltd A)	Knowledge sharing
<b>Novel</b>	1.Headquarter requirements in automotive industry; 2. week national and industrial standards in food industry	1.Mimetic pressure was less emphasised in automotive industry 2.Domestic companies in food and beverage industries tend to imitate successful competitors	Awareness and action of sustainable SCM in food industry is relatively weak

## 6.7.1 Companies in automotive industry

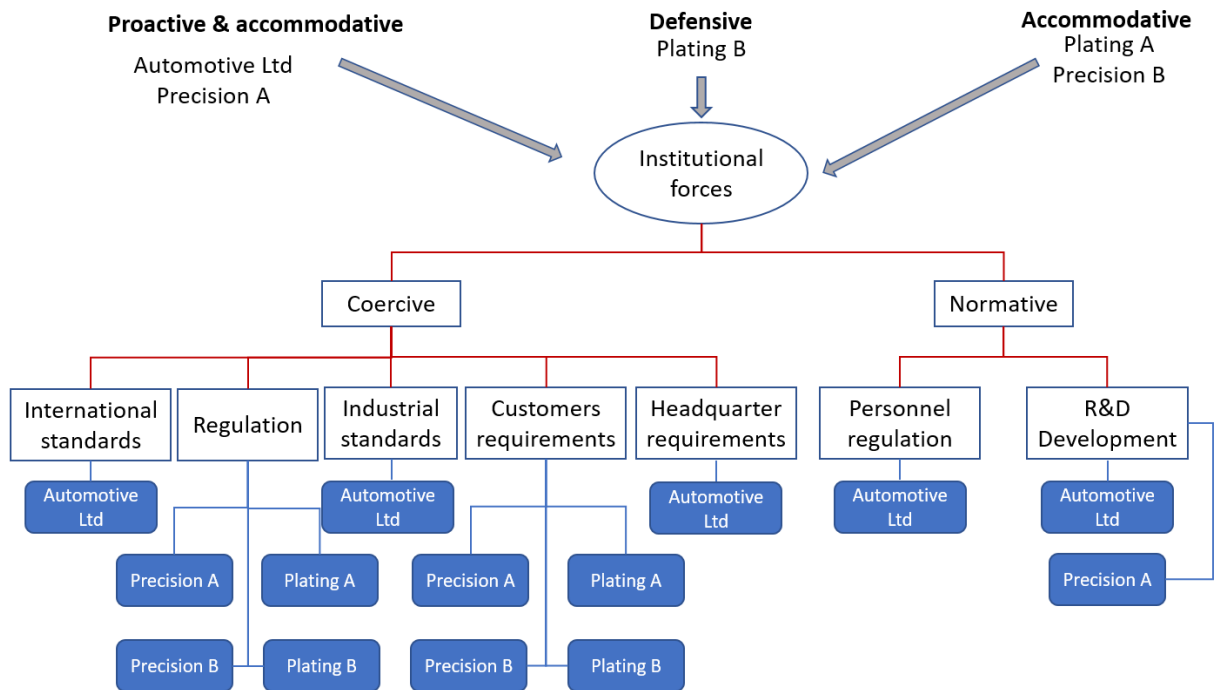
### 6.7.1.1 Coercive isomorphism and company strategy

In the current study, automotive companies appear to particularly emphasise *coercive isomorphism* (Figure 6.6). In this case, the primary reason is because the focal company, Automotive Ltd, is foreign-owned by its company headquarters in Germany; in other words, the coercive pressure is mainly from international regulations and industrial standards. The participants in Automotive Ltd said that 'Germany has a guiding program for specific approaches. Such as requiring use of yellow log for pedestrian region, but where to set up the yellow line is according to the actual situation of the factory.' There

is some degree of localisation, however, where the headquarters have merely a guiding program and standardised operation systems; for example, requests of RoHS and REACH compliance to address sustainable impact on both human health and the environment. Therefore, Automotive Ltd complies with its suppliers for environmental responsibility. 'Social responsibility is also the corresponding codes, but only when customers require do we then comply with our suppliers', as stated by the quality control manager. Apart from standardised compliance for products, the headquarters also list the 'must-have' facilities for employees: inside the workout area there must be a yellow logo region indicating the routes for pedestrians for safe and security concerns; a designated area should be setup for casual interaction; on the back of each door in the washroom, a picture is presented to remind employees to drink sufficient water, indicated by concentration of their urine (picture below).



Figure 6.6 Institutional forces and company strategies in automotive companies



Coercive pressures for companies Plating A, Plating B, Precision A, Precision B are mainly from government regulations and customer requirements. However, different **company strategies** could moderate sustainable implementation to some extent (Figure 7.6). Table 6.11 has also given examples clarifying the contests of four company strategies in this study. In a proactive company, according to the procurement managers in Precision A, ‘... like these prime customers, it is very important for their corporate images. They have an annual review which includes the quality system review, and reviews for environmental and CSR implementations’. When asked whether the pressures are from local government, she said ‘It is more customer-driven and environment-driven because all our customers are high-end and the products are exported to Europe. Each year we have to meet the declaration ... keeping the pace is sustainability.’ In this case,



'environment-driven' is interpreted as industrial standards and expectations because, as she explained, the capacity of the factory exceeds the Chinese government requirements for sustainable practices; therefore, maintaining a frontier in the industry is a way of conducting sustainable practices. Not only do they comply with customer requirements, but they also introduce new products to customers; for example, to convince customers to use spray-free paint for products, in order to reduce environmental impacts as well as avoid damage to human health from chemical toxins, such as formaldehyde and p-Xylene.

Table 6.11 Company strategies in this study

Rating	Strategy	Cases in this study
Defensive	Admit responsibility but fight it	Observation in the factory contradicted the participants' claim that the employees were required to use masks and gloves in production (Plating B).
Accommodative	Accept responsibility	' In fact, our business are in international standards after joining the WTO... ' (Carton Package)
Proactive	Anticipate responsibility	I provide and tell them (the farmers) how to use the seeds and pesticides ... In the long-term, as long as they planted them, I have to buy the vegetable, at least I have a reserve price for them' (Vegetable Trader).

Adapted from Clarkson (1995)

Companies that adopt accommodative strategy accept institutional forces and stakeholder expectations in implementing sustainability; moreover, they target success in meeting the highest level of requirements. Managers in Plating A company explained that their implementation of ISO14001 and TS16949 is not because of customer requirements, but mainly '... due to the development of the enterprise to some extent. If you want to continue to develop, you have to meet international and industry standards.'

Plating B company adopted a defensive strategy towards institutional forces of sustainability. Walker *et al.* (2008) have suggested that some companies do not comply with institutional regulation, but are making efforts over environmental issues for cost-saving. This is what has been observed in this case. Even though managers presented positive attitudes towards national regulation and industrial requirements for environmental and social responsibilities, the company pays most attention to recycling because the raw materials are silver and gold. 'The annual recycling amount is more than 100 kilograms ... if not recycled, it would be wasted.' However, in terms of environmental issues, such as water discharge and gas disposal, the company relies solely on central processing within the manufacturing area. ISO 14001 standards do not apply to the company because they are not required. ISO 9000 is the certificate they update every two years for quality control. They also claimed that workers must wear masks and earplugs during production; however, observation within the manufacturing lines did not corroborate their statement – employees are surrounded by gas and noise pollution.

#### **6.7.1.2 Normative isomorphism and company strategy**

In respect of *normative pressures*, there is no evidence observed from defensive companies, which is unremarkable since defensive companies are doing the least that is required rather than actively and collectively dealing with environmental and social issues. Companies holding accommodative strategies are endeavouring to improve their social and environmental implementation. For example, Automotive Ltd have set their personnel regulations in a special EHS which is responsible for the entire company's internal health, safety and environmental issues. Engineers are responsible for conducting special management approaches for dangerous operations. As specified in

the EHS statement, all employees benefit from the same type of health insurance and annual health check, regardless of their positions, in consideration of human health and equity. Proactive organizations, such as Precision A company, have established an R&D Centre for investing environmental-friendly solutions for their products; at the same time, they try to increase their professionalisation of the field by sending representatives from the R&D centre to participate in related seminars each year.

Some companies do not necessarily embrace clear strategies for sustainable SCM. Rather, managers' decisions and leadership style prove to be constructive in interactions with stakeholders. For example, Plating A company holds a hybrid strategy - a combination of accommodative and proactive strategies, in their strategic decision-making for sustainable SCM. In terms of environmental responsibilities, the company follows international standards and believes that these are higher than national standards. Therefore, they obtain international certificates, such as RoSH, REACH and TS 16949, to meet customer requirements. The company also applies a recycling policy. Similarly, in their social responsibility, the company is proactive and doing more than is required. Not only do they follow the Labour Law in China, but also offer various compensation schemes to employees for when they get married, when family members suffer serious illness or pass away, when giving birth, and even on Children's Day.

### **6.7.1.3 Novel observation**

*Mimetic pressures* have not yet been observed in automotive companies. Possibly, this is because there are mature declarations of government regulations and industrial

standards. Also, it might be because the sample companies, especially the focal company and its first-tier suppliers, are succeeding in environmental and social practices in the market. According to the manager in Precision A company, ‘... you might find our operations in a textbook’. Whether this is true, it indicates that they are recognised by their stakeholders.

From these observations, it is noted that, although every company operates under specific institutional regulations and industrial standards, the degree to which sustainable practices are put into action is highly moderated by company strategies. Sustainability is mainly driven by external factors, while internal drivers matter in respect of the extent of implementations.

## **6.7.2 Companies in the food industry**

### **6.7.2.1 Coercive isomorphism and company strategy**

With regard to companies in the food industry, *coercive isomorphism* is the major institutional force for enforcing firms’ implementation of sustainable SCM (Figure 6.7), which shows findings consistent with previous studies (Carter and Easten, 2011; Touboulic and Walker, 2015; Varsei et al., 2014). However, it is claimed that there is a lack of standardisation in regulations and industrial requirements, as emphasised by the managers from Vegetable Ltd, Vegetable Trader, Food Processor and Restaurants Owner. ‘This is a problem of our laws and regulations ... when cooperatives have spent money but no one does things [authority does not regulate and governance of environmental and social responsibilities is without clearly set standards] ... [so we] did not achieve the

desired goals', interpreted from Vegetable Ltd. This has resulted in inconsistencies and coordination difficulties in the industry (Roth et al.,2008, p.30). In this case, for companies that have set accommodative strategies or defensive strategies for sustainable practices, including Vegetable Ltd, Carton Packaging, Food Processor, Restaurants Owner and IT provider, the levels of their sustainable SCM implementation are relatively low compared with companies in the automotive and beverage sectors.

#### **6.7.2.2 Mimetic isomorphism and company strategy**

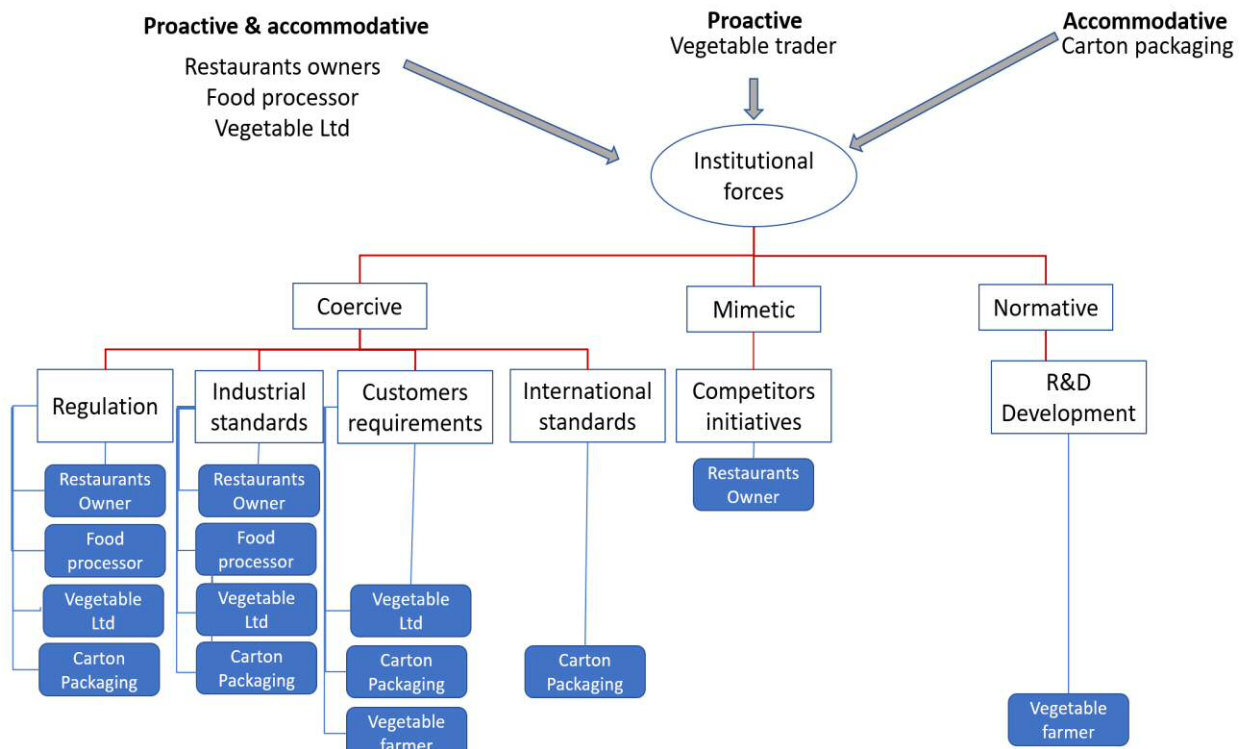
The Restaurants Owner has experienced a high level of *mimetic isomorphism* because of its competitors, such as McDonald's. Proactive strategy is employed in food quality and security. The respondent emphasised the supply of hygienic food by adopting 5S standardisation in restaurant chains.

#### **6.7.2.3 Normative isomorphism and company strategy**

Surprisingly, the Vegetable trader, directly trading vegetables from farming to Vegetable Ltd, is the only player that embraces proactive strategy. They have established long-term relationships with the farmers. The trader assigned environmentally friendly seeds for the farmers to avoid land pollution. Professional and technical staff have been invited to observe and measure whether the land is suitable for farming and with which crops, reflecting the normative isomorphism of sustainable practices. The trader then assigned the farming according to farmers' decisions regarding crops and quantity to match farmers' working capabilities with their expectation. Furthermore, the trader has implemented social responsibility by guaranteeing the minimum price for all products

farmers have cultivated. He explained that it is very vulnerable when there is a natural scenario, such as typhoon in the summer, when many vegetables are damaged; or when there is overproduction. 'It is difficult for the farmers to pay for the loss and uncertainty, so I guarantee the minimum price for the vegetable, whether they are damaged or overproduced, as long as the farmers work closely with me', the trader said.

Figure 6.7 Institutional forces and company strategies in food companies



#### 6.7.2.4 Novel observation

Apart from institutional forces, Vegetable Ltd stated that it is 'business ethic' to assume environmental and social responsibility. Therefore, this company has also practised a hybrid sustainable SCM strategy – accommodating and proactive strategy. For proactive practice, they regard their employees as part of their family – providing five meals per

day and attempting to increase employee wages as much as they can. They listed the company's priorities in order as: increase the wages of employees; company's sustainable practices (economic); social responsibility (for communities). From this perspective, the personal integrity and decision-making of senior managers significantly influence company strategy and practices in sustainable SCM.

### **6.7.3. Companies in the beverage industry**

#### **6.7.3.1 Coercive isomorphism and company strategy**

Similar with other cases, *coercive isomorphism* appears to be the primary driving factor for implementing sustainable SCM. In the beverage industry, domestic companies primarily react to national regulations (Figure 6.8). Proactive firms, such as Beverage Ltd A, have set up a legal department to interpret and discuss government policies. For a company conducting international business, such as the Sugar Processor, it was stated that requirements from customers are increasingly rising. Environmental guidelines are usually provided with non-negotiable terms and customers have authorized a third party to evaluate performance each year.

#### **6.7.3.2 Mimetic and normative isomorphisms and company strategy**

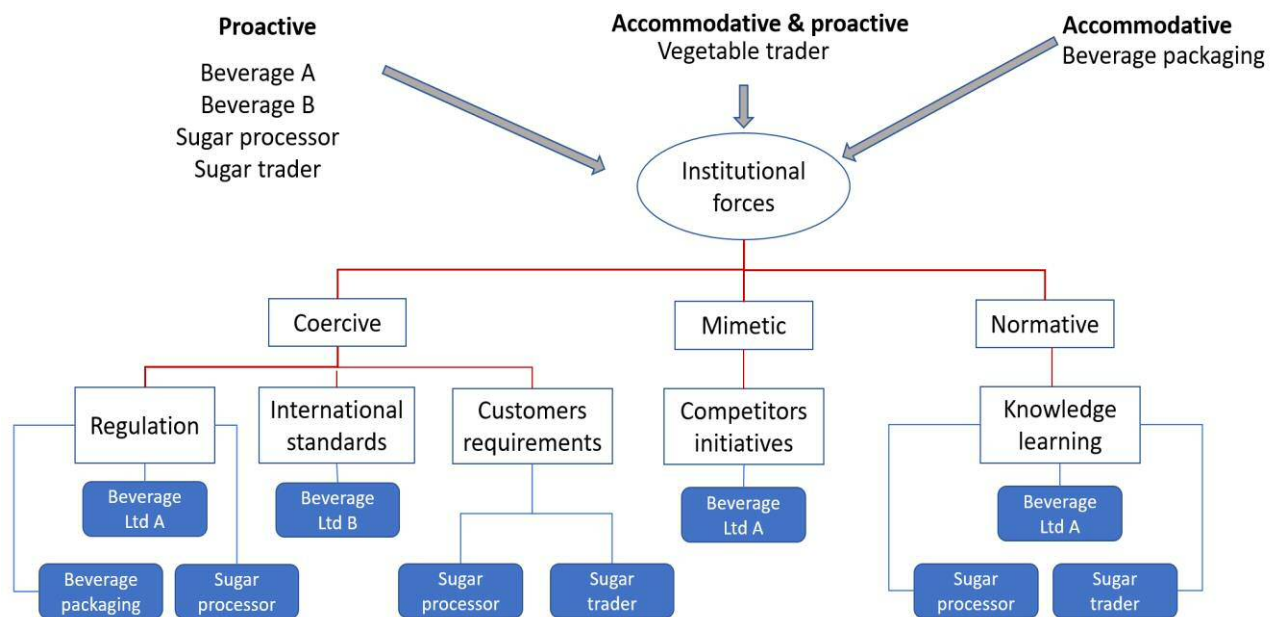
For proactive firms, such as Beverage Ltd A, Sugar Processor and Sugar Trader, *mimetic and normative isomorphisms* are also essential for enforcing environmental and social responsibilities for their supply chains. It is expected to be 'a company-wide strategy', where sustainability is not for an individual department or a company, but 'sustainability and serving strategy should be approached before we start with our business activities;

otherwise, we will be ruled out', according to the respondent from the Sugar trader. For company Beverage Ltd A, even though they have a strong marketing position as a domestic firm, there is substantial competition from international brands. Therefore, environmental issues, such as measuring and assessing chemical composition, are critical before procuring raw materials. The companies are also continually learning and imitating sustainable practice strategies and activities from their competitors. These companies have also recruited professional staff or external bodies to collect market information and develop their sustainable practices, aiming to enhance company competitiveness and internal efficiency for reducing waste. Sugar Processor has also published their Sustainable Report.

Beverage Ltd B is an international company which has well-developed environmental and social responsibilities. Therefore, the company has balanced the three institutional pressures with proactive strategy for sustainable practices. Being a global leader, the company has applied considerable energy to their sustainable responsibilities. An annual report has been published to indicate their efforts. As a pioneer in promoting sustainability, the company not only implements environmental responsibilities, such as reducing usage of electricity and water, but also promotes social responsibilities, such as raising awareness of embracing a 'Healthy Life' by organising charitable outdoor activities in more than 30 cities in China; donating clean water for areas in drought; training employees to lecture as volunteer teachers in impoverished areas. Brand image and corporate reputation are of such importance that the company has employed an engineering company to help design and meet requirements from EHS security.



Figure 6.8 Institutional forces and company strategies in beverage companies



### 6.7.3.3 Novel observation

Observations from the case studies indicate that companies in the beverage industry largely face national regulations for environmental responsibility, which is evaluated by the Environmental Protection Agency. In this case, accommodative strategy is most relevant to respond to government regulations and customer requirements by providing ISO certificate, food industry production license, recruiting qualified suppliers and recycling waste materials. Proactive firms pay additional attention to mimetic and normative pressures with learning from professional staff, consultancies, external bodies and even competitors, to secure their brand image and competitive advantage in the market.

## **6.8 Summary**

### **6.8.1 Reflecting upon RQ3, RQ4 and RQ5**

Developed from the survey findings, this chapter is focused on answering the research questions of how social networks (RQ3), institutional pressure (RQ4) and company strategy (RQ5) influence sustainable SCM implementation.

The current study has identified various types of social networks, with community and friends, customers and suppliers, and employees, and further addressed their impacts on individual behaviours and sustainable SCM implementation. At macro level, social networks carry institutional logics of sustainable practices and diffuse to the network members through socialisation, social identification, cultural preference and social learning. At the organisational level, social networks increase the flow of social capital, which drives efficient flow of financial and human capital. These findings are consistent with the results in the survey, regardless that the SEM does not investigate the relationship between the three types of capital in supply chains. Social networks have also created the mechanism of network selection. Actors hold different perspectives regarding the influence of social networks, passively or actively committing to sustainable SCM, which is moderated by the company's strategy under stakeholder's pressure.

At supply chain network level, social networks impact on supply chain structure and supply chain network scope. Automotive supply chain network is represented as a sequential structure where players cooperate with one another, between customers and

suppliers, to meet environmental and social responsibilities. Relational ties and personal connections drive high transiency, dependency and shorten distance among upstream and downstream players. In the food industry, reciprocal network structure was addressed with close personal and institutional relationships. Sustainable practises were supported by sustained financial and human capital with Interpersonal, knowledge, cash and materials flow. Under this circumstance, supply chain appears with high transparency and close distance. However, dependency level in this case is relatively low due to different organisational strategies in individual firms. Companies in the beverage industry show a pooled network structure where companies that do not directly link together (Beverage Ltd A and Beverage Ltd B), have weak ties through underlying common connections (Sugar Trader and Sugar Processor). As such, environmental and social responsibilities were formally monitored; in other words, social networks have limited influence on sustainable SCM implementation in this case. The levels of transparency and dependency between upstream and downstream appeared to be relatively low, even though suppliers tended to keep close geographical proximity with customers.

With regard to the RQ4 and RQ5, coercive isomorphism was the primary pressure on complying with environmental and social responsibilities due to national and international regulations, industrial standards and customers' requirements. Proactive firms have additionally reacted to normative isomorphism. In particular, in sequential and reciprocal network structures, players work together for information and knowledge sharing, joint R&D and integrated production processes for reducing environmental

impacts. Mimetic isomorphism was addressed in food and beverage industries. Evidence shows a certain differentiation between domestic firms and international companies where environmental and social responsibilities have been initially developed. Moderated by company strategy, proactive firms imitated sustainable implementation from their competitors in the market, and diffused their knowledge into social networks. Such efforts and process again reflect on social learning in social networks. For accommodative and defensive companies, sustainable responsibilities were assured by coercive isomorphism. Furthermore, it is less likely that companies would attempt to comply with their suppliers or contribute to the community in terms of environmental and social responsibilities. Sustainable SCM is driven by market-oriented and economic benefits.

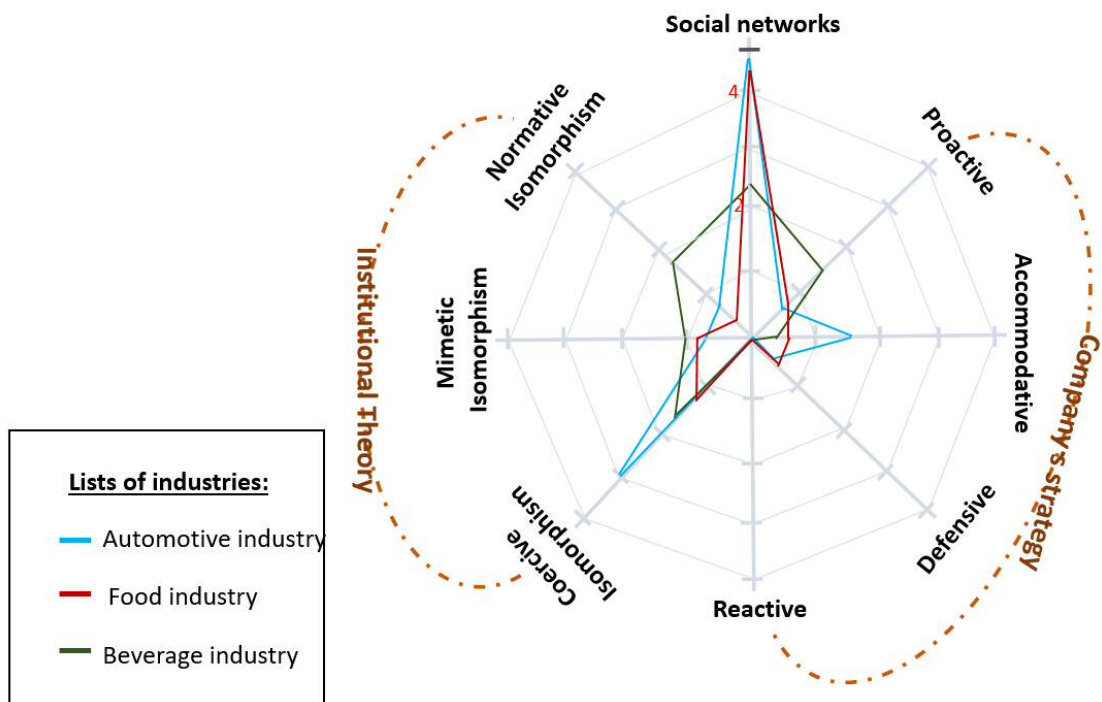
#### **6.8.2 Drivers for sustainable SCM from supply chain network perspectives**

Previous sections have discussed the three drivers for sustainable SCM independently to understand each factor thoroughly in answering RQ3, RQ4 and RQ5. Equally, it is worthwhile, in this section, to investigate how internal and external drivers work together and influence sustainable SCM implementation as a social system. Observations in Figure 6.9 show that in the automotive industry, social networks with various stakeholders are highly emphasised. As discussed previously, personal relationships inside companies increase communication, coordination and teamwork outputs between staff, which supports the argument that personal ties increase productiveness and performance in organisations, apparent in social network study (Heimer, 1992). Social networks also link with supply chain capital flow between companies and their

stakeholders, including buyers and suppliers, between firms and their competitors, and government policy-makers. In the automotive industry, due to the nature of a high entrance level with severely high standards and industrial requirements, social networks among players improve information and knowledge flow, technology flow and material flow. Trustworthiness is embedded among agents for partnerships and mutual development.

The automotive industry is also an example of showing an encouraging combination of formal and interpersonal governance, universalism and particularism when discussing institutional forces and social networks. The paradox of governance mechanisms between these two contexts is contradicted in literature, whereas it is shown to be complementary in real cases. There is a high coercive isomorphism in the automotive industry, with national and international requirements, particularly industrial standards and international regulation in environmental responsibilities; therefore, most companies adopt accommodative strategies, doing more than is expected by stakeholders towards their environmental and social responsibilities. Social network complements institutional forces by encouraging integration and collaboration from upstream and downstream players. Especially when things go wrong, companies exert an effort to 'help the least' of their suppliers and employees, instead of terminating contracts and recruitment relationships.

Figure 6.9 Driving factors in each industry



Note: distance to the center=the average of frequency of codes in each supply chain

Source: Author

Social networks are also important in the food industry for vertical integration. As noted, coercive isomorphism is equally important in this industry; however, there is a lack of national regulation and industrial standards in this sector. Therefore, proactive players tend to integrate supply chain capital within the networks to respond to uncertainty, such as programming for achieving traceability and transparency; forecasting inventory and replenishment; and integrating production processes. In the reciprocal network structure, players act with adjustments and imitation towards mimetic isomorphism. However, due to weak institutional and industrial regulations, accommodative and even defensive strategies towards sustainable SCM appear in both upstream and downstream companies. For example, there is no tactical approach to reducing food waste in the

entire supply chain network. When discussing whether to use plastic baskets instead of carbon boxes for shipping vegetables, Vegetable Ltd gave a clear answer that 'prices for plastic baskets are much higher, and our government does not offer any compensation for using recyclable baskets in shipping'. Yet, sustainable SCM appears to be profitability-driven in this industry, even though proactive firms are, to some extent, endeavouring to improve sustainable practices.

For the beverage industry, the pooled network structure directs a standardisation managing approach. Therefore, the influence of social networks seems generally to reflect weak ties, even though some players have maintained strong ties over a decade. Companies follow national and international regulations for sustainable practices. However, when companies are highly dependent on specific natural resources and suppliers have the power, customers have less influence on compliance with corporate codes of conduct for sustainability to their suppliers. Reflecting on the facts, coercive isomorphism is relatively less emphasised, compared with the automotive industry. Large international companies appear to have developed mutual corporate strategy for implementing environmental and social responsibilities, which creates an example for others to follow. Therefore, the mimetic pressure is relatively high in the sector and for proactive firms, investments in R&D and professional learning are significant in improving their environmental practices.

To summarise, social networks substitute for institutional regulation in sustainable SCM whereby institutional forces are weak, which is influenced by company strategy in practices.

## Chapter 7 DISCUSSION

### 7.1 Introduction

This chapter discusses and integrates the results of the current study together with the research questions. It is also structured and reflects on the research methods that this study has adopted – of how and why the development of a mixed-method was the right approach for data collection and answering research questions. The structure is set up in accordance with the research questions of the study.

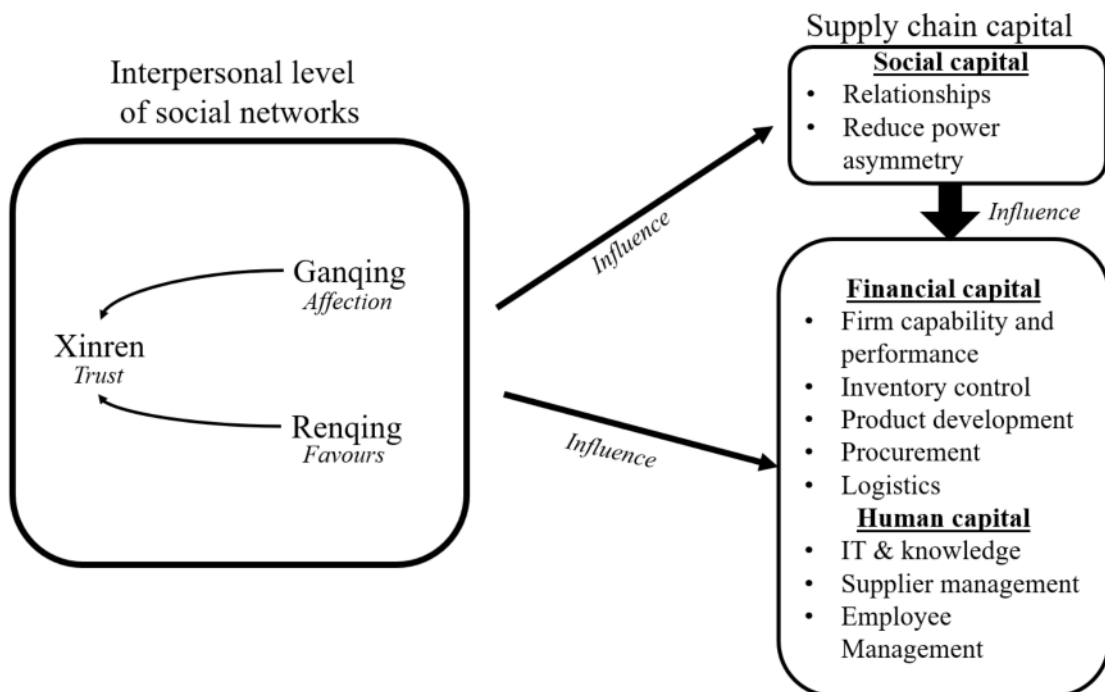
### 7.2 RQ1: How are flows of supply chain capital influenced in social networks?

The discussions of the influence of social networks in Confucian societies were based on understanding the meaning and constructs of social network in a specific context. Therefore, this study initially investigated the constructs of *guanxi* networks and their interlinks. From the systematic literature review, it was found that *ganqing*, *renqing*, and *xinren* were mostly addressed as the core constructs in *guanxi* networks, aligned with current literature (e.g. Park and Luo, 2001). However, regarding their internal relationships, the empirical findings contested the review results that they are interlinked and complementary (Figure 2.5) as current literature argued (Yen et al., 2011). Rather, empirical findings addressed how *xinren* is embedded in *ganqing* and/or *renqing* - without certain levels of emotional affection or reciprocal exchange, people trust any strangers with difficulty. Under this circumstance, organisational governance is carried by 'narrow contractual interface structure' (Faemes et al., 2008, p.1070) where transaction is only applied on clear contracting terms and responsibilities. Their argument



of such, to some extent, showing the opposite logic of social networks research – to increase personal ties and interactions in order to benefit network economics. Therefore, from a social network perspective, this study refined the relationship among *Ganqing*, *Renqing* and *Xinren* and continues to analyse the impacts on flow of supply chain capital (Figure 7.1).

Figure 7.1 Refine the influence of social networks on the flow of supply chain capital



Source: Author

Findings in this research show that supply chain capital, including financial, human and social capital, move and exchange between actors when they interact. Sociologists have addressed the embeddedness of economic behaviours in structured social networks and supply chain researchers have gradually highlighted social network and its impact on

practices (Borgatti and Li, 2009). This current study has focused on three types of capital in the supply chain, while explaining the operational contexts of these three types (Table 2.5). The 'soft stuff is the hard stuff' (Rodney, 2014), which leverages supply chain effectiveness and performance. The flow of capital is influenced within specific structure relationships and has a significant impact on supply chain functions, including sustainable practices which will be discussed in the RQ3.

Among the three supply chain types of capital, social networks primarily drive **social capital flow** through both strong ties and weak ties. In SCM, most research studies have paid attention to buyer-supplier relationships in relationship management (e.g. Nie *et al.*, 2011). In the survey questionnaire and SEM modelling testing, this study has examined the strong ties between buyers and suppliers and their impact on environmental and social practices. In coherence with existing literature (e.g. Yen *et al.*, 2007; Luo *et al.*, 2002), social networks increase the exchange of reciprocal assistance and emotional affections in relationship quality. Promoting a relationship-specific investment is important in SCM for constructing a stable environment in supply chain networks with uncertainty management.

Findings from both the survey and case studies support the arguments that social networks enhance relationship commitments and reduce power asymmetry in the supplying networks. Building and exchanging personal trust and social capital between players substantially reduce relational risks and increase collaboration in supply chain practice (Zhao *et al.*, 2010). Social capital plays an important role in stabilising SCM in the

automotive supply chain network, which reflects the feature of the industry where suppliers hold large amounts of manufacturing costs for the whole supply chain (Caniëls, Gehrsitz and Semeijn, 2013). This is similar to the food supply chain network, where Food Processor plays the role of integrating and sharing information about forecasting sales and inventory for their customers to reduce waste and costs. Players exhibit a high degree of trust in the reciprocal network structure with strong ties. Power asymmetry and relational risk is mitigated for long-term development (Caniëls, Gehrsitz and Semeijn, 2013).

Social network concepts could potentially be applied to both resource flow and less tangible relations (Borgatti and Li, 2009). In the current study, the researcher has observed that the utility of social capital linked to social networks influences the flow of financial and human capital. Secured by good social ties and social capital, actors react to the exchange and flow of **financial capital**. Being aligned with existing studies (e.g. Li and Lin, 2006; Shou et al., 2014), social networks have been shown to improve firm capability and performance in reducing lead time and improving delivery reliability. In the case of proactive companies, they work with close partners on a joint program, such as using cloud for tracing and recording information from land to people between Vegetable Ltd and IT provider.

Although the influence of social networks in each individual case could be diverse, one common factor the researcher has observed is the integration of inventory management for cost control. This finding is supported by the studies of Li and Lin (2006) and Zhao *et*

*al.* (2010). In the case of the beverage industry, the Sugar Trader plays the role of integrator, endeavouring to integrate logistics information with downstream and upstream players for inventory control of sugar storage and stabilising the price in the market.

Sustaining production systems has been particularly emphasised in the case of the automotive industry. Complying with high national and international standards of environmental and social regulation in the industry, focal companies pay significant attention to their sustainability responsibilities. Furthermore, due to the manufacturing of a large number of components being outsourced to suppliers, it is difficult to avoid social justice and criticism of the brands when things go wrong. Therefore, focal companies are held responsible for related problems caused by their suppliers (Koplin and Seuring, 2007). Under these circumstances, production quality appears to be highly emphasised in sourcing strategies and quality control departments. Social networks play the role of increasing mutual communication and helping for better improvement in product developments.

The flow of **human capital** in social networks was largely addressed as information sharing and knowledge learning, which then reflected on supplier and employee management. Strong ties in social networks leverage information sharing and technical support to transfer skills among actors (Cai and Yang, 2014), which has been confirmed from the survey findings and case studies. Firms technically support their partners in the supply chain to sustain mutual benefits. For example, in activities such as supplier

conference, supplier annual meeting, and joint new product development, technology and skills acquisition are transferred with specific aims and agenda. The flow of human capital is not limited between buyer and supplier, but is intra-organisational for employee training and skills development. For example, Plating B company indicated that their experienced technicians help and teach junior ones in improving their plating skills.

Surprisingly, the item of knowledge sharing and learning was not significant in the SEM model. Existing studies have generally distinguished the influence of relational ties and personal networks on knowledge sharing and transfer (Cheng, 2011). Later case studies have investigated this perspective further and are contrasting results. Accumulation of knowledge enables firms to coordinate activities and utilise resources; as members of strategic groups, people often share common resources and similar capabilities (Parnell *et al.*, 2014). Referring to Precision A company, one of the main reasons to attend industrial workshops and conferences and maintain communications with customers is because they believe that knowledge is embedded in social networks and other members have privileged intelligence they can learn from. Knowledge about environmental and social practices is a factor all companies tend to learn from and improve their networks to sustain competitive advantages. This includes not only knowledge about customers, suppliers, and government policies, but also about competitors. According to the firms of Provision A and Plating A, customers very often intentionally share knowledge about their competitors to increase competition and stimulate improvement in products and services. From this perspective, in-depth case studies have developed and

complemented the findings from the SEM model, which increases the validity and reliability of the current study.

Although social capital is essential for business collaboration after sustaining strong ties and human capital is significant for product development and control, this study found that obtaining financial capital was mainly highlighted in building social networks. Such arguments could suggest from the survey results that *guanxi* has influenced financial and human capital to a greater extent than social capital (0.92 V.S. 0.92 V.S. 0.84) shown in the SEM model and the case studies results. This reflects the literature findings that building *guanxi* and social networks in the business environment is primarily as instrumental ties standing for material and financial goals (Hwang, 1987; Huang, 2014). In other words, without foreseeing an increase in financial or human capital, players would have limited motivation to build social networks and increase the possibilities of knowledge sharing (Cheng, 2011) and collaboration (Luo *et al.*, 2015) for sustainable practices.

### **7.3 RQ2 What are the relationships between social networks and sustainable SCM?**

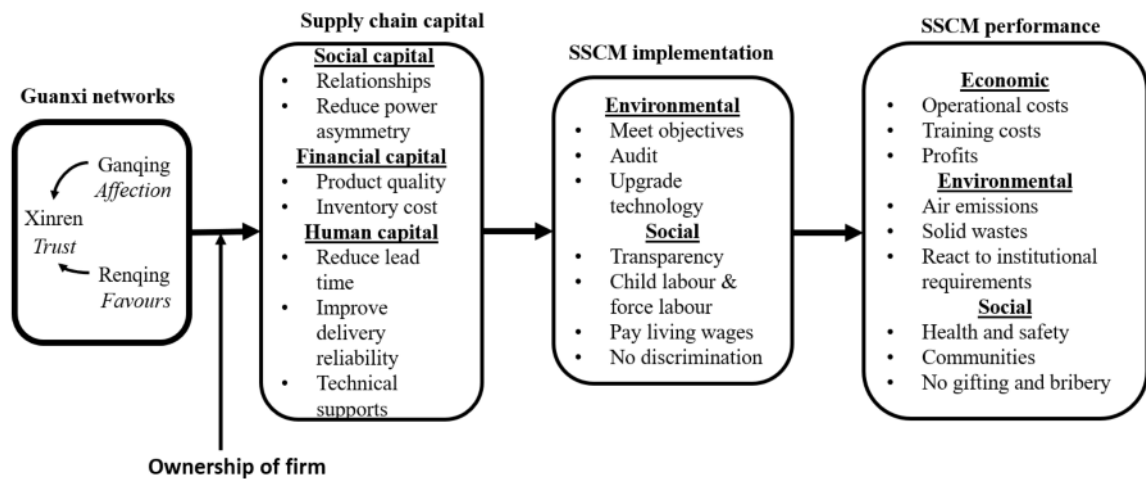
The findings provided the answer for RQ2 that *guanxi* positively impacts the implementation of sustainable SCM, fully mediated by supply chain capital. In other words, without considering the flow of supply chain capital, *guanxi* networks have no influence on sustainable SCM implementation nor sustainable SCM performance. Such a finding contradicts the study by Luo *et al* (2015) that *guanxi* can negatively influence

green supply chain collaboration. Neither does it support the arguments of positive influence from social networks on sustainable SCM as maintained by Vurro *et al.* (2010). Findings from the current study reflect the argument that building supply chain capital essentially enhances capacity and capabilities in dealing with supply chain issues, including sustainable practices.

Social capital has been found to play a significant role in environmental management (Chen and Hung, 2013; Cheng, 2011; Mauerhofer, 2013; Luo *et al.*, 2015). Consistent with current literature, findings show that social capital is closely linked with building long-term relationships for knowledge sharing and collaboration in environmental and social initiatives. Human capital from suppliers and employees assures the workforces' know-how to well-use of material and resources (Rawls, 1999) to efficiently practise sustainable SCM (Victor, 1996).

*Guanxi* also drives the flow of financial capital in social networks to enhance the capability of implementing environmental and social practices. Economic growth fundamentally assures the capability of innovation and investment for environmental and social practices, which is strongly linked to collaborations with outsider partners (Gold *et al.*, 2013, p.795). It generates economic growth for investing in innovation upgradation to solve environmental problems. From this perspective, human capital is recognized as a critical factor in sustainable practices (Reynolds *et al.*, 2009), which is associated with social networks between buyers and suppliers, as given by the survey findings.

Figure 7.2 Model to answer RQ2



Source: Author

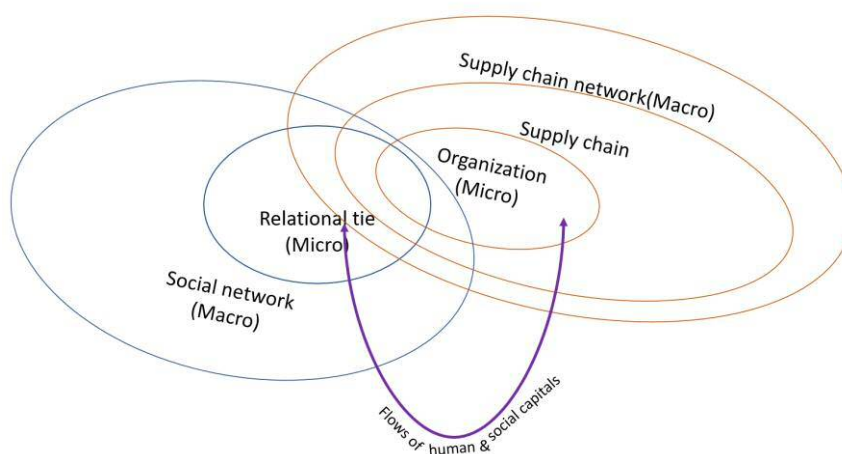
This study simultaneously examined the relationship between social networks in China and the implementation of sustainable SCM and found that guanxi networks positively increase the environmental and social practices in supply chains (Figure 7.2). As a result, performance in sustainable SCM is improved. Apart from the CFA and path analysis, the study also tested the control variable and moderators, for exploring the model in depth. Following Zhu and Sarkis (2004), firm size (in terms of number of employees) was tested as an extraneous effect to examine whether large companies and SEMs act differently in building and maintaining social networks. The results suggested insignificant influence in this regard. Neither is there a significant effect from the positions of the respondents. In contrast, Ownership of an organization does have significant influence on the adoption of social networks: private and domestic firms seem to emphasise personal ties more, compared with joint venture and foreign-owned companies, which is in accord with the arguments of Xing and Pearce (1996).



### 7.4 RQ3: How do social networks drive implementation of sustainable SCM?

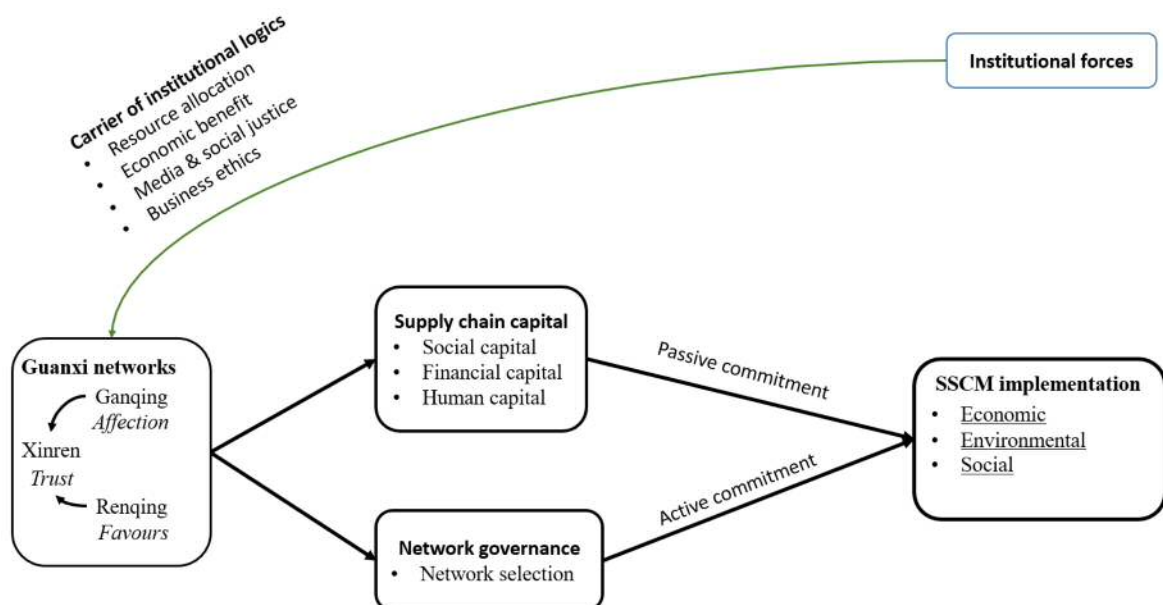
Social networks are argued to be the ‘micro-macro bridge’ turning small-scale personal interactions into large-scale patterns of influence and network behaviours (Grannovetter, 1973, p.1360). In the survey questionnaire, the unit of analysis was individual personnel and their knowledge of the impacts of social networks on organisational implementation of environmental and social responsibilities. Therefore, the analysis and discussion was at the micro levels in both social networks and organisational implementations (Figure 7.3). Developed from the quantitative findings, the unit of analysis in the case study was supply chain networks and investigating the influences of social networks. In this context, the scope of discussion was extended from individual personal to social networks, from firms to supply chain and supply chain network. The ‘micro-macro bridge’ of social networks was fully reflected and fruitful discussions were addressed regarding the impacts of sustainable SCM implementations.

Figure 7.3 The micro-macro bridge of social networks and supply chain networks



As Figure 7.4 shows, social networks carry the institutional logics of sustainable practices and diffuse to network members. However, in similar findings with other social networks research (e.g. Christakis & Fowler 2007), the influences of behaviours are rather slow in the processes of socialisation, social identification, culture presence and social learning. For industries, such as automotive and beverage, where international standards and requirements are well-developed, institutional logics of sustainable SCM could be easier to identify through learning and information sharing in social networks. However, for industry such as domestic food in China, it is difficult for the actors, either in firms or supply chain networks, to give clear identification of institutional logics of sustainability practices; therefore, sustainability implementation is rather raised from spontaneity. At the current stage of industrial practices, the main reasons in institutional logics include resources allocation, economic benefit, media and social justice. Business ethics were reported in proactive firms in the food supply chain that are working for the next generation.

Figure 7.4 Model to answer RQ3



Social networks increase the flow of supply chain capital, which is confirmed in the SEM findings. In addition, social networks influence individual behaviour in terms of network selection – to select partners who share similar values and vision of sustainable SCM. At the micro level of personal ties, the constructs of emotional affection (*ganqing*) reciprocity (*renqing*) and trust (*xinren*) influence the degree of dependency, transparency and distance among players (Awaysheh and Klassen, 2010). Due to the fact that all organisations are in human actions (Marx, 1995), personal ties then influence decision making and behaviours in approach as a result of supply chain structure - dependency, transparency and distance. Certainly, the degree of influence from social ties are moderated by company strategy.

With respect to the ‘micro-macro’ influence, it is difficult to justify where the starting point lies - in social ties or in close supply chain relationships and supply chain structure - but it is in a circulating, continuous progress. Even though it is believed that supply chain is the management of the flow of material and information within the network (Harland, 1996; Christopher, 1998), the distinct structure of networks might correspond to specific supply chain structure and dependency. At the macro level, in this study, the researcher has managed to identify three supply chain networks from empirical study; namely, reciprocal interdependence, sequential interdependence, and pooled interdependence. In a reciprocal interdependence network, agents are mutually dependent on the choice and actions made by each other (Lazzarini *et al.*, 2001, p.11); therefore, in theory, the degrees of dependency and transparency in the food supply chain network are expected to be high. Observation shows that there is a high level of transparency due to

partnership strategies, and short geographical and organisational distance among players. Network members in such structures share the same values and vision in sustaining business development, and their responsibilities for industrial standard setting, and environmental and social responsibilities. They believe that it is morally right to implement sustainable practices. The focal company (Vegetable Ltd) regards their customers and suppliers as friends, and treats their employees as family, striving to seek benefits for everyone within the network. Such structural and network ties drive a higher degree of commitment and integration in sustainable SCM implementation, particularly social responsibilities to meet expectations from network members.

The automotive supply chain network displays a typical kind of sequential interdependence structure. It involves direct relationships between actors in a serial fashion, which is described as a supply chain associating with buyer-supplier relationships. Relational ties among players carry an important role in improving communication, and helping one another between buyer and supplier to achieve better performance and sustain leading positions in the market. Given that sustainability standards are relatively high in the industry, social networks increase integration and collaboration in sharing R&D and innovation capabilities for performing economic, environmental and social responsibilities. In such structures, transparency and dependency show high values, compared with other cases. As a result, their supply chain is stable, with low risks, which is the most important factor for sustaining SCM, according to the quality control manager in Automotive Ltd.

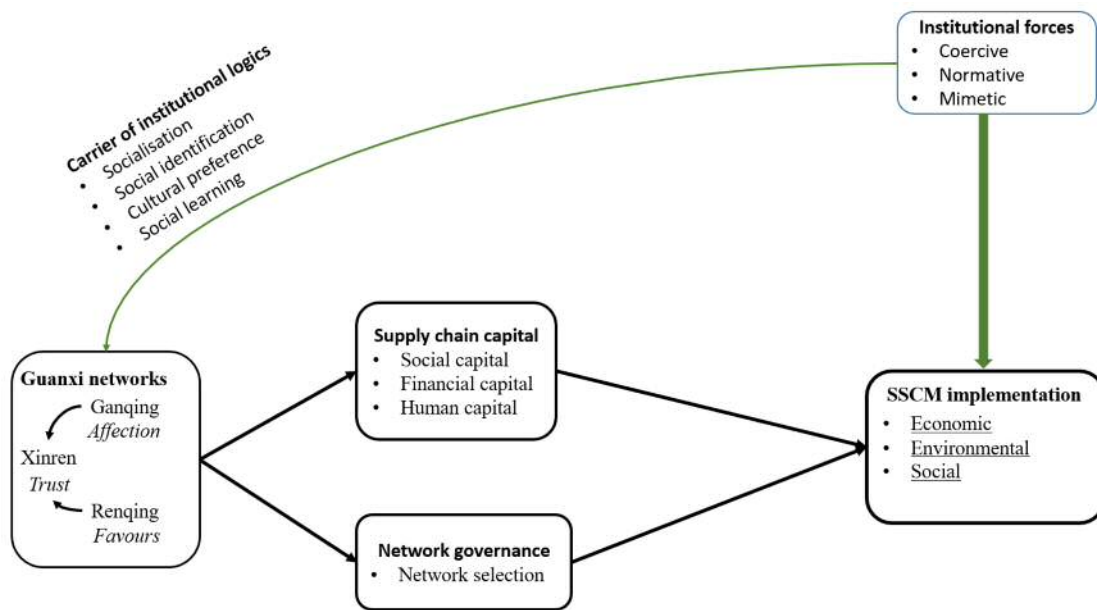
The governance mechanisms in these kinds of networks attempt to reduce transaction costs and increase efficiency between downstream and upstream stages (Lazzarini *et al.*, 2001). In the automotive case, there are high degrees of integration and collaboration between customers and their suppliers, for joint R&D and new product innovation with purposively close geographic distance suppliers, players with an ability to 'be easy to contact with', as stated by the Plating A. Efficient communications are needed to ensure the meeting of standards.

Interpersonal networks lie beneath organisational relationships and networks, influencing the implementation of environmental and social practices. As we are aware, Automotive Ltd is a foreign-owned company with German headquarters. Therefore, requirements for sustainable responsibilities are on a high, international standards level (higher than national standards), and the focal company complies with their corporate code of conduct for their suppliers. On the other hand, when their suppliers face difficulties in meeting requirements, the company provides training and helps to improve sustainable SCM performance, rather than using the hard code of punishment and directly terminating contracts. Some strategies have been applied by his suppliers to their upstream suppliers. Not only do people in the role of decision-making and implementation become more knowledgeable and effective through exchange of information and technology, as Johnston and Linton (2000) suggested in their study, but also players helping their partners to reach the same level of sustainability standards for long-term development.

## **7.5 RQ4 How do institutional forces drive sustainable SCM implementation?**

Given the importance of institutional forces, and reflecting on the survey observations, this study extended the discussion to formal regulation and requirements to understand influence from the institutional environment, in turn, to better understand the impact from social networks. Shown in the Figure 7.5, in this study, institutional forces drive sustainable SCM implementation through coercive, normative and mimetic isomorphism with coercive isomorphism dominating. In alignment with current studies (e.g. Glover *et al.*, 2014), existing powerful pressures from customers, international and national requirements, and industrial standards are applied to players in the supply chain, affecting decisions regarding sustainable activities (Brown *et al.* 2006; Tate *et al.*, 2010). In pursuit of the desirable standards of sustainable practices to satisfy customer and stakeholder expectations, branding companies, such as Automotive Ltd and Beverage Ltd B, often legitimise and introduce environmental and social responsibilities to their suppliers. To ensure economic benefits and gain competitive advantage in the market, smaller suppliers often follow the regulations/compliance from customers, even when the requirements are at higher standards than national regulation. This logic is often applied in a sequential supply chain structure when customers have the power to monitor and audit for environmental and social performance.

Figure 7.5 Model to answer RQ4



Source: Author

However, exceptions occur when suppliers have control of natural resources, and are thus in a powerful position, such as the suppliers for Plating B and Beverage Packaging. In this case, customers have limited power to exert compliance with sustainable responsibilities to their suppliers; therefore, coercive pressure is relied on from national regulation and industrial standards.

Normative and mimetic isomorphisms are closely linked with companies' strategies. Observations have noted that in pooled network structure, companies have experienced greater mimetic isomorphism due to competition, such as Beverage Ltd A and Beverage

Ltd B, Restaurant Owners, and their potential competitor, McDonalds, to imitate the actions of successful competitors and improve their environmental and social practices.

As noted, institutional pressures play an incremental role in regulating organisational practices for environmental and social practices (Brown *et al.* 2006; Sarkis *et al.*, 2011). This, however, differs from the findings of Chkanikova and Mont (2015) where the majority of interviewees confirmed the influence from legislation in the food industry, such as food safety standards, waste and energy regulation, legitimised in EU labelling rules. Practitioners interviewed in the case of food have expressed concern for the lack of regulation and standards in the food industry in China. Despite being specifically regulated, including Food Safety Law of the People's Republic of China, the food industry has gone through many crises (Roth *et al.*, 2008; Turi *et al.*, 2013). Sustainable practices in the food industry are challenging because they involve a long chain and at the end of the upstream are farmers who have limited knowledge about sustainability, but are fighting for survival. On the customers' side, whether they take initiatives for protecting the environment and committing to social responsibilities is more a matter of spontaneous rather than regulated behaviour, which is then highly dependent on the implementer's decision-making and company strategy. In this case, the influence from social networks seems to be important, as is reflected in the case of reciprocity interdependence networks. Apart from seeking economic benefits (e.g. achieving traceability from farm to folk), proactors in the food supply chain network have endeavoured to push for resources integration, energy reduction, and performing social responsibilities for employees, suppliers (including farmers) and social communities.



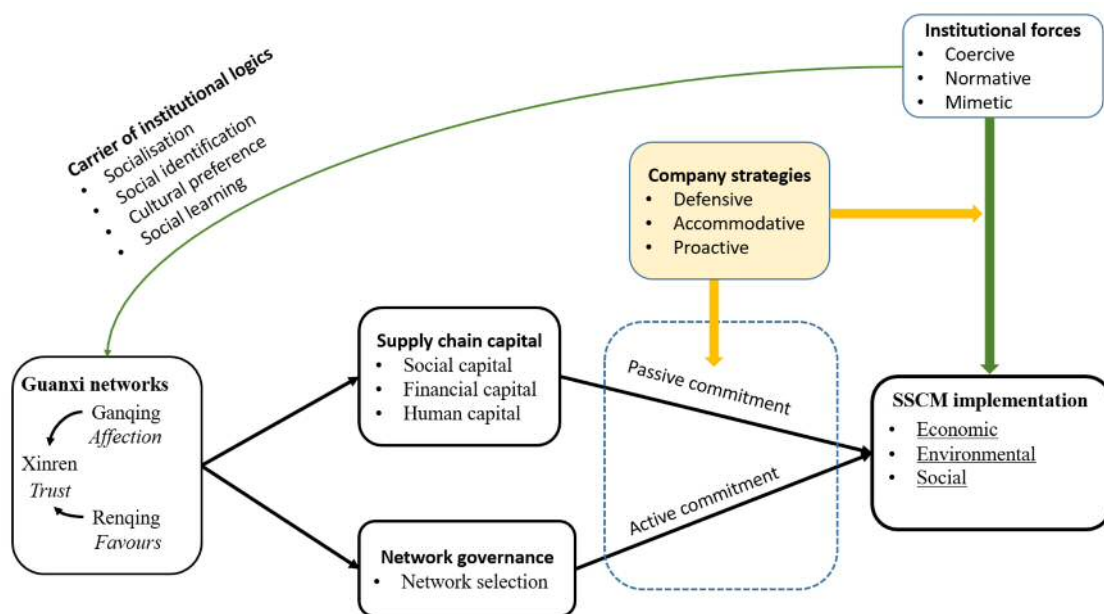
## **7.6 RQ5: How do companies moderate the influence from social networks and institutional force?**

SCM is in the frontline of sustainable practices, which, it has been argued, is driven by stakeholder pressures (Meixell and Luoma, 2015) in influencing firms to adopt sustainable decisions or goals (Zhu *et al.*, 2005; Wolf, 2013); for example, external stakeholders regulate public opinion (Zhu and Sarkis, 2006) and managerial stakeholders apply pressure for proactively planning and implementing sustainable strategies (Sarkis *et al.*, 2010). This study has examined the moderating role of company strategy, and revealed that regardless of the impacts from institutional forces and social network pressure, the degree to which a company acts on sustainable development practices depends on their strategy – defensive, accommodative or proactive.

The Figure 7.6 shows the final model of this study. It was observed that proactive firms, such as Precision A, Beverage B and Vegetable Ltd, often seek proactive response to environmental and social practices to achieve competitive benefits, which is influenced by the social complexity and network positions of organisations. Competitive benefits are seen as the outcome of emergent organisational capability in sustainable responsiveness strategies (Sharma and Vredenburg, 1998). Therefore, although companies have shared the same social networks, such as Food Processor and Carton Packaging, different strategies (proactive vs. accommodative) drive, then, towards various outcomes of sustainable SCM implementation. Although Food Processor has less experience in implementing sustainable SCM, it demonstrates the emergence of an organisation's capabilities for innovation in processes, inputs and operating systems, to create

competitive benefits, including cost reduction and leading industrial development. Another outstanding case is that of Beverage B, where, even though the company has set up a standardised managerial system whereby social networks with suppliers have less influence on managerial decisions, the company maintains an emphasis on social networks with employees to encourage their company staff to perform social responsibilities, such as being volunteers for education in poor areas, or promoting walking to reduce environmental impact. Internal stakeholders, including employees and managerial roles, have shown collaboration and emergence of talent and capability to perform responsibilities for the planet and society.

Figure 7.6 Final model of this study



Observations have also noted that it is not always the case for a company to set up a clear strategy towards sustainable SCM. For example, companies in the food supply chain are very proactive in reacting to economic and social responsibilities, in increasing transparency, traceability, time, testability, training and trust, and benefits for suppliers

and employees. However, in terms of environmental responsibilities, companies exhibit less attention in this area, holding defensive strategies of doing the least that is required, such as directly throwing away food waste/waste products from the Food Process. The reason for such mixed strategy might be because of a lack in regulation standards and professional knowledge, thus informing the judgement of decision-makers and the influence of leadership in sustainable SCM (Alexander *et al.*, 2014).

## **Chapter 8 CONCLUSION**

### **8.1 Introduction**

The aim of this study was to investigate the impact of social networks on sustainable SCM implementation. Chapter One presented the research background and the aims of the study. Chapter Two provided a literature background and a systematic literature review of *guanxi* networks in SCM for supporting theoretical framework development, which was presented in Chapter Three. The research methodology employed was described and justified in Chapter Four, followed by survey findings analysis in Chapters Five and Six. Chapter Seven presented the in-depth analysis for case studies. Chapter Eight provided a discussion on the quantitative and qualitative findings in relation to the research questions. The final chapter concludes the study.

This chapter consists of six sections. The first provides a summary of each chapter, following which is a summary of the findings in relation to the aims of the study. This is then succeeded by a review of the methodological strengths and limitations of the research. The fourth section presents justification of the academic contribution and the fifth section considers the implementation of the research from both a company and industry perspective. The final section extends the link to future research.

### **8.2 Review of research aims**

The integration of questionnaire and case studies results was discussed in detail in Chapter 8. The overall research question is to answer the impact of sustainable SCM

implementation from a social network perspective. This research question was decomposed into five research questions, presented in Chapter One, which were:

*RQ1: How are flows of supply chain capital influenced in social networks?*

From reviewing the current literature, this study visualised the constructs in social networks which foster relationship development in SCM and the flow of supply chain capital to support the building of organisational capabilities in implementing sustainable SCM. The questionnaire survey has confirmed the findings from literature and the theoretical framework, and tested the constructs of *guanxi* networks (i.e. *gangqing*, *renqing*, and *xinren*) and level of causal relationships between *guanxi* networks and the flow of supply chain capital. The results show strong relationships between *guanxi* networks and financial, human and social capital in supply chains, with specific emphasis on financial and human capital, which diverges from the literature findings that social capital is the most important motivation for building social networks in SCM. Case studies drive the discussion further by refining the relationships between the three types of capital in social networks and argues that building social and human capital with network members is fundamentally served by improvement in the flow of financial capital in SCM.

*RQ2: What are the relationships between guanxi networks and sustainable SCM implementations?*

Research shows that social network positively drives implementation of sustainable SCM, mediated by the flow of supply chain capital. Findings have been supported by the SEM

analysing data collected from 476 questionnaires. The Ownership of firms is a control variable influencing the model results that private and government-owned companies seem to rely more on social networks to assess supply chain capital, which impacts their implementation of sustainable SCM. Whether companies have experience in implementing environmental and social responsibilities has confound the model result and previous experience supports sustainable practices in SCM.

*RQ3: How do social networks drive implementation of sustainable SCM?*

This question was investigated from in-depth case studies from a unit of analysis in both individual companies and supply chain network scope. Social network drives implementation of sustainable SCM by, firstly, carrying the institutional logic of sustainable practices and diffusing this to network members. At the current stage, the institutional logic of implementing environmental and social responsibility in China is driven by resource allocation, stakeholder pressure and economic benefits. In the long term, social network carries the institutional logic and influences individuals within the network through social identification, cultural preference and social learning process.

Social networks also increase the flow of supply chain capital for enhancing sustainable practices, as detailed in the above section. Case studies have explored the discussion further and found that economic responsibilities are yet to be the primary factor in most companies, even though companies have performed a certain level of environmental and social responsibility under institutional requirements. Exceptional firms have adopted a

proactive strategy and perform more than is required for environmental and social responsibilities.

Social networks have influenced the supply chain and supply chain network structures, shaping individual knowledge, behavioural commitment and decision making. Social networks and relational ties influence communication and collaboration among players in the networks, resulting in the implementation and performance of sustainable SCM. By comparing and contrasting the implementation of environmental and social responsibilities in different structures of supply chain networks, research has revealed different underlying mechanisms for implementing SCM.

*RQ 4: How do institutional forces drive implementation of sustainable SCM?*

This research question was developed from the survey observation. Institutional forces drive implementation of sustainable SCM through on one hand, creating the institutional logics of sustainable practices in social networks; on the other hand, generating the mechanism of coercive, normative and mimetic isomorphisms.

Details of discussions were presented in Chapter 7. To summarise, the major pressure is coercive isomorphisms in common. However, when institutional standards are weak, such as the case in food industry, companies tend to primary focus on their economic accountability. Even though for those that adopt proactive strategy, a lack of professional knowledge and skills remains as a difficulty to implement sustainable SCM in practices.

Normative and mimetic isomorphism matter when companies accomplish their social obligations and invest in R&D, knowledge sharing and learning and adopt professional consultancy in their sustainable SCM implementation. However, these isomorphism are fairly affected by company strategy and social networks where they are located.

*RQ5: How does company strategy moderate the influence from social networks and institutional force?*

If we believe that social networks and institutional forces are external drives for sustainable SCM, then company strategy is the internal factor influencing the practices. This relates to stakeholder pressure and organisational capability for investing in environmental and social responsibilities.

Company strategy moderates the influence of social networks and institutional forces towards implementation and performance of sustainable SCM, which has been shown in the case studies. For institutional forces, companies have no choice to react on coercive isomorphism. However, the performance of implementation could be various in reality, which depends on company strategy accordingly. For proactive firms, they tend to do more than what have been expected, collaborating and integrating with their upstream and downstream players in order to sustain their leading positions in the markets. However, for accommodative and defensive companies, the institutional logics of sustainable practices is institutional and customer requirements. Therefore, it is less possible that companies would proactively react to normative and mimetic pressure.



Social networks mechanism is an essence; however, hardly companies would compromise economic benefits for coping with network expectations of implementing environmental and social responsibilities.

### **8.3 Reflection on using mixed-method approach for the study**

Sustainable SCM research has developed knowledge by using quantitative empirical tools as major approaches to answer the what-type questions as opposed to how-questions (Carter and Easton, 2011; Pagell and Chevchenko, 2014). Descriptions of empirical research often induce a large sample size to represent the overall population and show generalization; however, the pitfalls of this include a lack of depth which promotes incremental change instead of fundamental, structural and radical revolution in society (Burke Johnson and Onwuegbuzie, 2004).

This study has adopted the development of a mixed-method approach to reflect on the rigour and in-depth investigation of the topic. Following the research questions and theoretical framework, a questionnaire survey focused on deduction and hypothesis testing with statistical analysis to confirm the causal relationship between social networks and sustainable SCM. The benefit of adopting such a method is that it provides the opportunity to collect data with a large sample size, and the research results are relatively independent and objective of the researcher. As in any other quantitative research, the findings can be generalized and replicated in many cases.

The logic of following the survey questionnaire with case studies is to develop an understanding of the research topic in depth, with a broader scope for investigating supply chain and supply chain network structures and their impact on the model discussion. Inherent in any mixed method research is the difficulty for a single researcher to carry out both quantitative and quality research (Burke Johnson and Onwuegbuzie, 2004) and accessibility becomes even more critical in justifying the model at a supply chain network level (Galaskiewicz, 2011). However, it is worth the effort. Developing out of the observations from the survey, institutional factors and company strategy for sustainable practices were considered within the case studies. By comparing the findings, it is apparent that the SEM model is most applicable in real cases, while each case has a specific focus on individual dimension(s) in the flow of supply chain capital and sustainable SCM, which is related to institutional environment and company strategy. By investigating the research topic at supply chain network level, an overarching picture emerges of a macro-micro bridge between social network and supply chain networks, together with consideration of institutional forces and companies' strategies. Therefore, by using the development of a mixed-method approach, weaknesses from both quantitative and qualitative research have been overcome with stronger evidence for reaching a conclusion.

An inherent factor in research is that every study has limitations. One weakness in this PhD program is due to the emerging process of research development. At an early stage, the research core context was focused on *guanxi* network, which is a dyadic relationship concept. However, social network theory was subsequently adopted and in the later

stage, the current discussion was developed and elaborated on within a social network scope. Although the researcher has made the research thread coherent and justified the underlying logic, the study would be more aligned if the notion of social network had been carried out for data collection and analysis throughout the entire PhD work.

#### **8.4 Academic contributions**

Academic contributions in this study can be summarised as follows:

- The systematic literature review constructively reveals the constructs of social networks in China and their impact on supply chain capital. The findings, on the one hand, develops the concept of social network from western studies – introducing *mianzi*, dependency and other constructs in the social network theory. The study also contributed to explore the interlink among the three main constructs of guanxi networks. Contested the existing literature, this study argued that *xinren* (trust) is embedded in *ganqing* (affection) and/or *renqing* (reciprocity). On the other hand, this study offers opportunities for future research in examining the ‘soft’ ties of relationship in various supply chain activities, such as information sharing and technology innovation, new product design and development, and global logistics management.
- This study has extended the discussion of sustainable SCM from individual firm and dyadic relationship to a social network perspective. Discussions uncovered how social networks serve as a ‘micro-macro’ bridge for increasing social, financial, and human capital flow in SCM, as a result of enhancing companies and

their supply chains to practices environmental and social practices simultaneously. This study has also identified passive and active commitments to sustainable SCM, distinguished by whether sustainable practice is only driven by network economics (passive commitment) or actors proactively select network members who share similar value for sustainable SCM. Furthermore, this study has revealed how sustainable SCM implanted similarly or differently under different supply chain and network structure.

- Third, not only does the study focus on social network discussion, but also considers the impact from institutional forces and company strategy. The results show the interlinks between formal institutional and personal ties, external factors and internal strategy. As such, this study provides an overarching and system view regarding the implementation of economic, environmental and social responsibilities as a balance of organisational capabilities, rather than focusing on any dimension(s) more than another.
- Fourth, the study has made a theoretical contribution. It fills the research gaps by adopting social network theory in sustainable SCM, which reflects on the call for study from Wichmann and Kaufmann (2016). Given that SCM is the management of relationship (Hartland, 1996) and different processes and activities that produce value (Christopher, 1998). Social networks fit well in the discussion of capital flow in different relationships and processes. This study initially built the theoretical gap between social network theory and sustainable SCM, with considerations of economic, environmental and social practices simultaneously.

- Finally, the study has adopted a mixed-method approach to justify the logic of how sustainable SCM research has emerged and developed by integrating quantitative and qualitative evidence. Not only this contributes to research method in sustainable SCM research, but it shows the rigor in research to contest research findings from systematic literature review and survey questionnaire. The case studies findings, meanwhile, have elaborated the depth of the topic.

## **8.5 Practical implications**

Given that economic actions are embedded in social networks and social beings have crucial roles in organisational management, this research offers an alternative for sustaining business and supply chain performance from social network perspective.

More specifically, the SEM has provided statistical evidence of the constructs of *guanxi* networks and their positive impact on increasing the flow of supply chain capital and sustainable SCM implementation. Therefore, companies can make good use of their social networks to increase the flow of supply chain capital for enhancing companies' capabilities in solving their supply chain issues, including environmental and social responsibilities. Effective social networks can be used as enablers of sustainable SCM in global business contexts. Rather than forcing a formal governance approach, such as sustainability compliance and corporate codes of conduct, the research advocates the

use of relational ties to enable effective collaboration and integration with the supply chain actors, sharing responsibilities and jointly reaching sustainability targets.

The responsibility of implementing sustainable SCM is not limited to specific individuals, companies or institutions. In the sustainability journey, companies and their supply chains need to involve every employee, their main supply chain partners and government bodies. Building good relational ties in social networks enables effective diffusion of knowledge and advanced technologies, so increases in human capital can be dedicated to more environmentally conscious uses of natural resources and the trading, production and delivery of environmentally friendly products. Effective *guanxi* ties can also increase finance and social capital flow for effective investment directed towards undertaking sustainability initiatives as part of long-term buyer-supplier collaboration.

In addition, this study has also considered sustainable SCM from an institutional environment and company strategy perspective. Therefore, for business practice, companies can make their strategic plan according to their organisational capabilities, institutional environment and network resources in the social networks to increase economic benefits by addressing environmental and social responsibilities. Besides, the case study findings can inform for policy making for sustainable SCM practices. After comparisons, it shows that national institutional regulations in food supply chain is yet to be mature, even in other industries, such as automotive and beverage, where institutional environment are relatively mature, there is an inconsistency in the implementations of environmental and social practices for individual company and supply

chains. Given that international policy and regulations are well-developed, China and other emerging areas can benchmark specifications for sustainable practices for improving government enforcement.

The study of social networks in China and other Confucian countries could be generalised to other emerging economies where the institutional environment is uncertain and people rely on social relationships to build trust, such as Brazil and countries in the Middle East (Abosag & Lee, 2013). This paper has clarified the importance of social networks and relational ties in increasing the flow of supply chain capital, which could be beneficial for practitioners conducting business within similar social environments, so they can deal and collaborate effectively with other managers within their companies and from their supply chain partners in improving the sustainable performance of their companies and supply chains.

### **8.6 Limitations of this study**

One of the limitations in this study is regarded as the questionnaire design. The constructs for measuring guanxi scale should be contested with various sources instead of based on single paper, to improve construct validity of the model. Besides, even though the SEM model is in good fit, questionnaire design and collection should reflect on measurement bias of common method bias and social desirability bias.

Secondly, for running the SEM test, different models could be tested, such as separately testing the influence of social networks on environmental practice or social practice to explore the topic.

Thirdly, the focus of this study is social ties and personal networks, however, formal contracting relationships could be extended to discuss the dynamic relationship governance in organization and supply chains.

The final limitation is the generalizability of the findings. The positive relationship between social networks and sustainable SCM implementation could be generalised among different industries, however, to what degree individual industry reflect similarly or differently need further investigation. In addition, the empirical researches were conducted in China, the generalisation to other areas should be further tested.

## **8.7 Areas of future research**

In suggesting future research, there are various opportunities that researchers can develop based on this study:

- One of the opportunities is to employ longitude case studies and investigate how the study emerges with external changes. Given that sustainable SCM is acknowledged as institutional driven, the development of institutional standards and regulation is assumed to enhance the implementation of environmental and social sustainability, such as in food and beverage industries. A longitude study



would bring insights into how the implementation of sustainable SCM emerges over time.

- Moreover, comparative case studies could be employed outside China to other areas, such as the Middle East, Brazil, and even Europe, to compare and contrast the findings and investigate how different institutional environmental and social network structures impact on the implementation of sustainable SCM. As it was explained that in BRIC economics where environmental and social sustainability is yet a great concern, findings in this study could be contested in other regions and seek generalisation. Specifically, to ascertain whether social networks in emerging areas influence social behaviour more towards sustainable practices and shape the institutional environment; or whether institutional forces remain the major driver.
- Although this study has adopted social network theory, data was analysed by SEM and qualitative data analysis technique. Therefore, social network analysis could be an alternative for investigating the topic by examining the network structure and the impacts of sustainable SCM. The results from social network analysis can also compare and contrast the findings in the case studies and examine how social network structures influence supply chain network structure in sustainability practices. Furthermore, while this study is more focused on the inter-organisational level, intra-organisational personal ties could be explored further, to understand the inter-organisational relationships and the influence on the flow of supply chain capital and sustainable SCM implementation.

- Another interesting research topic would be to examine the recursive relationships between social networks and sustainable SCM. That is, whether the implementation of sustainable SCM will increase the social network strength and size. This reflects on the argument of the hierarchical nature of network building (Hwang, 1978) that the longer and more frequent interactions in the social networks, the more influential a person can be. In the case studies, almost all companies have certain degrees of interactions with their stakeholders, which drives the implementation of social sustainability. On the other hand, the more efforts companies make to improve their reputation and social practices, the higher degree of interactions they engage with their stakeholders, as a result of increasing social networks influence. Therefore, exciting researches could be engage in this area for further investigation.

## Self-reflection II

Before submission....



After submission....



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## Appendices

### Appendix 1: Survey questionnaire (English version)

#### Section one: Participants information

1. What is your position in your company?

Entrepreneur or Executive  Director or Senior manager  Middle manager  Junior manager  Operating staff

2. How long have you been working in the current position?

Up to 2 years  2-5 years  5-10 years  Over 10 years

3. Which department do you work in?

Administrative Management  Marketing  Finance  Operation  Supply chain  Purchasing  Logistics  Other (please specify)

4. Please indicate which city do you work in? \_\_\_\_\_

5. Which industry best reflects your company's main operation?

Manufacturing  Agriculture  Retail trade  Construction  Whole sale  Transport and warehousing  Other (please specific) \_\_\_\_\_

If you choose manufacturing, please specific from the following option:

Food manufacturing  Automotive manufacturing  Electronic manufacturing  Apparel manufacturing  Other (please specific)

6. What type of company is your firm?

Domestic  National owned  Multinational  Overseas-funded enterprise  Foreign company

If it is Multinational, overseas-funded enterprise, or foreign company, please indicate the origin country: \_\_\_\_\_

7. Please indicate the number of the employees in your company:

1-49  50-199  200-299  300-499  500-999  above 1000

8. Please indicate the range of operational incomes in your company:

less than ¥1M(million)  ¥1M– 10M  ¥10M-1B(billion)  ¥1B-2B  ¥2B or above

(Note: ¥10 ≈ £1)

9. Does your company have schemes on environmental and/or social responsibility in supply chain management?  Yes  No

If yes, what are they (please specify)? \_\_\_\_\_

10. Why would you consider to undertake sustainable supply chain initiatives into practice? (You can choose more than one)

- Global requirements
- National requirements
- Customer requirements
- Increase competitive advantage
- It's what companies in our network do
- Pure emotional good

**Section two: Measuring the levels of *guanxi* ties and social network strength between buyer and supplier**

This research is interested in buyer-supplier relationships. Therefore, please indicate if you are answering as buyer or a supplier?

- Buyer, and therefore your counterpart is a supplier
- Supplier, and therefore your counterpart is a buyer

1 Considering the *guanxi* ties with your counterpart's representative in your most important buyer-supplier relationship please indicate your level of agreement with the following statements:

(1.Strongly disagree; 2.disagree; 3.neutral; 4.agree; 5.strongly agree)

**Measurement of *guanxi***

**Level of agreement**

The representative and I are able to talk openly as friends

If I were to change this business company, I would lose a good friend

I would consider whether the representative's feelings would be hurt before I made an important decision

I would try my best to help out this representative when (s)he is in need because (s)he is a friend of mine

I feel a sense of obligation to this representative for doing him/her a favour

I think that 'calling in' favors is part of doing business with this representative

The practice of 'give and take' of favours is a key part of the relationship between the representative and me

I am happy to do a favour for this representative, when he/she requests one

This representative is only concerned about himself/herself

The people at my firm do not trust this representative

This representative is trustworthy

2. Please identify your company's network size by indicating the following statements.

(1.Strongly disagree; 2.disagree; 3.neutral; 4.agree; 5.strongly agree)

**Network size****Level of agreement**

Compared to the industry average, we maintain a large size of suppliers

We have a higher number of suppliers than most of our competitors

Compared to industry average, we maintain a large size of distributors and retailers

We have a higher number of distributors and retailers than most of our competitors

**Section three: Evaluating the influences of *guanxi* social networks on supply chains**

Please indicate the extent to which you agree with the following statements on how *guanxi* influences supply chain management practices.

(1.Strongly disagree; 2.disagree; 3.neutral; 4.agree; 5.strongly agree)

**Good *Guanxi* with partners leads to****Level of agreement**

Improving alliances and integration with supply chain partners

Sharing forecasting information with supply chain partners

Improving strategic procurement

Improving quality of sourcing network

Share production information between the company and its major supplier/buyer

Improving product quality

Reducing average investment in purchased parts inventory

Reducing lead time

Improving delivery reliability

Reducing demand and supply uncertainty

Technical support to improve supply chain practicing processes (e.g production, delivery, inventory)

Knowledge sharing about customers

Enhancing logistics management capability

Meeting the order quality requirements

Committing to close buyer-supplier relationships

- An Expectation of long-term buyer-supplier relationships
- Proprietary information being provided if it can help the other party
- Reducing the power asymmetry between buyer and supplier
- Increasing new business opportunities through the social network

**Section four: This section is designed to examine the influence of *guanxi* social networks on sustainable supply chain management by taking into account of economic responsibility, environmental responsibility, and social responsibility.**

Please indicate the extent to which you agree with the following statements on the potential impact of *guanxi* on sustainable supply chain management :

(1.Strongly disagree; 2.disagree; 3.neutral; 4.agree; 5.strongly agree)

**Good *Guanxi* with partners leads to...**

**Level of agreement**

Increasing commitment to environmental SCM from managers

Providing design specification from buyers to suppliers that include environmental requirements for purchased item

Increasing cooperation between buyers and suppliers to meet environmental objectives

Providing environmental audit for the internal management of buyers or suppliers

Working together to upgrade technology to deal with environmental issues

Cooperating to imply and enforce the formal environmental policymaking system

Requiring ISO14000 certification for buyers or suppliers

Encouraging a better work/life balance cross the supply with your counter parts

Introducing employee health and safety compliance and auditing systems with your counterpart

Ensuring our counterpart do not use child labour or forced labour

Ensuring our counterpart pay their worker a living wage

Ensuring our counterpart have regulated over-time wage

Ensuring our counterpart do not discriminate against its own workers

Ensuring that our counterpart provide a healthy and safe working environment for their employees

Increasing transparency within the *guanxi* network in supply chain practices

**Section Five: This section aims to examine the influence of *guanxi* social networks on sustainable supply chain performance by taking into account of economic , environmental and social performance.**

Over the past two years, to what extent has the *guanxi* with your major buyer/supplier impacted the level of sustainable supply chain performance?

(1. Strong negative; 2.negative; 3.neutral; 4..positive; 5.strong positive)

***Guanxi* impacts on economic performance**

**Impact of *guanxi***

Supply chain total costs

Investment for helping major supplier/customers to implement SSCM

Operational costs

Training costs

Costs for purchasing environmentally friendly materials

Costs of maintaining good *guanxi*

Profits

Market share

Fines for environmental accidents

***Guanxi* to impacts on environmental performance**

**Impact of *guanxi***

Air emissions

Waste water

Solid wastes

Consumption of natural resources

Consumption of hazardous/harmful/toxic materials

Flexibility to react to national and international environmental requirements

Flexibility to react to counterpart's environmental requirements

Frequency of environmental accidents

***Guanxi* to impacts on social performance**

**Impact of *guanxi***

Health risks for consumers

Health and safety hazards for employees

Monitoring safety in your counterpart's operation suppliers' operation

Unethical activities within the supply chain, such as using child labour

Level of equality and fairness throughout the supply chain

Level of volunteers at local charities

Counterpart's knowledge and skills of SSCM

Gift giving, bribery between company representatives and partner companies

Thank you very much for your cooperation! If you'd like to know a summary of the results, please leave your contact details: \_\_\_\_\_



## Survey questionnaire (Chinese version)

### 第一部分：基本信息

1. 您在贵公司的职位：

总监、总经理  高级经理  中层经理  初级经理、基层管理人员  运营人员

2. 您在现任职位工作时间

2年以内  2-5年  5-10年  10年以上

3. 请问您在哪个部分工作？

管理  市场营销  金融  运营  供应链  采购  物流  
 其它（请说明） \_\_\_\_\_

4. 请说明您所在的工作城市（市）\_\_\_\_\_

5. 请问贵公司主要经营哪个行业？

食品加工生产  汽车生产  电子产品  服装生产  农产品产业  零售业  建筑行业  
 批发销售  交通和仓库  其它（请说明） \_\_\_\_\_

6. 贵公司所属企业类别：

民营企业  国有企业  跨国企业  外商独资企业  中外合资企业

如果是跨国企业，外商独资企业，或是中外合资企业三者之一，请说明总公司所在国：\_\_\_\_\_

7. 请说明贵公司的员工人数：

1-49  50-199  200-299  300-499  500-999  1000 以上

8. 请说明贵公司的上年度总收入：

<3百万;  ≥3百万, <5百万;  ≥5百万, <1千万;  ≥1千万, <2千万;  
 ≥2千万, <3千万;  ≥3千万, <4千万;  ≥4千万, <8千万;  ≥8千万

9. 贵公司有没有推广供应链社会责任或环境责任? 有 没有  
如果有, 请具体说明\_\_\_\_\_

10. 为什么您会考虑在实践中推行可持续供应链管理? (可多项选择)

国际标准要求     国内标准要求     客户要求     提高竞争优势     社会网络中其它公司都推行  
 单纯道德情感上觉得这是对的

## 第二部分: 衡量买家与供应商之间的关系网络程度和社会网络的强度

本研究主要集中调查买家与供应商之间的关系, 因此, 请说明您是以买家或是供应商的身份作答:

买家, 所以您的对方公司就是供应商;

供应商, 所以您的对方公司就是买家

1. 根据您跟主要的对方公司(买方或供应商)的代表人之间的关系, 请回答:

(1. 强烈不同意; 2. 不同意; 3 不太同意; 4 中立; 5 一定程度上同意; 6 同意; 7 强烈同意)

### 衡量关系

同意程度

我和对方公司代表能像朋友一样聊天

如果我更换对方公司, 我会失去一个朋友

在我做一个相关的重要决定之前, 我会考虑会不会伤害到对方公司代表

因为对方是我的朋友, 所以当他(她)需要的时候我会尽最大可能帮忙

我感觉有责任帮助对方代表

我觉得提供帮助是跟对方代表做生意的一部分

给予跟接受帮助是我跟对方代表保持关系的重要部分

当对方代表需要的时候, 我很乐意给予其帮助

对方代表只关心他(她)本人

我公司内部人员不相信对方代表

对方代表是值得信任的

2 请根据贵公司的社会网络规模给以下陈述做出判断

(1. 强烈不同意; 2. 不同意; 3 不太同意; 4 中立; 5 一定程度上同意; 6 同意; 7 强烈同意)

### 网络规模

同意程度

跟业界均值比较, 贵公司维持了大规模数量的供应商

跟竞争公司相比, 贵公司保持更多的供应商

跟业界均值比较，贵公司维持了大规模的分销商跟零售商  
跟竞争公司相比，贵公司保持了更多的分销商跟零售商

### 第三部分：评估关系社会网络对供应链的影响

在何种程度上买家与供应商的关系在实践中怎样影响供应链管理的？根据您的看法给以下陈述做出判断：

(1. 强烈不同意； 2. 不同意； 3 不太同意； 4 中立； 5 一定程度上同意； 6 同意； 7 强烈同意)

#### 关系促使了

同意程度

供应链合作伙伴间的联盟与整合程度的提高

产品发展的长久计划和资产获得的规划

与供应链合作伙伴联合预测市场动向

提高采购策略

提高供应网络的质量

跟主要供应商/买方分享生产信息

提高产品质量

减少外购件的库存平均投资

减少供应链总成本

缩短交货时间

提高运输的可靠性

减少供需的不确定性

技术支持，改善流程

跟对方分享流程上的知识

增加关于客户的知识量

在供应链中提高知识转移的水平

加强物流管理的能力

达到订单的质量要求

为良好的买卖关系尽责

希望长久的买卖关系

提高买卖双方在购买程序中的参与程度  
提高买卖双方在生产程序中的参与程度  
提供对对方有帮助的信息  
双方频繁地交换信息  
减少买卖双方的权利不对称  
通过社会网络增加新的商机  
通过关系伙伴给予的价格优惠，控制或减少生产价格  
提高供应链的风险管理

第四部分：检验关系社会网络怎样在经济责任，环境责任，和社会责任上影响可持续供应链管理。

请说明您在哪种程度上同意以下关于关系如何影响供应链可持续发展的表述：

(1. 强烈不同意； 2. 不同意； 3 不太同意； 4 中立； 5 一定程度上同意； 6 同意； 7 强烈同意)

**关系促使了**

**同意程度**

管理者提高对供应链环境责任的投入程度  
买方给供应商提供设计规范，包括对所购买的物品的环保要求  
采购商与供应商以加强达到环境目标的合作  
在买家或供应商的内部管理提供环境审计  
共同致力于技术升级来处理资源浪费  
共同致力于技术升级来处理环境污染  
买家与供应商之间协同暗示和要求执行正式的环境决策系统  
买家或供应商要求提供 ISO14000 认证  
对二级供应商环保措施的评估

与对方公司加强落实环保行动的合作

在供应链管理中与对方公司一起鼓励工作与家庭达到平衡

与对方公司一起引进关于员工的健康和安全的合理规章制度和审计制度

帮助对方公司获得健康和安全管理认证

在关系社会网络中提高供应链实践的透明度

确保对方公司不会使用童工

确保对方公司不会使用劳役

确保对方公司支付员工工资

确保对方公司有明确规定加班补贴

确保对方公司不会轻视员工

确保对方公司为企业员工提供健康安全的工作环境

确保对方公司在危险区域为员工提供保护设施

第五部分：检验关系社会网络如何在提高经济、环境、社会绩效中提高可持续供应链的绩效。

在过去的两年，您与主要买家或供应商代表之间的关系是怎样影响可持续供应链的绩效？请根据您的具体情况给以下表述做出判断：

（1. 十分负面； 2. 负面； 3. 一定程度上负面； 4. 中立； 5. 一定程度上正面； 6. 正面； 7. 十分正面）

**关系在供应链实践中对经济绩效的影响**

**关系的影响**

供应链总成本

投资以帮助主要客户/供应商实施可持续供应链管理

运营成本

培训成本

购买环境友好型材料的成本

维持良好关系的成本

利润

市场份额

环境破坏的罚款

### **关系在供应链实践中对环境绩效的影响**

### **关系的影响**

气体排放

水质污染

固体废物

自然资源的消耗

危险/有害/有毒物质的消耗

灵活应对国内外环保要求

灵活应对对方公司对外环保要求

环境事故发生频率

### **关系在供应链实践中对社会绩效的影响**

### **关系的影响**

对消费者健康产生风险

对员工健康和安全生产产生隐患

对对方公司经营管理其下游供应商进行安全监控

供应链中产生不道德行为, 例如使用童工

平等和公平在整个供应链中的水平

在当地的慈善机构中履行志愿行为

对方公司的可持续供应链管理知识和技能

与合作伙伴公司代表可进行送礼等贿赂行为



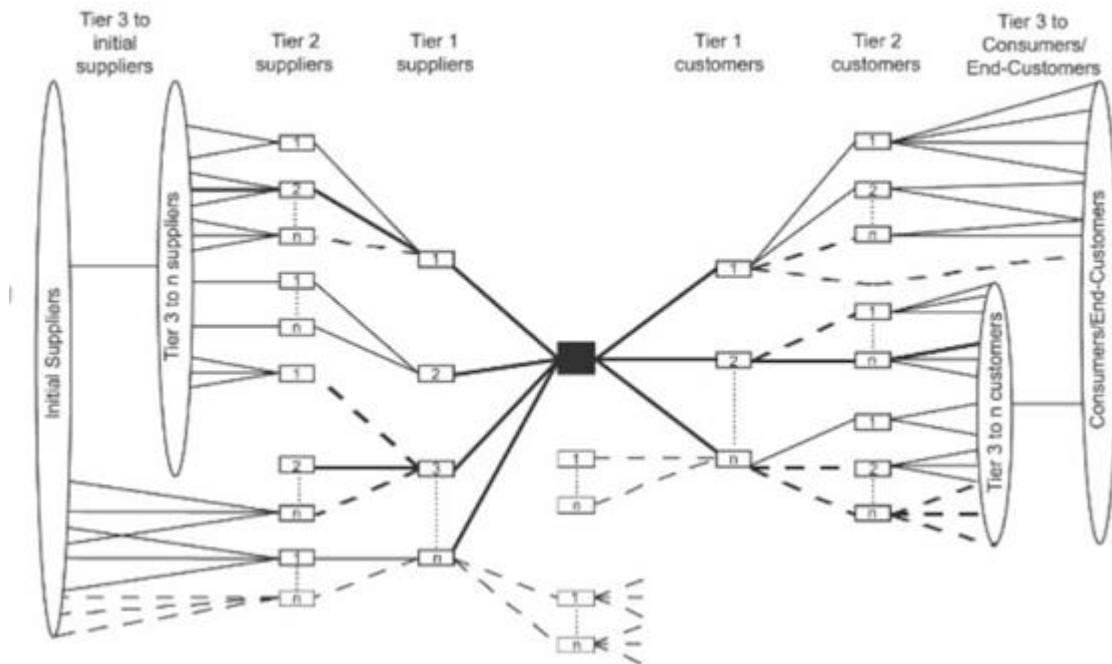
## Appendix 2: Case studies – Interview questions

### Interview questions

1. May I ask your professional background?
  - Working position
  - Duration in the company
  - Years of industry experience
2. From your perspective, how would you define sustainable SCM?
3. Has your company adopted sustainability practices in SCM?
  - If yes, can you specify which sustainable practices have been adopted by your company please?
  - If no, please give details on your short/middle-term plans to adopt sustainable practices?
4. What driving factors do you think encourage your company to adopt sustainable SCM (open question)?
  - State regulations, industrial self-regulation, monitoring organizations (e.g. NGOs, media), trade association, formal process of stakeholder engagement
  - Follow other companies
  - Professional knowledge and targets in sustainability performance
  - Stakeholders pressure
  - Proactive measures
5. To what extent do you think social networks (e.g. interpersonal relationships with customers and suppliers) increase the flows of capitals within supply chain (open question)?
  - Finance capitals (cash flow, warehousing and inventory investment, procurement and sourcing networks, ect.)
  - Human capitals (knowledge transfer, Information and technology learning, etc.)
  - Social capitals (long-term buyer-supplier relationships, relationships with various stakeholders, including competitors, community, officers)
6. To what extent does increases of supply chain capital flows can drive successful sustainable SCM implementation?



7. Can you draw a picture of your supply chain network structure and indicate the position of your company? For example:



8. To what extent do you think social networks interactions impact on your company supply chain networks (open question)?

- Network density (e.g. good personal relationships with multi-sourcing suppliers)
- Network centralization (e.g. personal power on other suppliers/customers)

9. To what extent do your company's supply chain networks impact on sustainable SCM implementation (open question)?

- The flow of capitals in supply chains
- Transactional model
- Dictatorial model
- Acquiescent model
- Participative

10. To what extent do your social networks drive successful sustainable SCM implementations (open question)?

- Network economics (flow of capitals in SCM)
- Homogeneity
- Network selection

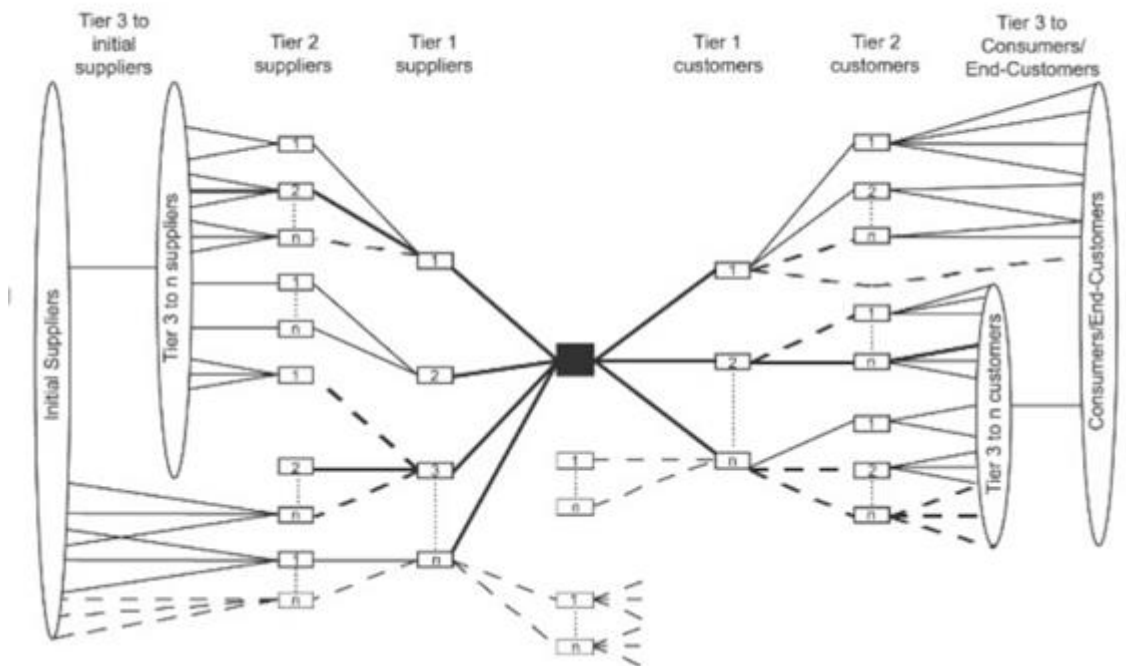
11. How many years have you worked with your main suppliers? Could you introduce them to join projects in order to investigate sustainability implementations in your supply chain and supply networks?

## Interview questions (Chinese version)

访谈对象：负责企业运营，采购与供应链管理相关的中高级管理人员

1. 请问您的工作职位是什么？在公司有多少年了？在相关领域工作了多少年？
2. 根据您的经验与理解，请问您是怎样定义可持续供应链管理的？
3. 请问您所在的企业有没有在供应链管理中推行可持续发展？
  - 如果有，可否请您说明是具体的哪些实践？
  - 如果没有，企业有没有考虑制定短期 / 中期的计划实行可持续发展的管理？如有，是什么？
4. 请问是什么推动因素鼓励公司实行可持续供应链管理的（开放性问题）
  - 国家法规，行业规定，其它企业的监督（例如，非营利性企业，媒体），贸易协会
  - 模仿跟从其它企业的可持续发展行为
  - 专业的可持续发展知识和制定的可持续发展绩效的计划
  - 企业理应相关者的压力
  - 企业前瞻性权衡
5. 在何种程度上您认为社会网络（例如与供应商跟客户的个人关系）提高了供应链的资本流（开放性题目）？
  - 财政资本（例如资金流，仓库及库存的投资，采购及供应网络等）
  - 人力资本（知识转移，信息与技术的学习等）
  - 社会资本（长久的客户与供应商关系，与不同企业相关者的关系，包括竞争者，社区工作人员，政府工作人员）
6. 在何种程度上您认为增加以上所说的供应链资本流能够促进可持续供应链的执行？

7. 请问您能够画出您所在企业的供应链网络结构并指出企业的所在位置吗？例如：



8. 在何种程度上您认为社会网络中的互动会影响到您所在公司的供应链网络结构（开放性题目）？

- 影响到供应链网络的密度（例如跟不同的客户和供应商保持一定的个人关系）
- 影响到供应链网络的集中度（例如处于社会网络的中心，个人的影响力影响到其他相关者的决策跟企业行为）

9. 在何种程度上您所在公司的供应链网络（如方才所画）影响到可持续供应链管理的实行（开放性题目）？

- 供应链的资本流
- 交易模型（以最低限度满足相关要求）
- 专制模型（利用网络中的地位迫使其他人（例如供应商）执行）
- 默认模型（利用密集的网络将可持续供应链管理的理念及推行方式推广到网络中）
- 参与合作模型（利用网络密度及中心度推行可持续供应链管理）

10. 在何种程度上您个人的社会网络促使了公司的可持续供应链管理的执行（开放性题目）？
- 网络经济(供应链资本流)
  - 网络的同一性（通过有效交流，跟建立起社会网络关系的供应商 / 客户逐渐趋向同一的价值和认知）
  - 网络的选择性（选择有相似的价值和企业管理文化的供应商 / 客户）
11. 您跟公司的主要客户有多少年的合作经验？请问您可否推荐合适的供应商一起参与此次课题研究，以更全面的了解到公司的供应链网络和您所在的社会网络上如何推动可持续供应链管理的执行和推广的？

## Appendix 3 – Ethical approvals for empirical studies

Student number:  
(if applicable)

ETHICS 2

**FULL ETHICAL APPROVAL FORM  
(STAFF/PHD STUDENTS) or students referring  
their form for a full ethical review**



(For guidance on how to complete this form, please see Learning Central – CARBS RESEARCH ETHICS)

If your research will involve patients or patient data in the NHS then you should secure approval from the NHS Health Research Authority. Online applications are available on <http://www.hra.nhs.uk/resources/applying-for-reviews/>

NB: Safety Guidelines for researchers working alone on projects – please go to this University's web link to learn about safety policies - <http://www.cf.ac.uk/osheu/index.html>

Name of Lead Researcher : Haiyan Lu

School: Cardiff University

Email: luh10@cardiff.ac.uk

Names of other Researchers:

Email addresses of other Researchers :

Title of Project: Survey designed for examining the influences of guanxi in sustainable supply chain management

Start and Estimated End Date of Project: 15<sup>th</sup> July 2015 to 30<sup>th</sup> October 2015

**Aims and Objectives of the Research Project:**

Guanxi is given as a definition of relationships between people, containing a sense of 'social connections' implicitly based on mutual trust, interests and benefits (Yang, 1994). The aims of this survey is to test the established hypotheses of the influences of guanxi in sustainable supply chain management with empirical evidence; specifically, to quantify the guanxi level from the social network perspectives; and to examine the related correlations to sustainable supply chain practices and performance.

**Please indicate any sources of funding for this project:**

N/A

APPLICATION APPROVED  
Research Ethics Committee  
Cardiff Business School  
Cardiff University



Cardiff Business School  

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Ysgol Busnes Caerdydd

Lu, Haiyan  
Cardiff University Business School

28 October 2016

Dear Haiyan:

Ethics Approval Reference: 1617016

Project Title: Interviews for practitioners on the topic of guanxi networks and Sustainable supply chain management

I would like to confirm that your project has been granted ethics approval as it has met the review conditions.

Should there be a material change in the methods or circumstances of your project, you would in the first instance need to get in touch with us for re-consideration and further advice on the validity of the approval.

I wish you both the best of luck on the completion of your research project.

Yours sincerely,

Electronic signature via email

Debbie Foster  
Chair of the ethics sub-committee  
Email: CARBSResearchOffice@cardiff.ac.uk